

SUGGESTED ANSWERS

TO

QUESTIONS

SET AT THE

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A COMPILATION

FINAL EXAMINATION

**PAPER – 2 : MANAGEMENT ACCOUNTING
AND FINANCIAL ANALYSIS**



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PROJECT PLANNING AND CAPITAL BUDGETING

Question 1

Welsh Limited is faced with a decision to purchase or acquire on lease a mini car. The cost of the mini car is Rs. 1,26,965. It has a life of 5 years. The mini car can be obtained on lease by paying equal lease rentals annually. The leasing company desires a return of 10% on the gross value of the asset. Welsh Limited can also obtain 100% finance from its regular banking channel. The rate of interest will be 15% p.a. and the loan will be paid in five annual equal instalments, inclusive of interest. The effective tax rate of the company is 40%. For the purpose of taxation it is to be assumed that the asset will be written off over a period of 5 years on a straight line basis.

- Advise Welsh Limited about the method of acquiring the car.
- What should the annual lease rental to be charged by the leasing company to match the loan option?

For your exercise use the following discount factors:

Discount rate	Years				
	1	2	3	4	5
10%	0.91	0.83	0.75	0.68	0.62
15%	0.87	0.76	0.66	0.57	0.49
9%	0.92	0.84	0.77	0.71	0.65

(20 marks)(May 1996)

Answer

- Welsh Ltd.

Computation of annual loan repayment instalment

$$= \frac{\text{Loan amount}}{\text{Annuity factor of 15\%}} = \text{Rs. } \frac{1,26,965}{3.86} = \text{Rs. } 32,892$$

Note: Annuity factor is based on the assumption that loan instalment is repaid at the beginning of the year to be at par with lease rentals. Such annuity factor at 15% works out to be 3.86.

Management Accounting and Financial Analysis

Computation of interest in debt payments

	(Rs.)				
Year	0	1	2	3	4
Opening Balance of Principal	1,26,965	94,073	75,292	53,694	28,856
Interest @ 15%		<u>14,111</u>	<u>11,294</u>	<u>8,054</u>	<u>4,036*</u>
Total	1,26,965	1,08,184	86,586	61,748	32,892
Repayment of Instalment	<u>32,892</u>	<u>32,892</u>	<u>32,892</u>	<u>32,892</u>	<u>32,892</u>
Closing Balance	<u>94,073</u>	<u>75,292</u>	<u>53,694</u>	<u>28,856</u>	<u>Nil</u>

*Difference between the instalment amount and opening balance of 4th year.

Schedule of Cash Outflows in debt financing

	(Rs.)						
End of year	Annual loan repayment instalment	Interest @ 15%	Depreciation	Tax shield	Net cash outflows	PV factor at 9%	Present value of cash flow at 9%
	(1)	(2)	(3)	(4)	(5)		(6)
				(((2) + (3) × t)	(1) – (4)		
0	32,892	–	–	–	32,892	1.00	32,892
1	32,892	14,111	25,393	15,802	17,090	0.92	15,723
2	32,892	11,294	25,393	14,675	18,217	0.84	15,302
3	32,892	8,054	25,393	13,379	19,513	0.77	15,025
4	32,892	4,036	25,393	11,772	21,120	0.71	14,995
5	–	–	25,393	10,157	(10,157)	0.65	<u>(6,602)</u>
	Total						<u>Rs. 87,335</u>

Computation of Annual lease rentals:

$$= \frac{\text{Cost of assets}}{\text{Annuity factors of 10\%}} = \text{Rs. } \frac{1,26,965}{4.17} = \text{Rs. } 30,447$$

Schedule of Cash outflows – Leasing alternative

	(Rs.)				
End of year	Lease payment	Tax shield	After tax cash out flows	PV factor at 9%	Present value of cash flow at 9%
0	30,447	–	30,447	1.00	30,447
1-4	30,447	12,179	18,268	3.24	59,188

Project Planning and Capital Budgeting

5	—	12,179	(12,179)	0.65	(7,916)
Total Present Value =		81,719			

Decision: The present value of cash outflows under lease financing is Rs. 81,719 while that of debt financing (i.e. owning the asset) is Rs. 87,335. Thus leasing has an advantage over ownership in this case.

- (b) Let the annual lease rentals be X.

Therefore, the after tax cost of lease rentals will be $0.60 \times$

Present value will be $0.60 \times 4.17 = 2.502 \times$

Equating $2.502 \times = \text{Rs. } 87,335$; the value of x is obtained at Rs. 34,906.

Therefore the lease rentals should be Rs. 34,906 to match the loan option.

Question 2

Write short notes on any four of the following:

- (a) Margin Money.

- (b) Internal Rate of Return.

(10 marks) (May 1996)

Answer

- (a) **Margin Money:** Bankers keep a cushion to safeguard against changes in value of securities against which loans are given to customer. This cushion represents the Margin Money.

The quantum of Margin money depends upon the credit worthiness of the borrower and the nature of security.

In project financing, Margin Money has to come from Promoters' contribution.

In the case of borrowing for working capital Margin Money has to be provided as per norms that are prescribed from time to time by RBI. In the case of new projects Margin Money required for working capital is included in the Project Cost.

- (b) **Internal Rate of Return:** It is that rate at which discounted cash inflows are equal to the discounted cash outflows. In other words, it is the rate which discounts the cash flows to zero. It can be stated in the form of a ratio as follows:

$$\frac{\text{Cash inflows}}{\text{Cash outflow}} = 1$$

This rate is to be found by trial and error method. This rate is used in the evaluation of investment proposals. In this method, the discount rate is not known but the cash outflows and cash inflows are known.

In evaluating investment proposals, Internal rate of return is compared with a required rate of return, known as cut-off rate. If it is more than cut-off rate, the project is treated as acceptable; otherwise project is rejected.

Management Accounting and Financial Analysis

Question 3

Nine Gems Ltd. has just installed Machine – R at a cost of Rs. 2,00,000. The machine has a five year life with no residual value. The annual volume of production is estimated at 1,50,000 units, which can be sold at Rs. 6 per unit. Annual operating costs are estimated at Rs. 2,00,000 (excluding depreciation) at this output level. Fixed costs are estimated at Rs. 3 per unit for the same level of production.

Nine Gems Ltd. has just come across another model called Machine – S capable of giving the same output at an annual operating cost of Rs. 1,80,000 (exclusive of depreciation). There will be no change in fixed costs. Capital cost of this machine is Rs. 2,50,000 and the estimated life is for five years with nil residual value.

The company has an offer for sale of Machine – R at Rs. 1,00,000. But the cost of dismantling and removal will amount to Rs. 30,000. As the company has not yet commenced operations, it wants to sell Machine – R and purchase Machine –S.

Nine Gems Ltd. will be a zero-tax company for seven years in view of several incentives and allowances available.

The cost of capital may be assumed at 14%. P.V. factors for five years are as follows:

Year	P.V. Factors
1	0.877
2	0.769
3	0.675
4	0.592
5	0.519

- (i) Advise whether the company should opt for the replacement.
- (ii) Will there be any change in your view, if Machine-R has not been installed but the company is in the process of selecting one or the other machine?

Support your view with necessary workings.

(12 marks) (November 1996)

Answer

- (i) Replacement of Machine – R:

Incremental cash out flow

	Rs.
(i) Cash outflow on Machine – S	2,50,000
Less: Sale value of Machine – R	
Less: Cost of dismantling and removal	
(Rs. 1,00,000 – 30,000)	<u>70,000</u>
Net outflow	<u>1,80,000</u>

Project Planning and Capital Budgeting

Incremental cash flow from Machine –S	
Annual cash flow from Machine – S	2,70,000
Annual cash flow from Machine – R	<u>2,50,000</u>
Net incremental cash in flow	<u>20,000</u>

Present value of incremental cash in flows = Rs. 20,000 × (0.877 + 0.769 + 0.675 + 0.592 + 0.519)

= 20,000 × 3.432 = Rs. 68,640

NPV of Machine – S = Rs. 68,640 – Rs. 1,80,000 = (–) Rs. 1,11,360.

Rs. 2,00,000 spent on Machine – R is a sunk cost and hence it is not relevant for deciding the replacement.

Decision: Since Net present value of Machine –S is in the negative, replacement is not advised.

If the company is in the process of selecting one of the two machines, the decision is to be made on the basis of independent evaluation of two machines by comparing their Net present values.

(ii) Independent evaluation of Machine– R and Machine –S

	Machine– R	Machine– S
Units produced	1,50,000	1,50,000
Selling price per unit (Rs.)	<u>6</u>	<u>6</u>
Sale value	9,00,000	9,00,000
Less: Operating Cost (exclusive of depreciation)	<u>2,00,000</u>	<u>1,80,000</u>
Contribution	7,00,000	7,20,000
Less: Fixed cost	<u>4,50,000</u>	<u>4,50,000</u>
Annual Cash flow	2,50,000	2,70,000
Present value of cash flows for 5 years	<u>8,58,000</u>	<u>9,26,640</u>
Cash outflow	2,00,000	2,50,000
Net Present Value	<u>6,58,000</u>	<u>6,76,640</u>

As the NPV of Cash in flow of Machine-S is higher than that of Machine-R, the choice should fall on Machine-S.

Note: As the company is a zero tax company for seven years (Machine life in both cases is only for five years), depreciation and the tax effect on the same are not relevant for consideration.

Management Accounting and Financial Analysis

Question 4

Excel Ltd. manufactures a special chemical for sale at Rs. 30 per kg. The variable cost of manufacture is Rs. 15 per kg. Fixed cost excluding depreciation is Rs. 2,50,000. Excel Ltd. is currently operating at 50% capacity. It can produce a maximum of 1,00,000 kgs at full capacity.

The Production Manager suggests that if the existing machines are fully replaced the company can achieve maximum capacity in the next five years gradually increasing the production by 10% per year.

The Finance Manager estimates that for each 10% increase in capacity, the additional increase in fixed cost will be Rs. 50,000. The existing machines with a current book value of Rs. 10,00,000 can be disposed of for Rs. 5,00,000. The Vice-President (finance) is willing to replace the existing machines provided the NPV on replacement is about Rs. 4,53,000 at 15% cost of capital after tax.

- (i) You are required to compute the total value of machines necessary for replacement.

For your exercise you may assume the following:

- (a) The company follows the block assets concept and all the assets are in the same block. Depreciation will be on straight-line basis and the same basis is allowed for tax purposes.
- (b) There will be no salvage value for the machines newly purchased. The entire cost of the assets will be depreciated over five year period.
- (c) Tax rate is at 40%.
- (d) Cash inflows will arise at the end of the year.
- (e) Replacement outflow will be at the beginning of the year (year 0).

(f) Year	0	1	2	3	4	5
Discount Factor at 15%	1	0.87	0.76	0.66	0.57	0.49

- (ii) On the basis of data given above, the managing director feels that the replacement, if carried out, would at least yield post tax return of 15% in the three years provided the capacity build up is 60%, 80% and 100% respectively. Do you agree?

(20 marks) (May 1997)

Answer

- (i) Computation of the total replacement value of machine. (Assuming that existing machines also have valid life for 5 years.

Step 1 : Incremental Cash Inflows

Year	1	2	3	4	5
Incremental Capacity	10%	20%	30%	40%	50%
Incremental production and					

Project Planning and Capital Budgeting

sales (Kgs.)	10,000	20,000	30,000	40,000	50,000
	Rs.	Rs.	Rs.	Rs.	Rs.
Incremental contribution	1,50,000	3,00,000	4,50,000	6,00,000	7,50,000
Incremental Fixed cost	50,000	1,00,000	1,50,000	2,00,000	2,50,000
Incremental PBT	1,00,000	2,00,000	3,00,000	4,00,000	5,00,000
Tax at 40%	40,000	80,000	1,20,000	1,60,000	2,00,000
Incremental PAT BD	60,000	1,20,000	1,80,000	2,40,000	3,00,000
Discount factors	0.87	0.76	0.66	0.57	0.49
Discounted value of PAT BD	52,200	91,200	1,18,800	1,36,800	1,47,000
Total for 5 years	5,46,000				

Step 2 : Incremental Cash outflow

Let the total cost of replacement	X
Disposal value of existing machines	5,00,000
Incremental cash outflow	(X – 5,00,000)

Step 3 : Tax savings on depreciation

(Incremental block/5) × Tax rate × (Annuity factor of 15% for 5 years)

$$[(X - 5,00,000)/5] \times 40\% \times 3.35 = 0.268 \times X - 1,34,000$$

Step 4 : Total Discounted cash inflows

$$\begin{aligned} \text{Total incremental discounted cash inflows} &: 5,46,000 + .268X - 1,34,000 \\ &= 4,12,000 + .268X \end{aligned}$$

Step 5 : Equation

NPV = Sum of discounted cash inflows – Sum of the discounted cash outflows

$$4,53,000 = (4,12,000 + .268X) - (X - 5,00,000)$$

$$4,53,000 = 4,12,000 + .268X - X + 5,00,000$$

$$4,53,000 - 4,12,000 - 5,00,000 = .268X - X$$

$$- 4,59,000 = -0.732X$$

$$\text{Or } 0.732X = 4,59,000$$

$$\text{Or } X = 4,59,000/0.732 = \text{Rs. } 6,27,049$$

Management Accounting and Financial Analysis

(ii) Evaluation whether replacement would yield post tax return of 15% in 3 years.

	1	2	3
Incremental capacity	10%	30%	50%
Incremental PBT	1,00,000	3,00,000	5,00,000
Depreciation $(6,27,049 - 5,00,000)/5$	25,410	25,410	25,410
Incremental PBT	74,590	2,74,590	4,74,590
Tax at 40%	29,836	1,09,836	1,89,836
Incremental PAT	44,754	1,64,754	2,84,754
PAT + Depreciation	70,164	1,90,164	3,10,164
Discount factors	0.87	0.76	0.66
Discounted cash inflows	61,043	1,44,525	2,04,708
Total discounted cash inflow	4,10,276		
Discounted incremental cash outflow	1,27,049		
NPV	2,83,227		

Conclusion: As the net present value is positive the view of the Managing Director is correct.

Alternative Solution:

(i) Cash inflows:

(Figures in lakhs of Rupees)					
Capacity	60%	70%	80%	90%	100%
Sales	18.00	21.00	24.00	27.00	30.00
Less: Variable cost	<u>9.00</u>	<u>10.50</u>	<u>12.00</u>	<u>13.50</u>	<u>15.00</u>
Contribution (A)	9.00	10.50	12.00	13.50	15.00
Less: Fixed cost (B)	<u>3.00</u>	<u>3.50</u>	<u>4.00</u>	<u>4.50</u>	<u>5.00</u>
Profit before (C)	6.00	7.00	8.00	9.00	10.00
Depreciation & Tax					
Discount factors (D)	0.87	0.76	0.66	0.57	0.49
Present value PATBD (E)	5.22	5.32	5.28	5.13	4.90
(C × D)					
Sum Total of Present Values in E (F)					
					Rs. 25.85

Project Planning and Capital Budgeting

After Tax present Values (G) = $(1 - T) F = \text{Rs. } 25.85 \times 0.6 = \text{Rs. } 15.51$

Tax savings on depreciation

Let 'X' be the cost of machines purchased.

The salvage value of old machine is Rs. 5 lakhs.

∴ Net outflow of new machines would be $(X - 5)$ lakhs.

Depreciation on straight line basis on this would be $\left(\frac{X - 5}{5}\right)$ lakhs

Which will be the same for 5 years.

The present value of such recurring Depreciation in equal sum would be $\left(\frac{X - 5}{5}\right) \times 3.35$

Note: 3.35 is the sum total of present values for 5 years of uniform flow.

Tax saving on such depreciation is $\left(\frac{X - 5}{5}\right) \times 3.35 \times 0.4 = \text{Rs. } 0.268 X - \text{Rs. } 1.34$

Equation:

Net present value of replacement = In flows in N years – outflow in the year 0.

According to the Vice-President (Finance) NPV should be equal to Rs. 4.53 lakhs.

Hence, the equation $0.268 X - 1.34 + 15.51 - (X - 5) = 4.53$

$= 0.268 X + 14.17 - X + 5 = 4.53$ lakhs

or $0.732 X = 14.64$ lakhs

$X = \frac{14.64}{0.732} = \text{Rs. } 20.00$ lakhs The cost of new machines is Rs. 20 lakhs.

(ii)		(Rupees in lakhs)		
Capacity		60%	80%	100%
Profit before Depreciation & Taxes	A	6.00	8.00	10.00
Less: Depreciation	B	<u>5.00</u>	<u>5.00</u>	<u>5.00</u>
Profit after Depreciation (A – B)	C	1.00	3.00	5.00
Less: Tax @ 40%	D	<u>0.40</u>	<u>1.20</u>	<u>2.00</u>
Profit after tax	E	0.60	1.80	3.00
Profit after tax but Depreciation added back i.e. inflow (B + E)	F	5.60	6.80	8.00
Discount factor	G	0.87	0.76	0.66
Present values of F	H	4.872	5.168	5.28
Net Present Value I				
Total of H – Initial outflow = Rs. 15.32 – 15.00 = Rs. 0.32 lakhs				

Management Accounting and Financial Analysis

As the Net Present Value is positive (though in a small sum). The view of the Managing Director is correct.

Question 5

S Engineering Company is considering to replace or repair a particular machine, which has just broken down. Last year this machine costed Rs. 20,000 to run and maintain. These costs have been increasing in real terms in recent years with the age of the machine. A further useful life of 5 years is expected, if immediate repairs of Rs. 19,000 are carried out. If the machine is not repaired it can be sold immediately to realize about Rs. 5,000 (Ignore loss/gain on such disposal).

Alternatively, the company can buy a new machine for Rs. 49,000 with an expected life of 10 years with no salvage value after providing depreciation on straight line basis. In this case, running and maintenance costs will reduce to Rs. 14,000 each year and are not expected to increase much in real term for a few years at least. S Engineering Company regard a normal return of 10% p.a. after tax as a minimum requirement on any new investment. Considering capital budgeting techniques, which alternative will you choose? Take corporate tax rate of 50% and assume that depreciation on straight line basis will be accepted for tax purposes also.

Given cumulative present value of Re. 1 p.a. at 10% for 5 years Rs. 3.791, 10 years Rs. 6.145. (20 marks) (May 1998)

Answer

Evaluation of proposal to repair existing machine or buy a new machine for M/s S. Engineering Company

(i) To repair existing machine:

	Rs.
Present value of after-tax cash outflows	
Cost of repairs immediately net of tax Rs. 9,500 (50% of Rs. 19,000)	
Equivalent annual cost for 5 years $\left(\frac{\text{Rs. 9,500}}{3.791} \right)$	2,506
Running and maintenance cost per annum net of tax (50% of Rs. 20,000)	<u>10,000</u>
Total net equivalent cash outflows p.a.	<u>12,506</u>

(ii) To buy a new machine:

	Rs.
Present value of after-tax cash outflows	
Purchase cost of new machine	49,000
Less: Sale Proceeds of old machine	<u>5,000</u>
	<u>44,000</u>

Project Planning and Capital Budgeting

Equivalent annual cost for 10 years $\left(\frac{\text{Rs. } 44,000}{6.145} \right)$	7,160
Tax saving of depreciation (Rs. 49,000/10) $\times$ 50%	(2,450)
Running and maintenance cost p.a. net of tax (50% of Rs. 14,000)	<u>7,000</u>
Total net equivalent cash outflows p.a.	<u>11,710</u>

Since, net equivalent cash outflows p.a. for buying a new machine Rs. 11,710 is less than net equivalent cash outflows of Rs. 12,506 for repairing of an existing machine. Therefore, it is advisable that the company should go for buying a new machine.

(Second Solution)

(i) To repair an existing machine:

	Rs.
Present value of after-tax cash outflow	
Cost of repairs immediately net of tax (Rs. 19,000 $\times$ 50%)	9,500
Running and maintenance cost for 5 years (Rs. 20,000 $\times$ 50% $\times$ 3.791)	<u>37,910</u>
Total net present value of after tax cash outflows for 5 years	<u>47,410</u>
Hence, net equivalent cash outflows p.a. Rs. $\left(\frac{47,410}{3.791} \right)$	12,506

(ii) To Buy new machine

		Rs.
Present value of after-tax cash outflow		
Purchase cost of new machine	49,000	
Less: Sale proceeds of old machine	<u>5,000</u>	44,000
Tax benefit on depreciation p.a. (Rs. 49,000/10) $\times$ 50%	(2,450)	
Running and maintenance cost p.a. (50% of Rs. 14,000)	<u>7,000</u>	
	4,550	
Net cash outflows for 10 years (Rs. 4,550 $\times$ 6.145)		<u>27,960</u>
Total net present value of after tax cash outflows for 10 years		<u>71,960</u>
Hence, net equivalent cash outflow p.a. Rs. $\left(\frac{71,960}{6.145} \right)$		11,710

Since, net equivalent cash outflows p.a. for buying a new machine Rs. 11,710 is less than net equivalent outflows of Rs. 12,506 for repairing of an existing machine. Therefore, it is advisable that the company should go for buying a new machine.

Management Accounting and Financial Analysis

Question 6

A limited company operates a lodging house with a restaurant, shops and recreational facilities attached. Its manager has entrusted you with the planning of the coming year's operations, more particularly on the level of profits the company was likely to earn.

The lodging house has 100 double-bed rooms, which are likely to be rented at Rs. 150 per day. The manager expects an occupancy ratio of 75% for a period of 250 days during the tourist season. It is also anticipated that both the beds in a room will be occupied during the period.

Each person staying in the lodging house is expected to spend, on the basis of past statistics, Rs. 30 per day in the shops attached to the lodge and Rs. 60 per day in the restaurant. The recreational facilities are not charged to the customer.

Some other relevant data available to you is as under:

(i) Variable cost to volume ratio:

	Shops	Restaurant
Cost of goods sold	40%	30%
Supplies	5%	15%
Others	5%	10%

(ii) For the lodging house, the variable costs are Rs. 25 per day per occupied room for cleaning, laundry etc.

(iii) Annual fixed costs for the entire complex are Rs. 19,50,000.

From the above, you are required to prepare:

- (a) an income statement for the coming year; and
- (b) an analysis to indicate whether the manager's suggestion of reducing the room rent to Rs. 125 per day to enhance the occupancy ratio to 90% should be accepted.

(14 marks) (May 1998)

Answer

(a) Expected Income Statement of A Ltd. Company

(A) Revenue:		Rs.
Hotel Room receipts (100 rooms × 250 days × Rs. 150 × 75%)		28,12,500
Shops (100 rooms × 2 persons × 250 days × Rs. 30 × 75%)		11,25,000
Restaurant (100 rooms × 2 persons × 250 days × Rs. 60 × 75%)		<u>22,50,000</u>
		61,87,500
(B) Variable costs:	Rs.	Rs.
Hotel Room (100 rooms × 250 days × Rs. 25 × 75%)	4,68,750	

Project Planning and Capital Budgeting

Shops (Rs. 11,25,000 × 50%)	5,62,500	
Restaurant (Rs. 22,50,000 × 55%)	<u>12,37,500</u>	<u>22,68,750</u>
(C) Contribution (A – B)		39,18,750
Less: Fixed costs		<u>19,50,000</u>
Expected profits		<u>19,68,750</u>

(b) Income Statement based on Manager's suggestions

(A) Revenue:		Rs.
Hotel Room receipts (100 rooms × 250 days × Rs. 125 × 90%)		28,12,500
Shops (100 rooms × 2 persons × 250 days × Rs. 30 × 90%)		13,50,000
Restaurant (100 rooms × 2 persons × 250 days × Rs. 60 × 90%)		<u>27,00,000</u>
		68,62,500
(B) Variable costs:	Rs.	Rs.
Hotel Room (100 rooms × 250 days × Rs. 25 × 90%)	5,62,500	
Shops (Rs. 13,50,000 × 50%)	6,75,000	
Restaurant (Rs. 27,00,000 × 55%)	<u>14,85,000</u>	<u>27,22,500</u>
(C) Contribution (A – B)		41,40,000
Less: Fixed costs		<u>19,50,000</u>
Profits		<u>21,90,000</u>

The profit based on manager's suggestion Rs. 21,90,000 is higher than the expected profit Rs. 19,68,750, therefore, it is advisable that the manager's suggestion of reducing the room rent to Rs. 125 per day to enhance the occupancy ratio to 90% should be accepted.

Question 7

Write short note on Appraisal of projects under inflationary conditions.

(5 marks) (May 1998)

Answer

Appraisal of projects under inflationary conditions: The timing of project appraisal is significant from the point of view of appraisers. A project under normal conditions is viewed from different angles, viz, technical feasibility, commercial and financial viability and economic and social considerations and managerial aspects. However, normal conditions seldom exist and a project is subjected to inflationary pressures from time to time because the project has to be implemented over a long time frame. During such a period, it will be difficult to predict

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when the trade cycle sets in and the up-turn the economy is generated. Besides this, the size and magnitude of the project also varies from organization to organisation. In such a situation, inflation is bound to affect the project appraisal and implementation process.

In a developing country like ours, inflation has become a part of life and has been steadily increasing over a period of years. Therefore, it is always prudent to make adequate provision for a probable escalation in the project costs as a cushion to inflationary jerks.

It is well known that during a period of inflation, the project cost is bound to escalate on all heads viz. labours, raw material, cost of fixed assets, building materials, remunerations of technician and managerial personnel etc. Besides, such conditions erode the purchasing power of the consumers and are likely to affect the pattern of demand. Thus, not only the costs of production but also the projected statements of profitability, cash flows etc., will get seriously affected. Financial institutions may revise their lending rates of interest during such inflationary times. IN these circumstances, project appraisal has to be done generally keeping in view the following guidelines which are adopted normally by governmental agencies, banks and financial institutions.

- (a) It is always advisable to make provisions for cost escalation for all heads keeping in mind the rate of inflation, likely delay in completion of project etc.
- (b) The various sources of finance should be scrutinized carefully with response to possible revision in the rates of interest by lenders which will affect the cost of borrowing, the collateral securities offered, margins required etc.
- (c) Adjustments are to be made in the profitability and cash flow projections to take care of the inflationary pressure affecting future projections.
- (d) It is also advisable to critically examine the financial viability of the project at the revised rates and reasons the economic justification of the project. The appropriate measure for this is the economic rate of return for the project which will equate the present cost of capital expenditure to net cash flows over the project life. The rate of return should be acceptable which also accommodates the rate of inflation.
- (e) In an inflationary situation, projects having early pay back periods should be preferred because projects with a longer pay back periods may tend to be risky.

Because inflation can have major effect on business, it is critically important and must be recognized. "The most effective way to deal with inflation is to build into each cash flow element, using the best available information about how each element will be affected, since one cannot estimate future rates of inflation, errors are bound to be made. Therefore, inflation adds to uncertainty, riskness and complexity to capital budgeting. Fortunately, computers and spread sheet models are available to help inflation analysis. Thus, in practice, the mechanics of inflation adjustments are not difficult.

Project Planning and Capital Budgeting

Question 8

- (a) Following are the data on a capital project being evaluated by the management of X Ltd.

	Project M
	Rs.
Annual cost saving	40,000
Useful life	4 years
I.R.R.	15%
Profitability Index (PI)	1.064
NPV	?
Cost of capital	?
Cost of project	?
Payback	?
Salvage value	0

Find the missing values considering the following table of discount factor only:

Discount factor	15%	14%	13%	12%
1 year	0.869	0.877	0.885	0.893
2 years	0.756	0.769	0.783	0.797
3 years	0.658	0.675	0.693	0.712
4 years	<u>0.572</u>	<u>0.592</u>	<u>0.613</u>	<u>0.636</u>
	<u>2.855</u>	<u>2.913</u>	<u>2.974</u>	<u>3.038</u>

- (b) S Ltd. has Rs. 10,00,000 allocated for capital budgeting purposes. The following proposals and associated profitability indexes have been determined:

Project	Amount Rs.	Profitability Index
1	3,00,000	1.22
2	1,50,000	0.95
3	3,50,000	1.20
4	4,50,000	1.18
5	2,00,000	1.20
6	4,00,000	1.05

Which of the above investments should be undertaken? Assume that projects are indivisible and there is no alternative use of the money allocated for capital budgeting.

(12 + 8 = 20 marks) (November 1998)

Management Accounting and Financial Analysis

Answer

(a) Cost of Project M

At 15% I.R.R., the sum total of cash inflows = Cost of the project i.e. Initial cash outlay

Given:

Annual cost saving	Rs. 40,000
Useful life	4 years
I.R.R.	15%

Now, considering the discount factor table @ 15% cumulative present value of cash inflows for 4 years is 2.855

Therefore,

Total of cash inflows for 4 years for Project M is $(Rs. 40,000 \times 2.855) = Rs. 1,14,200$

Hence cost of project is $= Rs. 1,14,200$

Payback period of the Project M

$$\text{Pay back period} = \frac{\text{Cost of the project}}{\text{Annual cost saving}} = \frac{Rs. 1,14,200}{40,000}$$

$= 2.855$ or 2 years 11 months approximately

Cost of Capital

If the profitability index (PI) is 1, cash inflows and outflows would be equal. In this case, (PI) is 1.064. Therefore, cash inflows would be more by 0.64 than outflow.

$$\text{Profitability index (PI)} = \frac{\text{Discounted cash inflows}}{\text{Cost of the project}}$$

$$\text{Or } 1.064 = \frac{\text{Discounted cash inflows}}{Rs. 1,14,200}$$

$$\text{or } 1.064 \times Rs. 1,14,200 = Rs. 1,21,509$$

Hence, Discounted cash inflows = Rs. 1,21,509

Since, Annual cost saving is Rs. 40,000. Hence, cumulative discount factor for 4 years

$$= Rs. \frac{1,21,509}{40,000}$$

$= 3.037725$ or 3.038

Considering the discount factor table at discount rate of 12%, the cumulative discount factor for 4 years is 3.038.

Hence, the cost of capital is 12%.

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Net present value of the project.

N.P.V. = Total present value of cash inflows – Cost of the project

= Rs. 1,21,509 – Rs. 1,14,200

= Rs. 7,309.

(b) Statement showing ranking of projects on the basis of Profitability Index

Project	Amount	P.I.	Rank
1	3,00,000	1.22	1
2	1,50,000	0.95	5
3	3,50,000	1.20	2
4	4,50,000	1.18	3
5	2,00,000	1.20	2
6	4,00,000	1.05	4

Assuming that projects are indivisible and there is no alternative use of the money allocated for capital budgeting on the basis of P.I., the S Ltd., is advised to undertake investment in projects 1, 3, and 5.

However, among the alternative projects the allocation should be made to the projects which adds the most to the shareholders wealth. The NPV method, by its definition, will always select such projects.

Statement showing NPV of the projects

Project	Amount (Rs.)	P.I.	Cash inflows of project (Rs.)	N.P.V. of Project (Rs.)
(i)	(ii)	(iii)	(iv) = [(ii) × (iii)]	(v) = [(iv) – (ii)]
1	3,00,000	1.22	3,66,000	66,000
2	1,50,000	0.95	1,42,500	(–)7,500
3	3,50,000	1.20	4,20,000	70,000
4	4,50,000	1.18	5,31,000	81,000
5	2,00,000	1.20	2,40,000	40,000
6	4,00,000	1.05	4,20,000	20,000

The allocation of funds to the projects 1, 3 and 5 (as selected above on the basis of P.I.) will give N.P.V. of Rs. 1,76,000 and Rs. 1,50,000 will remain unspent.

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However, the N.P.V. of the projects 3, 4 and 5 is Rs. 1,91,000 which is more than the N.P.V. of projects 1, 3 and 5. Further, by undertaking projects 3, 4 and 5 no money will remain unspent. Therefore, S Ltd. is advised to undertake investments in projects 3, 4 and 5.

Question 9

- (a) A company is considering two mutually exclusive projects X and Y. Project X costs Rs. 30,000 and Project Y Rs. 36,000. You have been given below the net present value, probability distribution for each project:

Project X		Project Y	
NPV Estimate	Probability	NPV Estimate	Probability
Rs.		Rs.	
3,000	0.1	3,000	0.2
6,000	0.4	6,000	0.3
12,000	0.4	12,000	0.3
15,000	0.1	15,000	0.2

- (i) Compute the expected net present value of Projects X and Y.
(ii) Compute the risk attached to each project i.e., Standard Deviation of each probability distribution.
(iii) Which project do you consider more risky and why?
(iv) Compute the profitability index of each project.
- (b) Determine the risk adjusted net present value of the following projects:

	A	B	C
Net cash outlays (Rs.)	1,00,000	1,20,000	2,10,000
Project life	5 years	5 years	5 years
Annual cash inflow (Rs.)	30,000	42,000	70,000
Coefficient of variation	0.4	0.8	1.2

The company selects the risk-adjusted rate of discount on the basis of the co-efficient of variation:

Coefficient of variation	Risk adjusted rate of discount	Present value factor 1 to 5 years at risk adjusted rate of discount
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274

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1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

(14 + 6 = 20 marks) (May 1999)

Answer

(a)

Project X

NPV Estimate	Probability	NPV Estimate × Probability	Deviation from Expected NPV i.e. Rs. 9,000	Square of the deviation	Square of the deviation × Probability
Rs.		Rs.		Rs.	Rs.
3,000	0.1	300	6,000	3,60,00,000	36,00,000
6,000	0.4	2,400	3,000	90,00,000	36,00,000
12,000	0.4	4,800	−3,000	90,00,000	36,00,000
15,000	0.1	<u>1,500</u>	−6,000	3,60,00,000	<u>36,00,000</u>
Expected NPV		<u>9,000</u>			<u>1,44,00,000</u>

Project Y

NPV Estimate	Probability	NPV Estimate × Probability	Deviation from Expected NPV i.e. Rs. 9,000	Square of the deviation	Square of the deviation × Probability
Rs.		Rs.		Rs.	Rs.
3,000	0.2	600	6,000	3,60,00,000	72,00,000
6,000	0.3	1,800	3,000	90,00,000	27,00,000
12,000	0.3	3,600	−3,000	90,00,000	27,00,000
15,000	0.2	<u>3,000</u>	−6,000	3,60,00,000	<u>72,00,000</u>
Expected NPV		<u>9,000</u>			<u>1,98,00,000</u>

(i) The expected net present value of Projects X and Y is Rs. 9,000 each.

(ii) Standard Deviation = $\sqrt{\text{Square of the deviation} \times \text{probability}}$

In case of Project X : Standard Deviation = $\sqrt{\text{Rs.1,44,00,000}}$

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$$= \text{Rs. } 3,795$$

$$\begin{aligned} \text{In case of Project Y : Standard Deviation} &= \sqrt{\text{Rs. } 1,98,00,000} \\ &= \text{Rs. } 4,450 \end{aligned}$$

$$(iii) \text{ Coefficient of variation} = \frac{\text{Standard deviation}}{\text{Expected net present value}}$$

$$\text{In case of Project X : Coefficient of variation} = \frac{3,795}{9,000} = 0.42$$

$$\text{In case of Project Y : Coefficient of variation} = \frac{4,450}{9,000} = 0.49 \text{ or } 0.50$$

Project Y is riskier since it has a higher coefficient of variation.

$$(iv) \text{ Profitability index} = \frac{\text{Discounted cash inflow}}{\text{Discounted cash outflow}}$$

$$\text{In case of Project X : Profitability Index} = \frac{9,000 + 30,000}{30,000} = 1.30$$

$$\text{In case of Project Y : Profitability Index} = \frac{9,000 + 36,000}{36,000} = \frac{45,000}{36,000} = 1.25$$

(b) Statement showing the determination of the risk adjusted net present value

Projects	Net cash outlays	Coefficient of variation	Risk adjusted discount rate	Annual cash inflow	PV factor 1-5 years at risk adjusted rate of discount	Discounted cash inflow	Net present value
	Rs.			Rs.	Rs.	Rs.	Rs.
(I)	(ii)	(iii)	(iv)	(v)	(vi)	(vii) = (v) × (vi)	(viii) = (vii) – (ii)
A	1,00,000	0.4	12%	30,000	3.605	1,08,150	8,150
B	1,20,000	0.8	14%	42,000	3.433	1,44,186	24,186
C	2,10,000	1.20	16%	70,000	3.274	2,29,180	19,180

Question 10

C developed original specification of a product and founded C Manufacturing Ltd. In 1997 the firm manufactured 980 Nos. at an average price of Rs. 900 each. IN 1998 due to continuous price rise of the inputs, he raised his prices at an average of 12%, since he knew he could sell

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is plant's full capacity of 980 Nos. per year. In spite of price rise for the product, which sold for over Rs. 1,000 for the first time, C was surprised to learn in late 1998 (as may be seen from the financial statements) that C Manufacturing Ltd. show a decline in earnings and still worse, decline in cash flow.

His accountant has brought the following:

- (i) We are following FIFO system for the purpose of issues.
- (ii) Costs are going up faster than 12% and they will go up further in 1999.
- (iii) We are not setting aside enough to replace the machinery; we need to set aside Rs. 1,65,000, not Rs. 1,50,000 so as to be able to buy new machinery.
- (iv) It is still not late to switch to LIFO for 1998. This will reduce closing inventory to Rs. 3,30,000 and raise cost of goods sold.

	C Manufacturing Ltd.	Income Statement (Rs. 000)
	1998	1997
Sales	1,008	900
Cost of goods sold		
Opening inventory	320	250
Raw material	500	400
Labour	200	174
Depreciation	150	150
End inventory	<u>(-390)</u>	<u>(-320)</u>
	780	654
Gross margin	228	246
Administration expenses	<u>100</u>	<u>92</u>
EBIT	128	154
Interest	<u>50</u>	<u>50</u>
	78	104
Income-tax	<u>39</u>	<u>52</u>
Profit after tax	39	52
Add: Non-cash expenses	150	150
Inventory change	<u>(-70)</u>	<u>(-70)</u>
Cash flow	<u>119</u>	<u>132</u>

Required:

- (1) What is the weighted average inflation factor for the firm using LIFO?
- (2) If the firm desires a 15 per cent profit margin on sales, how much should the firm charge for the product per unit? (10 marks) (May 1999)

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Answer

(1)		1998		(Rs. 000)
		Expenses		1997
				Expenses
Raw material				
Opening inventory	320		250	
Add: Purchases	<u>500</u>		<u>400</u>	
	820		650	
Less: Closing inventory based on LIFO*	<u>330</u>	490	<u>320</u>	330
Labour		200		174
Depreciation		<u>165*</u>		<u>150</u>
Cost of goods sold		855		654
Add: Administration expenses		<u>100</u>		<u>92</u>
		<u>955</u>		<u>746</u>

*considered on replacement cost basis.

Hence, weighted average inflation factor for the firm in 1998 = $\frac{955}{746}$

= 1.28 i.e. 28% over 1997

- (2) If the firm desires a 15 per cent profit margin on sales the price which the firm should charge for the product per unit can be identified in two ways:-

- (i) In 1997, EBIT as a percentage of sales was 17.1%.

Hence, if we take the weighted average inflation in 1998 over 1997 and increase prices to that extent the charge per product in 1998 will be

$$\text{Rs. } \frac{9,00,000}{980} \times 1.28 = 1,175.50$$

or in other words

Average price in 1997 $\times$ (1 + inflation %)

$$= \text{Rs. } 918.36 \times 1.28 = \text{Rs. } 1,175.50 \text{ per product}$$

i.e. Total sales will be (Rs. 1,175.50 $\times$ 980 Nos.) = Rs. 11,52,000 approximately

Alternatively,

- (ii) Total cost in 1998, for 980 Nos. is Rs. 9,55,000.

Hence, for each No. = Rs. 974.50.

In order to earn 15% profit margin on sales (EBIT level), the sales price per product will be

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$$\text{Rs. } \frac{974.50}{0.85} = \text{Rs. } 1146.50$$

Total sales will be (Rs. 1,146.50 × 980 Nos.) = Rs. 11,23,570

Note: Figures have been rounded off.

Question 11

A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of Rs. 50 lakhs per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of Rs. 30 lakhs before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

The machine required for carrying out the processing will cost Rs. 200 lakhs to be financed by a loan repayable in 4 equal instalments commencing from the end of year 1. The interest rate is 16% per annum. At the end of the 4th year, the machine can be sold for Rs. 20 lakhs and the cost of dismantling and removal will be Rs. 15 lakhs.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

Year	Rs. in lakhs			
	1	2	3	4
Sales	322	322	418	418
Material consumption	30	40	85	85
Wages	75	75	85	100
Other expenses	40	45	54	70
Factory overheads	55	60	110	145
Depreciation (as per income-tax rules)	50	38	28	21

Initial stock of materials required before commencement of the processing operations is Rs. 20 lakhs at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be Rs. 55 lakhs and the stocks at the end of year 4 will be nil. The storage of materials will utilize space which would otherwise have been rented out for Rs. 10 lakhs per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of Rs. 15 lakhs in year 1 and Rs. 10 lakhs in year 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of Rs. 30 lakhs per annum payable on this venture. The company's tax rate is 50%.

Present value factors for four years are as under:

Year	1	2	3	4
Present value factors	0.870	0.756	0.658	0.572

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Advise the management on the desirability of installing the machine for processing the waste.
All calculations should form part of the answer. (20 marks) (May 1999)

Answer

Statement of Incremental Profit

(Rs. in lakhs)

Years	1	2	3	4
Sales: (A)	<u>322</u>	<u>322</u>	<u>418</u>	<u>418</u>
Material consumption	30	40	85	85
Wages	60	65	85	100
Other expenses	40	45	54	70
Factory overheads (Insurance)	30	30	30	30
Loss of rent	10	10	10	10
Interest	32	24	16	8
Depreciation (as per income tax rules)	<u>50</u>	<u>38</u>	<u>28</u>	<u>21</u>
Total cost: (B)	<u>252</u>	<u>252</u>	<u>308</u>	<u>324</u>
Incremental profit: (C) = (A) – (B)	70	70	110	94
Tax (50% of (C))	35	35	55	47

Statement of Incremental Cash Flows

(Rs. in lakhs)

Years	0	1	2	3	4
Material stocks	(20)	(35)	–	–	–
Compensation for contract	(30)	–	–	–	–
Contract payment saved	–	50	50	50	50
Tax on contract payment	–	(25)	(25)	(25)	(25)
Incremental profit	–	70	70	110	94
Depreciation added back	–	50	38	28	21
Tax on profits	–	(35)	(35)	(55)	(47)
Loan repayment	–	(50)	(50)	(50)	(50)
Profit on sale of machinery (net)	–	–	–	–	<u>5</u>
Total incremental cash flows	(50)	25	48	58	48
Present value factor	1.00	0.870	0.756	0.658	0.572
Net present value of cash flows	(50)	21.75	36.288	38.164	27.456

Net present Value = Rs. 123.658 – Rs. 50 = 73.658 lakhs.

Advice: Since the net present value of cash flows is Rs. 73.658 lakhs which is positive the management should install the machine for processing the waste.

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Notes:

1. Materials stock increase are taken in cash flows.
2. idle-time wages have also been considered.
3. Apportioned factory overheads are not relevant only insurance charges of this project are relevant.
4. Interest calculated at 16% based on 4 equal instalments of loan repayment.
5. Sale of machinery – Net income after deducting removal expenses taken. Tax on capital gains ignored.
6. Saving in contract payment and income tax there on considered in the cash flows.

Question 12

- (a) ABC Company Ltd. has been producing a chemical product by using machine Z for the last two years. Now the management of the company is thinking to replace this machine either by X Or by Y machine. The following details are furnished to you:

	Z	X	Y
Books value (Rs.)	1,00,000	—	—
Resale value now (Rs.)	1,10,000	—	—
Purchase price (Rs.)	—	1,80,000	2,00,000
Annual fixed costs (including depreciation) (Rs.)	92,000	1,08,000	1,32,000
Variable running costs (including labour) per unit (Rs.)	3	1.50	2.50
Production per hour (unit)	8	8	12

You are also provided with the following details:

Selling price per unit	(Rs.) 20
Cost of materials per unit	(Rs.) 10
Annual operating hours	2,000
Working life of each of the three machines (as from now)	5 years
Salvage value of machines Z Rs. 10,000, X Rs. 15,000, Y Rs. 18,000	

The company charges depreciation using straight line method. It is anticipated that an additional cost of Rs. 8,000 per annum would be incurred on special advertising to sell the extra output of machine. Assume tax rate of 50% and cost of capital 10%. The present value of Re. 1 to be received at the end of the year at 10% is as under:

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Year	1	2	3	4	5
Present value	.909	.826	.751	.683	0.621

Required: Using NPV method, you are required to analyse the feasibility of the proposal and make recommendations.

- (b) The Globe Manufacturing Company Ltd. is considering an investment in one of the two mutually exclusive proposals – Projects X and Y, which require cash outlays of Rs. 3,40,000 and Rs. 3,30,000 respectively. The certainty-equivalent (C.E.) approach is used in incorporating risk in capital budgeting decisions. The current yield on government bond is 8% and this be used as the riskless rate. The expected net cash flows and their certainty-equivalents are as follows:

Year-end	Project X		Project Y	
	Cash flow	C.E.	Cash flow	C.E.
	Rs.		Rs.	
1	1,80,000	.8	1,80,000	.9
2	2,00,000	.7	1,80,000	.8
3	2,00,000	.5	2,00,000	.7

Present value factors of Re. 1 discounted at 8% at the end of year 1, 2 and 3 are .926, .857 and .794 respectively.

Required:

- Which project should be accepted?
 - If risk adjusted discount rate method is used, which project would be analysed with a higher rate?
- (14 + 6 = 20 marks)(November, 1999)

Answer

- (a) ABC Company Ltd.
Computation of yearly cash inflow

Machine	Z	X	Y
Sales (units)	16,000	16,000	24,000
Selling price per unit (Rs.)	20	20	20
Sales : (A)	3,20,000	3,20,000	4,80,000
Less: Costs			
Variable running costs	48,000	24,000	60,000
Material cost	1,60,000	1,60,000	2,40,000
Annual fixed cost	<u>92,000</u>	<u>1,08,000</u>	<u>1,32,000</u>
Additional cost (Special advertising)	—	—	<u>8,000</u>
Total costs: (B)	<u>3,00,000</u>	<u>2,92,000</u>	<u>4,40,000</u>
Profit before tax: (A) – (B)	20,000	28,000	40,000

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Less: Tax @ 50%	<u>10,000</u>	<u>14,000</u>	<u>20,000</u>
Profit after tax	10,000	14,000	20,000
Add: Depreciation	<u>20,000</u>	<u>33,000</u>	<u>36,400</u>
Cash inflow	<u>30,000</u>	<u>47,000</u>	<u>56,400</u>

Computation of cash inflow in 5th year

Machine	Z	X	Y
Cash in flow	30,000	47,000	56,400
Add: Salvage value of machines	<u>10,000</u>	<u>15,000</u>	<u>18,000</u>
Cash inflow	<u>40,000</u>	<u>62,000</u>	<u>74,000</u>

Computation of Net Present Value

Year	Machine	Z		X		Y	
	Discounting factor	Cash inflow	P.V. of cash inflow	Cash inflow	P.V. of cash inflow	Cash inflow	P.V. of cash inflow
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	0.909	30,000	27,270	47,000	42,723	56,400	51,267.60
2	0.826	30,000	24,780	47,000	38,822	56,400	46,586.40
3	0.751	30,000	22,530	47,000	35,297	56,400	42,356.40
4	0.683	30,000	20,490	47,000	32,101	56,400	38,521.20
5	0.621	40,000	<u>24,840</u>	62,000	<u>38,502</u>	74,400	<u>46,202.40</u>
			1,19,910		1,87,445		2,24,934.00
Less: Purchase price			1,10,000		1,80,000		<u>2,00,000.00</u>
Net present value			9,910		7,445		24,934.00

Recommendation:

The net present value is higher in the case of Machine Y. Therefore, it is advisable that the company should replace machine Z with machine Y.

However, as the cost of investment is not the same for all machines, it would be better to base the decision on profitability index which is as under:

$$P.I. = \frac{\text{P.V. of cash inflow}}{\text{P.V. of cash outflow}}$$

$$\text{Machine Z} = \frac{1,19,910}{1,10,000} = 1.09$$

$$\text{Machine X} = \frac{1,87,445}{1,80,000} = 1.041$$

Management Accounting and Financial Analysis

$$\text{Machine Y} = \frac{2,24,934}{2,00,000} = 1.12$$

Since the profitability index of machine Y is the highest therefore machine Z should be replaced by machine Y.

(b) (i) Statement showing Net Present Value of Project X

Year-end	Cash flow Rs.	C.E.	Adjusted Cash flow Rs.	Present value factor at 8%	Total present value Rs.
	(a)	(b)	(c) = (a) × (b)	(d)	(e) = (c) × (d)
1	1,80,000	0.8	1,44,000	0.926	1,33,344
2	2,00,000	0.7	1,40,000	0.857	1,19,980
3	2,00,000	0.5	1,00,000	0.794	<u>79,400</u>
					3,32,724
Less: Initial investment					<u>3,40,000</u>
Net present value					<u>(7,276)</u>

Statement showing the Net Present Value of Project Y

Year-end	Cash flow Rs.	C.E.	Adjusted Cash flow Rs.	Present value factor	Total present value Rs.
	(a)	(b)	(c) = (a) × (b)	(d)	(e) = (c) × (d)
1	1,80,000	0.9	1,62,000	0.926	1,50,012
2	1,80,000	0.8	1,44,000	0.857	1,23,408
3	2,00,000	0.7	1,40,000	0.794	<u>1,11,160</u>
					3,84,580
Less: Initial investment					<u>3,30,000</u>
Net present value					<u>54,580</u>

Decision: Since the net present value of project Y is positive, the project Y should be accepted.

- (ii) Since the certainty-equivalent (C.E.) Co-efficient of project X is lower than project Y, the project X is riskier than project Y. Therefore, if risk adjusted discount rate method is used the project X would be analysed with a higher rate.

Question 13

- (a) A firm has an investment proposal, requiring an outlay of Rs. 40,000. The investment proposal is expected to have 2 years' economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be Rs. 25,000 and 0.6 probability

Project Planning and Capital Budgeting

that cash inflow after tax will be Rs. 30,000. The probabilities assigned to cash inflows after tax for the year II are as follows:

The Cash inflow year I	Rs. 25,000		Rs. 30,000	
The Cash inflow year II		Probability		Probability
	Rs. 12,000	0.2	Rs. 20,000	0.4
	Rs. 16,000	0.3	Rs. 25,000	0.5
	Rs. 22,000	0.5	Rs. 30,000	0.1

The firm uses a 10% discount rate for this type of investment.

Required:

- Construct a decision tree for the proposed investment project.
- What net present value will the project yield if worst outcome is realized? What is the probability of occurrence of this NPV?
- What will be the best and the probability of that occurrence?
- Will the project be accepted?

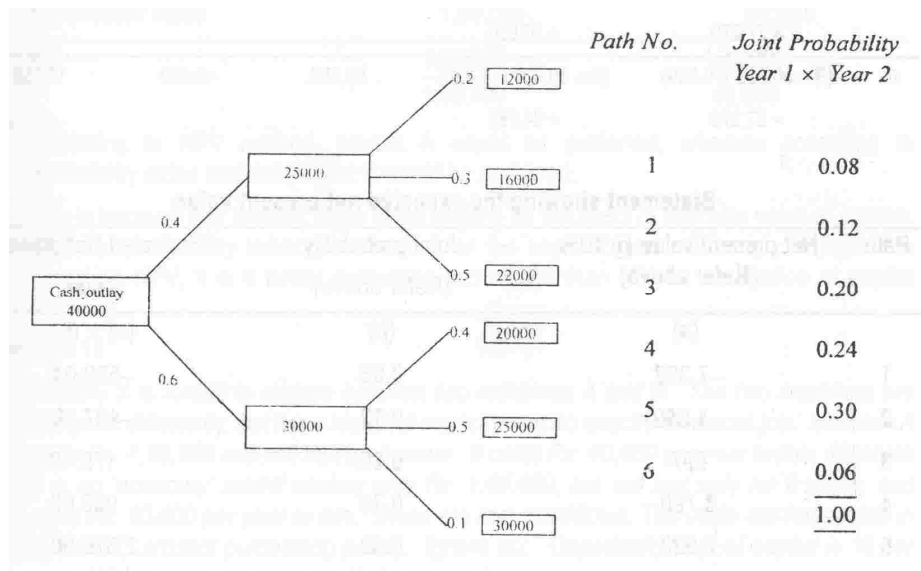
(10% Discount factor	1 year	0.909
	2 year	0.826)

- Do the profitability index and the NPV criterion of evaluating investment proposals lead to the same acceptance – rejection and ranking decisions? In what situations will they give conflicting results?

(14 + 6 = 20 marks) (November, 1999)

Answer

(a)



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The decision tree given above shows that there are six possible outcomes each represented by a path. The net present value of each path at 10% discount rate is given below:

Path	(Cash inflow year 1 × discount factor year 1)	(Cash inflow year 2 × discount factor year 2)	Total Cash inflow	Cash outflow	Net present value
	(a)	(b)	(c) = (a) + (b)	(d)	(e) = (c) – (d)
			Rs.	Rs.	Rs.
1	(Rs. 25,000 × 0.909) = 22,725	(Rs. 12,000 × 0.826) = 9,912	32,637	40,000	–7,363
2	(Rs. 25,000 × 0.909) = 22,725	(Rs. 16,000 × 0.826) = 13,216	35,941	40,000	–4,059
3	(Rs. 25,000 × 0.909) = 22,725	(Rs. 22,000 × 0.826) = 18,172	40,897	40,000	897
4	(Rs. 30,000 × 0.909) = 27,270	(Rs. 20,000 × 0.826) = 16,520	43,790	40,000	3,790
5	(Rs. 30,000 × 0.909) = 27,270	(Rs. 25,000 × 0.826) = 20,650	47,920	40,000	7,920
6	(Rs. 30,000 × 0.909) = 27,270	(Rs. 30,000 × 0.826) = 24,780	52,050	40,000	12,050

Statement showing the expected net present value

Path	Net present value @ 10% (Refer above)	Joint probability (Refer above)	Expected Net present value
	(a)	(b)	(a) × (b)
1	–7,363	0.08	–589.04
2	–4,059	0.12	–487.08
3	897	0.20	179.40
4	3,790	0.24	909.60
5	7,920	0.30	2,376.00
6	12,050	0.06	<u>723.00</u>
			<u>3,111.88</u>

- (b) If the worst outcome is realized the Net present value which the project will yield is Rs. 7,363 (negative). The probability of occurrence of this Net present value is 8%.
- (c) The best outcome will be path 6 when Net present value is higher i.e. Rs. 12,050 (positive). The probability of occurrence of this Net present value is 6%.

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- (d) Yes, the project will be accepted since the Expected Net present value $\times$ probability sum total is positive.
- (b) In most of the situations the Net present value method (NPV) and Profitability Index (PI) yield same accept or reject decision. In general terms, under PI method a project is acceptable if profitability index value is greater than 1 and rejected if it is less than 1. Under NPV method a project is acceptable if Net present value of a project is positive and rejected if it is negative. Clearly a project offering a profitability index greater than 1 must also offer a net present value which is positive. But a conflict may arise between two methods if a choice between mutually exclusive projects has to be made. Consider the following example:

	Project A	Project B
PV of Cash inflows	2,00,000	1,00,000
Initial cash outflows	<u>1,00,000</u>	<u>40,000</u>
Net present value	1,00,000	60,000
P.I.	$\frac{2,00,000}{1,00,000} = 2$	$\frac{1,00,000}{40,000} = 2.5$

According to NPV method, project A would be preferred, whereas according to profitability index method project B would be preferred.

This is because Net present value gives ranking on the basis of absolute value of rupees. Whereas profitability index gives ranking on the basis of ratio. Although PI method is based on NPV, it is a better evaluation techniques than NPV in a situation of capital rationing.

Question 14

- (a) Company X is forced to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs Rs. 1,50,000 and will last for 3 years. It costs Rs. 40,000 per year to run. Machine B is an 'economy' model costing only Rs. 1,00,000, but will last only for 2 years, and costs Rs. 60,000 per year to run. These are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore tax. Opportunity cost of capital is 10 per cent. Which machine company X should buy?
- (b) Company Y is operating an elderly machine that is expected to produce a net cash inflow of Rs. 40,000 in the coming year and Rs. 40,000 next year. Current salvage value is Rs. 80,000 and next year's value is Rs. 70,000. The machine can be replaced now with a new machine, which costs Rs. 1,50,000, but is much more efficient and will provide a cash inflow of Rs. 80,000 a year for 3 years. Company Y wants to know whether it should replace the equipment now or wait a year with the clear understanding that the new machine is the best of the available alternatives and that it in turn be replaced at the optimal point. Ignore tax. Take opportunity cost of capital as 10 per cent. Advise with reasons.

(12 + 8 = 20 marks) (May 2000)

Management Accounting and Financial Analysis

Answer

(a) Statement showing the evaluation of two machines

Machines	A	B
Purchase cost (Rs.): (i)	1,50,000	1,00,000
Life of machines (years)	3	2
Running cost of machine per year (Rs.): (ii)	40,000	60,000
Cumulative present value factor for 1-3 years @ 10% (iii)	2,486	—
Cumulative present value factor for 1-2 years @ 10% (iv)	—	1.735
Present value of running cost of machines (Rs.): (v)	99,440	1,04,100
	[(ii) × (iii)]	[(ii) × (iv)]
Cash outflow of machines (Rs.): (vi) = (i) + (v)	2,49,440	2,04,100
Equivalent present value of annual cash outflow	1,00,338	1,17,637
	[(vi) ÷ (iii)]	[(vi) ÷ (iv)]

Decision: Company X should buy machine A since its equivalent cash outflow is less than machine B.

(b) Statement showing present value of cash inflow of new machine when it replaces elderly machine now

	Rs.
Cash inflow of a new machine per year	80,000
Cumulative present value for 1-3 years @ 10%	2.486
Present value of cash inflow for 3 years (Rs. 80,000 × 2.486)	1,98,880

	Rs.
Less: Cash outflow	
Purchase cost of new machine	1,50,000
Less: Salvage value of old machine	<u>80,000</u>
N.P.V. of cash inflow for 3 years	1,28,880
Equivalent annual net present value of cash	
Inflow of new machine $\left(\frac{\text{Rs. } 1,28,880}{2.486} \right)$	51,842

Statement showing present value of cash inflow of new machine when it replaces elderly machine next year

	Rs.
Cash inflow of a new machine per year	80,000
Cumulative present value for 1-3 years @ 10%	2.486

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Present value of cash inflow for 3 years (Rs. 80,000 × 2.486)	1,98,880
	Rs.
Less: Cash outflow	
Purchase cost of new machine	1,50,000
Less: Salvage value of old machine	<u>70,000</u>
	<u>80,000</u>
N.P.V. of cash inflow for 3 years	1,18,880
Equivalent annual net present value of cash Inflow $\left(\frac{\text{Rs. } 1,18,880}{2.486} \right)$	47,820

Advise: Since the equivalent annual cash inflow of new machine now and next year is more than cash inflow (Rs. 40,000) of an elderly machine the company Y is advised to replace the elderly machine now.

Company Y need not wait for the next year to replace the elderly machine since the equivalent annual cash inflow now is more than the next year's cash inflow.

Question 15

A private university with a current enrolment of 12,000 students is reviewing cost and revenue data for the past academic year. Student tuition is Rs. 3,600 a year. Tuition normally covers 75 per cent of university expenditures. The remaining 25 per cent comes from endowments and contributions. During the last academic year fixed costs amounted to Rs. 300 lakhs. The rest of the costs varied with student enrolment. Cost have been rising more rapidly than tuition or contributions, and the university just broke even last year. A tuition increase is being contemplated. The budget committee thinks endowment revenues and contributions will remain constant at last years' level for the next several years.

The fixed costs are expected to increase by Rs. 30 lakhs and the variable costs are expected to increase by 10 per cent. The president of the university tells the budget committee that he expects a new grant of Rs. 50 lakhs in addition to the normal contributions for each of the next 5 years from a large corporation owned by an alumnus of the university. The university has been postponing a number of major capital improvements and building projects.

Required:

- (i) If the grant is received and tuition is raised to Rs. 4,200, how much money would the university have available in the first year for capital improvements and building with student enrolment of 11,200 and the expected cost increases?
- (ii) If the grant is received and costs increases as predicted for the coming year, what tuition should the university charge to break-even with its current enrolment of 12,000 students after providing Rs. 40.40 lakhs for capital improvements? (12 marks) (May 2000)

Management Accounting and Financial Analysis

Answer

Past academic year

	(Rs. in lakhs)
Students tuition @ Rs. 3,600 × 12,000 students – (75%)	432
Endowment and contribution – (25%)	<u>144*</u>
Total cost	576*

$\left(* 25\% \text{ of total cost i.e. } \frac{100}{75} \times 432 = \text{Rs. } 576 \text{ lakhs} \right)$

Less: fixed cost	<u>300</u>
Variable cost	<u>276</u>

Hence variable cost per student = $\frac{\text{Rs. } 276 \text{ lakhs}}{12,000 \text{ students}} = \text{Rs. } 2,300$

*Out of fixed cost of Rs. 300 lakhs, endowment and contribution is of Rs. 144 lakhs.

Statement showing the money which would be available to the university in first year for capital improvements and building

		(Rs. in lakhs)
(i) Tuition fee Rs. 4,200 × 11,200 students		470.40
Add: Endowment and contribution	144.00	
Grant	<u>50.00</u>	<u>194.00</u>
		664.40
Less: Variable cost – Rs. 2,300 × 1.10 × 11,200 students	283.36	
Fixed cost – Rs. 300 lakhs + Rs. 30 lakhs	<u>330.00</u>	<u>613.36</u>
Balance for capital improvements		<u>51.04</u>

Statement showing the tuition fee which university should charge to break-even

(ii) Variable cost – Rs. 2,300 × 1.10 × 12,000 students	303.60
Add: Fixed cost Rs. 300 lakhs + Rs. 30 lakhs	330.00
Capital improvements	<u>40.40</u>
Total cost	674.00
Less: Endowment, contribution and grants	<u>194.00</u>
Balance from tuitions	<u>480.00</u>

Hence, tuition which university should charge from each student.

Project Planning and Capital Budgeting

$$= \frac{\text{Rs. 480 lakhs}}{12,000 \text{ students}} = \text{Rs. 4,000 per student.}$$

Question 16

What are the issues that need to be considered by an Indian investor and incorporated within the Net Present Value (NPV) model for the evaluation of foreign investment proposals?

(8 marks) (November, 2000)

Answer

The issues that need to be considered by an Indian investor and incorporated within the Net Present Value (NPV) model for the evaluation of foreign investment proposals are the following:

- (1) Taxes on income associated with foreign projects: The host country levies taxes (rates differ from country to country) on the income earned in that country by the Multi National Company (MNC). Major variations that occur regarding taxation of MNC's are as follows:
 - (i) Many countries rely heavily on indirect taxes such as excise duty, value added tax and turnover taxes etc.
 - (ii) Definition of taxable income differs from country to country and also some allowances e.g. rates allowed for depreciation.
 - (iii) Some countries allow tax exemption or reduced taxation on income from certain "desirable" investment projects in the form of tax holiday's, exemption from import and export duties and extra depreciation on plant and machinery etc.
 - (iv) Tax treaties entered into with different countries e.g. double taxation avoidance agreements.
 - (v) Offer of tax havens in the form of low or zero corporate tax rates.
- (2) Political risks: The extreme risks of doing business in overseas countries can be seizure of property/nationalisation of industry without paying full compensation. There are other ways of interferences in the operations of foreign subsidiary e.g. levy of additional taxes on profits or exchange control regulations may block the flow of funds, restrictions on employment of foreign managerial/technical personnel, restrictions on imports of raw materials/supplies, regulations requiring majority ownership vetting within the host country.

NPV model can be used to evaluate the risk of expropriation by considering probabilities of the occurrence of various events and these estimates may be used to calculate expected cash flows. The resultant expected net present value may be subjected to extensive sensitivity analysis.

Management Accounting and Financial Analysis

- (3) Economic risks: The two principal economic risks which influences the success of a project are exchange rate changes and inflation.

The impact of exchange rate changes and inflation upon incremental revenue and upon each element of incremental cost need to be computed.

Question 17

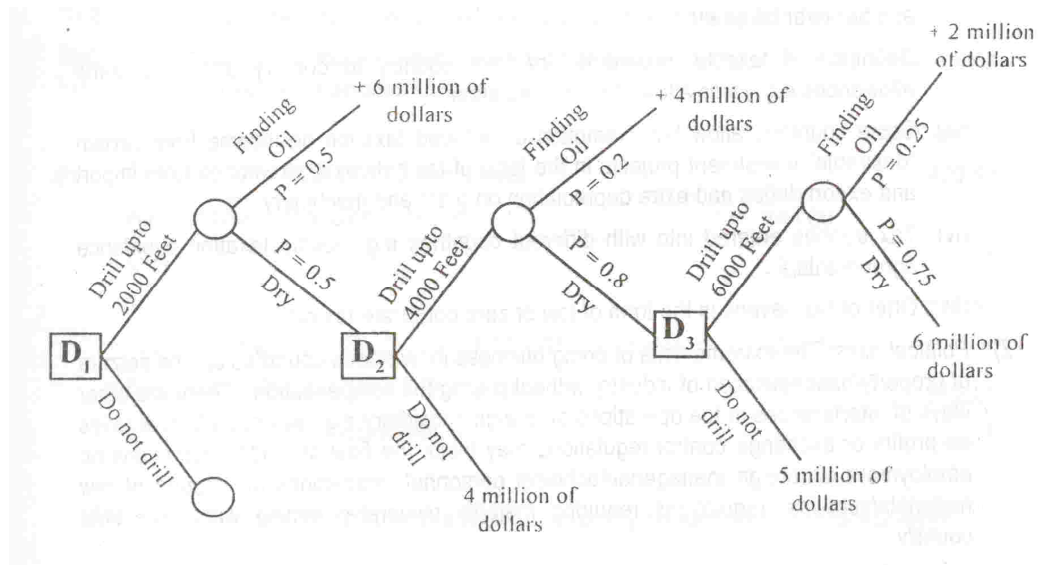
Big Oil is wondering whether to drill for oil in Westchester Country. The prospectus are as follows:

Depth of Well Feet	Total Cost Millions of Dollars	Cumulative Probability of Finding Oil	PV of Oil (If found) Millions of Dollars
2,000	4	0.5	10
4,000	5	0.6	9
6,000	6	0.7	8

Draw a decision tree showing the successive drilling decisions to be made by Big Oil. How deep should it be prepared to drill? (8 marks) (November, 2000)

Answer

The given data is easily represented by the following decision tree diagram:



There are three decision points in the tree indicated by D_1 , D_2 and D_3 .

Using rolling back technique, we shall take the decision at decision point D_3 first and then use it to arrive decision at a decisions point D_2 and then use it to arrive decision at a decision point D_1 .

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Statement showing the evaluation of decision at Decision Point D₃

Decision	Event	Probability	P.V. of Oil (if found) (Millions of dollars)	Expected P.V. of Oil (if found) (Millions of dollars)
1. Drill upto 6,000 feet	Finding Oil	0.25	+ 2	0.50
	Dry	0.75	–6	–4.50
	(Refer to working note)			–4.00
2. Do not drill				–5.00

Since the Expected P.V. of Oil (if found) on drilling upto 6,000 feet – 4 millions of dollars is greater than the cost of not drilling – 5 millions of dollars. Therefore, Big Oil should drill upto 6,000 feet.

Statement showing the evaluation of decision at Decision Point D₂

Decision	Event	Probability	P.V. of Oil (if found) (Millions of dollars)	Expected P.V. of Oil (if found) (Millions of dollars)
1. Drill upto 4,000 feet	Finding Oil	0.2	4	0.8
	Dry	0.8	–4	–3.2
	(Refer to working note)			–2.4
2. Do not drill				–4

Since the Expected P.V. of Oil (if found) on drilling upto 4,000 feet – 2.4 millions of dollars is greater than the cost of not drilling – 4 millions of dollars. Therefore, Big Oil should drill upto 4,000 feet.

Statement showing the evaluation of decision at Decision Point D₁

Decision	Event	Probability	P.V. of Oil (if found) (Millions of dollars)	Expected P.V. of Oil (if found) (Millions of dollars)
1. Drill upto 2,000 feet	Finding Oil	0.5	6	3.0
	Dry	0.5	–2.4	–1.2
	(Refer to working note)			1.8
2. Do not drill				NIL

Management Accounting and Financial Analysis

Since the Expected P.V. of Oil (if found) on drilling upto 2,000 feet is 1.8 millions of dollars (positive), Big Oil should drill upto 2,000 feet.

Working Notes:

Let x be the event of not finding oil at 2,000 feet and y be the event of not finding oil at 4,000 feet and z be the event of not finding oil at 6,000 feet.

We know, that,

$$P(x \cap y) = P(x) \times P(y/x)$$

Where, $P(x \cap y)$ is the joint probability of not finding oil at 2,000 feet and 4,000 feet, $P(x)$ is the probability of not finding oil at 2,000 feet and $P(y/x)$ is the probability of not finding oil at 4,000 feet, if the event x has already occurred.

$$\begin{aligned} P(x \cap y) &= 1 - \text{Cumulative probability of finding oil at 4,000 feet} \\ &= 1 - 0.6 = 0.4 \end{aligned}$$

$$\begin{aligned} P(x) &= 1 - \text{Probability of finding oil at 2,000 feet} \\ &= 1 - 0.5 = 0.5 \end{aligned}$$

$$\text{Hence, } P(y/x) = \frac{P(x \cap y)}{P(x)} = \frac{0.4}{0.5} = 0.8$$

Therefore, probability of finding oil between 2,000 feet to 4,000 feet = $1 - 0.8 = 0.2$ we know that

$$P(x \cap y \cap z) = P(x) \times P(y/x) \times P(z/x \cap y)$$

Where $P(x \cap y \cap z)$ is the joint probability of not finding oil at 2,000 feet, 4,000 feet and 6,000 feet, $P(x)$ and $P(y/x)$ are as explained earlier and $P(z/x \cap y)$ is the probability of not finding oil at 6,000 feet if the event x and y has already occurred.

$$\begin{aligned} P(x \cap y \cap z) &= 1 - \text{Cumulative probability of finding oil at 6,000 feet} \\ &= 1 - 0.7 = 0.3 \end{aligned}$$

$$P(z/x \cap y) = \frac{P(x \cap y \cap z)}{P(x) \times P(y/x)} = \frac{0.3}{0.5 \times 0.8} = \frac{0.3}{0.4} = 0.75$$

Therefore, probability of finding oil between 4,000 feet to 6,000 feet = $1 - 0.75 = 0.25$

Question 18

Ze-Te Fashions is a high-fashion women's garments manufacturer. It is planning to introduce a new fashion garment in the market in the forthcoming Diwali season. Four metres of cloth (material) are required to layout the dress pattern. After cutting, some material remains that can be sold as a cut-piece. The left-over material can also be used to manufacture a matching cap and handbag.

Ze-Te expects to sell 2,500 dresses, if matching caps and handbags are not provided and 20% more, if matching caps and handbags are made available. The market research

Project Planning and Capital Budgeting

indicates that the cap and/or handbag cannot be sold independently, but only as accessories with the dress.

The following combination of sales is expected:

Complete sets of dress, can and handbag	68%
Dress and Cap only	12%
Dress and handbag only	09%
Dress only	<u>11%</u>
	<u>100%</u>

The material used in the dress costs Rs. 60 per metre. The cost of cutting the dress, if the cap and handbag are not manufactured, is estimated at Rs. 20 a dress and the resulting remnants can be sold for Rs. 5 for each dress cut out.

If the cap and handbag are to be manufactured, it requires a more delicate and skillful cutting and hence cutting cost will increase by Rs. 8 per dress.

The selling prices and the other costs to complete the three items, once they are cut, are as follows:

	Selling price per unit	Other costs per unit
	Rs.	Rs.
Dress	400.00	48.00
Cap	29.00	6.50
Handbag	18.00	3.00

Other costs per unit excludes the cost of material and cutting.

You are required to prepare a statement showing:

- Should the company go in for caps and handbags along with dresses? Substantiate your answer.
- What are the non-quantitative factors that could influence the company's decision to manufacture caps and handbags that match the dress? (16 + 4 = 20 marks) (May 2001)

Management Accounting and Financial Analysis

Answer

(a) Statement showing profitability of Ze-Te Fashions		
	If matching caps and handbags are not provided with dresses	If matching caps and handbags are provided with dresses
Expected Sales/Forecasted Sales (pieces)	2,500	3,000
	Rs.	Rs.
Sales revenue: (A)	10,00,000	13,11,180
	(2,500 dresses × Rs. 400)	(Refer to working note 2)
Costs		
Materials (i)	5,87,500	7,18,350
(Refer to working note 3)		
Cutting (ii)	50,000	81,360
	(2,500 dresses × Rs. 20)	(Refer to working note 4)
Others (iii)	1,20,000	1,66,530
	(2,500 dresses × Rs. 48)	(Refer to working note 5)
Total costs : (B) = [(i) + (ii) + (iii)]	7,57,500	9,66,240
Operating profit : (A) – (B)	2,42,500	3,44,940

Since, the company can earn an additional profit of Rs. 1,02,440 (Rs. 3,44,940 – Rs. 2,42,500) if matching caps and handbags are provided along with dresses. Therefore, the company should go for manufacturing matching caps and handbags and provide them along with dresses.

Working Notes:

1. Expected sales in forthcoming season, if caps and handbags are provided with dresses:

Complete sets of dress, cap and handbag	(68% of 3,000)	2,040 dresses
Dress and cap only	(12% of 3,000)	360 dresses
Dress and handbag only	(9% of 3,000)	270 dresses
Dress only	(11% of 3,000)	<u>330 dresses</u>
		<u>3,000 dresses</u>

Project Planning and Capital Budgeting

2. Sales revenue of expected sales, if caps and handbags are provided with dresses.

	Rs.
Complete set of dress, cap and handbag (2,040 dresses × Rs. 447)	9,11,880
Dress and cap only (360 dresses × Rs. 429)	1,54,440
Dress and handbag only (270 dresses × Rs. 418)	1,12,860
Dress only (330 dresses × Rs. 400)	<u>1,32,000</u>
	<u>13,11,180</u>

3. Material

	Rs.
For 2,500 dresses (4 metres × Rs. 60 per metre – Rs. 5) for 3,000 dresses	5,87,500
2,670 dresses (4 metres × Rs. 60 per metre) + 330 dresses (4 metres × Rs. 60 per metre – Rs. 5)	<u>7,18,350</u>

4. Cutting costs for 3,000 dresses

	Rs.
(2,670 dresses × Rs. 28 + 330 dresses × Rs. 20)	81,360

5. Other costs for 3,000 dresses

	Rs.
Complete set of dress, cap and handbag (2,040 dresses × Rs. 57.50)	1,17,300
Dress and cap only (360 dresses × Rs. 54.50)	19,620
Dress and handbag only (270 dresses × Rs. 51)	13,770
Dress only (330 dresses × Rs. 48)	<u>15,840</u>
	<u>1,66,530</u>

- (b) Non-quantitative factors that could influence the company's decision to manufacture caps and handbags that match the dress are:
 1. Reliability of various estimates of costs, sales and prices.
 2. Proper consideration of quality in terms of design, colour and durability.
 3. Timing of production and distribution of four combination i.e. complete set of dress, dress and cap, dress and handbags and dress only has been planned suitably in advance.
 4. Effect on the production, sale of other product lines of Ze-Te Fashions has to be examined.

Management Accounting and Financial Analysis

Question 19

Many companies calculate the internal rate of return of the incremental after-tax cash-flows from financial leases.

What problems do you think this may give rise to? To what rate should the internal rate of return be compared? Discuss. (8 marks) (May 2001)

Answer

Main problems faced in using Internal Rate of Return can be enumerated as under:

- (1) The IRR method cannot be used to choose between alternative lease bases with different lives or payment patterns.
- (2) If the firms do not pay tax or pay at constant rate, then IRR should be calculated from the lease cash-flows and compared to after-tax rate of interest. However, if the firm is in a temporary non-tax paying status, its cost of capital changes over time, and there is no simple standard of comparison.
- (3) Another problem is that risk is not constant. For the lessee, the payments are fairly riskless and interest rate should reflect this. The salvage value for the asset, however, is probably much riskier. As such two discount rates are needed. IRR gives only one rate, and thus, each cash-flow is not implicitly discounted to reflect its risk.
- (4) Multiple roots rarely occur in capital budgeting since the expected cash – flow usually change signs once. With leasing, this is not the case often. A lessee will have an immediate cash inflow, a series of outflows for a number of years, and then an inflow during the terminal year. With two changes of sign, there may be, in practice frequently two solutions for the IRR.

Question 20

XYZ Ltd., an infrastructure company is evaluating a proposal to build, operate and transfer a section of 35 kms. of road at a project cost of Rs. 200 crores to be financed as follows:

Equity Shares Capital Rs. 50 crores, loans at the rate of interest of 15% p.a. from financial institutions Rs. 150 crores. The Project after completion will be opened to traffic and a toll will be collected for a period of 15 years from the vehicles using the road. The company is also required to maintain the road during the above 15 years and after the completion of that period, it will be handed over to the Highway authorities at zero value. It is estimated that the toll revenue will be Rs. 50 crores per annum and the annual toll collection expenses including maintenance of the roads will amount to 5% of the project cost. The company considers to write off the total cost of the project in 15 years on a straight line basis. For Corporate Income-tax purposes the company is allowed to take depreciation @ 10% on WDV basis. The financial institutions are agreeable for the repayment of the loan in 15 equal annual instalments – consisting of principal and interest.

Calculate Project IRR and Equity IRR. Ignore Corporate taxation.

Explain the difference in Project IRR and Equity IRR (14 marks) (November, 2001)

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Answer

Computation of Project IRR

Project IRR is computed by using the following equation:

Where,

CO_0 = Cash outflow at time zero

CF_i = Net cash inflow at different points of time

N = Life of the project and

R = Rate of discount (IRR)

Now,

CO_0 = Rs. 200 crores

CF_i = Rs. 40 crores p.a. for 15 years

(Refer to working note (i))

Therefore,

$$\text{Rs. 200 crore} = \frac{\text{Rs. 40 crores}}{(1+r)^{15}}$$

The value of IRR of the project:

1. An approximation of IRR is made on the basis of cash flow data. A rough approximation may be made with reference to the payback period. The payback period in the given case is 5 years i.e. $\left(\frac{\text{Rs. 200 crores}}{\text{Rs. 40 crores}} \right)$. From the PVAF table the closest figures are given in rate 18% (5.092) and the rate 19% (4.876). This means the IRR of the project is expected to be between 18% and 19%.
2. The estimate of IRR cash inflow of the project for both these rates is as follows:
At 18% = Rs. 40 crores $\times$ PVAF (18%, 15 years)
= Rs. 40 crores $\times$ 5.092
= Rs. 203.68
At 19% = Rs. 40 crores $\times$ PVAF (19%, 15 years)
= Rs. 40 crores $\times$ 4.876
= Rs. 195.04
3. The exact IRR by interpolating between 18% and 19% is worked out as follows:

$$\text{IRR} = 18\% + \frac{\text{Rs. 203.68 crores} - \text{Rs. 200 crores}}{\text{Rs. 203.68 crores} - \text{Rs. 195.04 crores}} \times 1\%$$

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$$\begin{aligned} &= 18\% + \frac{\text{Rs. 3.68 crores}}{\text{Rs. 8.64 crores}} \times 1\% \\ &= 18\% + 0.426\% \\ &= 18.43\% \end{aligned}$$

Therefore, the IRR of the project is 18.43%.

Working Notes:

(i) Net cash inflow of the project

Cash inflow		Rs.
Toll revenue	50 crores p.a. for 15 years	
Cash outflow		Rs.
Toll collection expenses including maintenance of the roads	10 crores p.a. for 15 years	
(5% of Rs. 200 crores)		
Net cash inflow	<u>40 crores p.a. for 15 years</u>	

Note: Since corporate taxes is not payable. The impact of depreciation need not be considered.

Computation of Equity IRR

Equity IRR is computed by using the following equation:

$$\text{Cash inflow at zero date from equity shareholders} = \frac{\text{Cash inflow available for equity shareholders}}{(1+r)^n}$$

Where,

r = Equity IRR

n = Life of the project

Here, Cash inflow at zero date from equity shareholders = Rs. 50 crores

Cash inflow for equity shareholders = Rs. 14.35 crores p.a.

(Refer to working note)

Therefore:

$$\text{Rs. 50 crores} = \frac{\text{Rs. 14.35 crores}}{(1+r)^{15}}$$

The value of equity IRR of the project is calculated as follows:

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An approximation of IRR is made on the basis of cash flow data. A rough approximation may be made with reference to the payable period. The payback period in the given case is $3.484 \left(\frac{\text{Rs. 50 crores}}{\text{Rs. 14.35 crores}} \right)$. From the PVAF table at 28% the cumulative discount factor for 1 –15 years is 3.484. Therefore, the equity IRR of project is 28%.

- (ii) Equated annual instalment (i.e. principal + interest) of loan from financial institution:

Amount of loan from financial institution	Rs. 150 crores
Rate of interest	15% p.a.
No. of years	15
Cumulative discount factor for 1-15 years	5.847

Hence, equated yearly instalment will be Rs. 150 crores/5.847 i.e. Rs. 25.65 crores.

- (iii) Cash inflow available for equity shareholders

Net cash inflow of the project	Rs. 40.00 crores
[Refer to working note (i)]	
Equated yearly instalment of the project	Rs. 25.65 crores
[Refer to working note (ii)]	
Cash inflow available for equity shareholders	<u>Rs. 14.35 crores</u>

Difference in Project IRR and Equity IRR:

The project IRR is 18.4% whereas Equity IRR is 28%. This is attributed to the fact that XYZ Ltd. is earning 18.4% on the loan from financial institution but paying only 15%. The difference between the return and cost of funds from financial institution has enhanced equity IRR. The 3.4% (18.4% - 15%) earnings on Rs. 150 crores goes to equity shareholders who have invested Rs. 50 crore i.e.

$$3.4\% \times \frac{\text{Rs. 150 crores}}{\text{Rs. 50 crores}} = 10.2\% \text{ is added to the project IRR which gives equity IRR of 28\%}.$$

Question 21

DD amusement Park charges Rs. 4 each for all rides in the park. Variable costs amount to Re. 0.80 per ride and fixed costs are Rs. 32,00,000. Last year's net income was Rs. 6,40,000 on sales of Rs. 48,00,000. Rising costs have cut sharply into net income for DD for the last 2 years. This year management again expects a cost increase of 25 per cent in variable costs and 10 per cent in fixed costs. To help offset these increases, the management is considering raising the price of a ride to Rs. 5.

Required:

- (1) How many rides did DD sell last year?

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- (2) If the price increase is not implemented, what s the expected net income for this year assuming the same volume of activity?
- (3) Compute the price in difference point for the new ride price.
- (4) Compute the Break-even point for this year using the old price and the new price.
- (5) Should management raise the price of a ride, if the price increase will reduce ride volume 10 per cent from the last years' level? In that situation, what will be the expected net income? (November, 2001)

Answer

- (1) Rides which DD Amusement Park sell last year

$$\begin{aligned}
 \text{(No. of rides DD sell last year)} &= \frac{\text{Total Sales of rides last year}}{\text{Charges per ride last year}} \\
 &= \frac{\text{Rs. 48,00,000}}{\text{Rs. 4}} \\
 &= \text{Rs. 12,00,000 rides}
 \end{aligned}$$

- (2) Expected net income for this year if price increase is not implemented
(assuming the same volume of activity)

	Rs.
Charges per ride	4
Less: Expected Variable cost per ride (Refer to working note 1)	<u>1</u>
Contribution per ride: (A)	3
No. of rides : (B)	12,00,000
Total expected contribution for all rides: (C) = (A) × (B)	36,00,000
Less: Expected fixed costs (Refer to working note (ii))	<u>35,20,000</u>
Expected net income	<u>80,000</u>

- (3) Price indifference point for the new ride price

Price indifference point is a point at which the expected profits remains the same irrespective of sales price and costs.

	Rs.
New ride price	5.00
Less: Variable cost	<u>1.00</u>
Contribution per ride	<u>4.00</u>
Fixed costs of this year: (A)	35,20,000
Net income of last year: (B)	<u>6,40,000</u>
Contribution required: (A) + (B)	<u>41,60,000</u>

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$$\text{Price - indifference point} = \frac{\text{Rs. } 41,60,000}{\text{Rs. } 4} = 10,40,000 \text{ rides}$$

- (4) Break even point for this year using the old price and the new price

$$\text{Break even point} = \frac{\text{Fixed costs}}{\text{Contribution per ride}}$$

$$\begin{aligned} \text{At old price} &= \frac{\text{Rs. } 35,20,000}{\text{Rs. } 4 - \text{Re. } 1} \\ &= 11,73,334 \text{ rides} \end{aligned}$$

$$\begin{aligned} \text{At new price} &= \frac{\text{Rs. } 35,20,000}{\text{Rs. } 5 - \text{Re. } 1} \\ &= 8,80,000 \text{ rides} \end{aligned}$$

- (5) Expected net income if the price increase will reduce ride volume by 10% from the last year's levels.

	Rs.
Charges per ride	5.00
Less: Variable cost	<u>1.00</u>
Contribution per ride: (A)	<u>4.00</u>
No. of rides (12,00,000 – 1,20,000): (B)	10,80,000
Total contribution for all rides : (A) × (B)	43,20,000
Less: Fixed costs	<u>35,20,000</u>
Expected net income	<u>8,00,000</u>

Justification:

Since the increase in price of a ride will increase the net income by Rs. 1,60,000 (Rs. 8,00,000 – Rs. 6,40,000) the management should raise the price of a ride.

- (i) Expected variable cost this year

Variable cost last year	Re. 0.80 per ride
Add: Expected increase this year (25% of Re. 0.80)	<u>Re. 0.020 per ride</u>
Expected variable cost this year	<u>1.00 per ride</u>

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(ii) Expected fixed costs this year

	Rs.
Fixed costs last year	32,00,000
Add: Expected increase this year (10% of Rs. 32,00,000)	<u>3,20,000</u>
Expected fixed costs this year	<u>35,20,000</u>

Question 22

The total market value of the equity share of O.R.E. Company is Rs. 60,00,000 and the total value of the debt is Rs. 40,00,000. The treasurer estimate that the beta of the stock is currently 1.5 and that the expected risk premium on the market is 10 per cent. The treasury bill rate is 8 per cent.

Required:

- (1) What is the beta of the Company's existing portfolio of assets?
- (2) Estimate the Company's Cost of capital and the discount rate for an expansion of the company's present business. (6 marks) (November, 2001)

Answer

$$(1) \quad \beta_{\text{company assets}} = \beta_{\text{equity}} \times \frac{V_E}{V_0} + \beta_{\text{debt}} \times \frac{V_D}{V_0}$$

If company's debt capital is riskless than above relationship become:

$$\text{Here } \beta_{\text{equity}} = 1.5 \beta_{\text{assets}} = \beta_{\text{equity}} \frac{V_E}{V_0}$$

$$\beta_{\text{debt}} = 0$$

Note: Since β_{debt} is not given it is assumed that company debt capital is virtually riskless.

$$V_E = \text{Rs. 60 lakhs.}$$

$$V_D = \text{Rs. 40 lakhs.}$$

$$V_0 = \text{Rs. 100 lakhs.}$$

$$\begin{aligned} \beta_{\text{company assets}} &= 1.5 \times \frac{\text{Rs. 60 lakhs}}{\text{Rs. 100 lakhs}} \\ &= 0.9 \end{aligned}$$

- (2) Company's cost of capital = $\beta_8 \beta_A \times \text{Risk premium}$

Where β_8 = Risk free rate of return

β_A = Beta of company assets

Therefore, company's cost of capital = $8\% + 0.9 \times 10 = 17\%$

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In case of expansion of the company's present business, the same rate of return i.e. 17% will be used. However, in case of diversification into new business the risk profile of new business is likely to be different. Therefore, different discount factor has to be worked out for such business.

Question 23

Distinguish between Net Present-value and Internal Rate of Return. (2 marks) (May 2002)

Answer

NPV and IRR: NPV and IRR methods differ in the sense that the results regarding the choice of an asset under certain circumstances are mutually contradictory under two methods. IN case of mutually exclusive investment projects, in certain situations, they may give contradictory results such that if the NPV method finds one proposal acceptable, IRR favours another. The different rankings given by the NPV and IRR methods could be due to size disparity problem, time disparity problem and unequal expected lives.

The net present value is expressed in financial values whereas internal rate of return (IRR) is expressed in percentage terms.

In net present value cash flows are assumed to be re-invested at cost of capital rate. In IRR re-investment is assumed to be made at IRR rates.

Question 24

X Ltd. an existing profit-making company, is planning to introduce a new product with a projected life of 8 years. Initial equipment cost will be Rs. 120 lakhs and additional equipment costing Rs. 10 lakhs will be needed at the beginning of third year. At the end of the 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for Rs. 1 lakhs. Working Capital of Rs. 15 lakhs will be needed. The 100% capacity of the plant is of 4,00,000 units per annum, but the production and sales-volume expected are as under:

Year	Capacity in percentage
1	20
2	30
3-5	75
6-8	50

A sale price of Rs. 100 per unit with a profit-volume ratio of 60% is likely to be obtained. Fixed Operating Cash Cost are likely to be Rs. 16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure in Rs. lakhs each year	30	15	10	4

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The company is subject to 50% tax, straight-line method of depreciation, (permissible for tax purposes also) and taking 12% as appropriate after tax Cost of Capital, should the project be accepted? (14 marks) (May 2002)

Answer

(a) Computation of initial cash outlay

(Rs. in lakhs)

Equipment Cost (0)	120
Working Capital (0)	<u>15</u>
	<u>135</u>

Calculation of Cash Inflows:

Year	1	2	3-5	6-8
Sales in units	80,000	1,20,000	3,00,000	2,00,000
	Rs.	Rs.	Rs.	Rs.
Contribution @ Rs. 60 p.u.	48,00,000	72,00,000	1,80,00,000	1,20,00,000
Fixed cost	16,00,000	16,00,000	16,00,000	16,00,000
Advertisement	30,00,000	15,00,000	10,00,000	4,00,000
Depreciation	<u>15,00,000</u>	<u>15,00,000</u>	<u>16,50,000</u>	<u>16,50,000</u>
Profit/(loss)	(13,00,000)	26,00,000	1,37,50,000	83,50,000
Tax @ 50%	<u>Nil</u>	<u>13,00,000</u>	<u>68,75,000</u>	<u>41,75,000</u>
Profit/(loss) after tax	(13,00,000)	13,00,000	68,75,000	41,75,000
Add: Depreciation	<u>15,00,000</u>	<u>15,00,000</u>	<u>16,50,000</u>	<u>16,50,000</u>
Cash Inflow	<u>2,00,000</u>	<u>28,00,000</u>	<u>85,25,000</u>	<u>58,25,000</u>

Computation of PV of CIF

Year	CIF	PV Factor @ 12%	Rs.
	Rs.		Rs.
1	2,00,000	.893	1,78,600
2	28,00,000	.797	22,31,600
3	85,25,000	.712	60,69,800
4	85,25,000	.636	54,21,900
5	85,25,000	.567	48,33,675
6	58,25,000	.507	29,53,275
7	58,25,000	.452	26,32,900

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8	58,25,000	.404	29,99,700
	15,00,000		
WC			
SV	1,00,000		
			2,73,21,450
	PV of COF 0 1,35,00,000		
Additional Investment = Rs. 10,00,000 × .797			<u>7,97,000</u>
			NPV
			<u>1,42,97,000</u>
			<u>1,30,24,450</u>

Recommendation: Accept the project in view of positive NPV.

Question 25

Write short note on Certainty Equivalent Approach.

(4 marks) (May 2002)

Answer

Certainty Equivalent Approach: This approach recognizes risk in capital budgeting analysis by adjusting estimated cash flows and employs risk free rate to discount the adjusted cash-flows. Under this method, the expected cash flows of the project are converted to equivalent riskless amounts. The greater the risk of an expected cash flow, the smaller the certainty equivalent value for receipts and longer the C.E. value for payment. This approach is superior to the risk adjusted discounted approach as it can measure risk more accurately.

This is yet another approach for dealing with risk in capital budgeting to reduce the forecasts of cash flows to some conservative levels. In certainty Equivalent approach we incorporate risk to adjust the cash flows of a proposal so as to reflect the risk element. The certainty Equivalent approach adjusts future cash flows rather than discount rates. This approach explicitly recognizes risk, but the procedure for reducing the forecasts of cash flows is implicit and likely to be inconsistent from one investment to another.

Question 26

- (a) What is the sensitivity analysis in Capital Budgeting?
- (b) Skylark Airways is planning to acquire a light commercial aircraft for flying class clients at an investment of Rs. 50,00,000. The expected cash flow after tax for the next three years is as follows:

Year 1		Year 2		Year 3	
CFAT	Probability	CFAT	Probability	CFAT	Probability
14,00,000	0.1	15,00,000	0.1	18,00,000	0.2
18,00,000	0.2	20,00,000	0.3	25,00,000	0.5

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25,00,000	0.4	32,00,000	0.4	35,00,000	0.2
40,00,000	0.3	45,00,000	0.2	48,00,000	0.1

The Company wishes to take into consideration all possible risk factors relating to an airline operations. The company wants to know:

- (i) The expected NPV of this venture assuming independent probability distribution with 6 per cent risk free rate of interest.
 - (ii) The possible deviation in the expected value.
 - (iii) How would standard deviation of the present value distribution help in Capital Budgeting decisions?
- (6 + 14 = 20 marks)(November, 2002)

Answer

- (a) Sensitivity Analysis in Capital Budgeting: Sensitivity analysis is used in Capital budgeting for more precisely measuring the risk. It helps in assessing information as to how sensitive are the estimated. Parameters of the project, such as, cash flows, discount rate, and the project life to the estimation errors. Future being always uncertain and estimations are always subject to error, sensitivity analysis takes care of estimation errors by using a number of possible outcomes in evaluating a project. The methodology adopted in sensitivity analysis is to evaluate a project by using a number of estimated cash flows so as to provide to the decision maker an insight into the variability of outcome. Thus, it is a technique of risk analysis which studies the responsiveness of a criterion of merit like NPV or IRR to variation in underlying factors like selling price, quantity sold, returns from an investment etc.

Sensitivity analysis answers questions like,

- (i) What happens to the present value (or some other criterion of merit) if flows are, say Rs. 50,000 than the expected Rs. 80,000?
- (ii) What will happen to NPV if the economic life of the project is only 3 years rather than expected 5 years?

Therefore, wherever there is an uncertainty, of whatever type, the sensitivity analysis plays a crucial role. However, it should not be viewed as the method to remove the risk or uncertainty, it is only a tool to analyse and measure the risk and uncertainty. In terms of capital budgeting the possible cash flows are based on three assumptions:

- (a) Cash flows may be worst (pessimistic)
- (b) Cash flows may be most likely.
- (c) Cash flows may be most optimistic.

Sensitivity analysis involves three steps

- (1) Identification of all those variables having an influence on the project's NPV or IRR.
- (2) Definition of the underlying quantitative relationship among the variables.

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- (3) Analysis of the impact of the changes in each of the variables on the NPV of the project.

The decision maker, in sensitivity analysis always asks himself the question – what if?

(b) (i)			Expected NPV			(Rs. in lakhs)		
Year I			Year II			Year III		
CFAT	P	CF×P	CFAT	P	CF×P	CFAT	P	CF×P
14	0.1	1.4	15	0.1	1.5	18	0.2	3.6
18	0.2	3.6	20	0.3	6.0	25	0.5	12.5
25	0.4	10.0	32	0.4	12.8	35	0.2	7.0
40	0.3	<u>12.0</u>	45	0.2	<u>9</u>	48	0.1	<u>4.8</u>
	$\bar{x}$ or $\overline{CF}$	<u>27.0</u>		$\bar{x}$ or $\overline{CF}$	<u>29.3</u>		$\bar{x}$ or $\overline{CF}$	<u>27.9</u>

NPV	PV factor @ 6%	Total PV
27	0.943	25.461
29.3	0.890	26.077
27.9	0.840	<u>23.436</u>
	PV of cash inflow	74.974
	Less: Cash outflow	<u>50.000</u>
	NPV	<u>24.974</u>

- (ii) Possible deviation in the expected value

Year I				
$X - \bar{X}$	$X - \bar{X}$	$(X - \bar{X})^2$	P_1	$(X - \bar{X})^2 P_1$
14 – 27	-13	169	0.1	16.9
18 – 27	-9	81	0.2	16.2
25 – 27	-2	4	0.4	1.6
40 – 27	13	169	0.3	<u>50.7</u>
				<u>85.4</u>

$$\sigma_1 = \sqrt{85.4} = 9.241$$

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Year II

$X - \bar{X}$	$X - \bar{X}$	$(X - \bar{X})^2$	P_2	$(X - \bar{X})^2 \times P_2$
15-29.3	-14.3	204.49	0.1	20.449
20-29.3	-9.3	86.49	0.3	25.947
32-29.3	2.7	7.29	0.4	2.916
45-29.3	15.7	246.49	0.2	<u>49.298</u>
				<u>98.61</u>

$$\sigma_2 = \sqrt{98.61} = 9.930$$

Year III

$X - \bar{X}$	$X - \bar{X}$	$(X - \bar{X})^2$	P_3	$(X - \bar{X})^2 \times P_3$
18-27.9	-9.9	98.01	0.2	19.602
25-27.9	-2.9	8.41	0.5	4.205
35-27.9	7.1	50.41	0.2	10.082
48-27.9	20.1	404.01	0.1	<u>40.401</u>
				<u>74.29</u>

$$\sigma_3 = \sqrt{74.29} = 8.619$$

Standard deviation about the expected value:

$$= \sqrt{\frac{85.4}{(1.06)^2} + \frac{98.61}{(1.06)^4} + \frac{74.29}{(1.06)^6}} = 14.3695$$

- (iii) Standard deviation is a statistical measure of dispersion; it measures the deviation from a central number i.e. the mean.

In the context of capital budgeting decisions especially where we take up two or more projects giving somewhat similar mean cash flows, by calculating standard deviation in such cases, we can measure in each case the extent of variation. It can then be used to identify which of the projects is least riskier in terms of variability of cash flows.

A project, which has a lower coefficient of variation will be preferred if sizes are heterogeneous.

Besides this, if we assume that probability distribution is approximately normal we are able to calculate the probability of a capital budgeting project generating a net present value less than or more than a specified amount.

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Question 27

Agrani Ltd. is in the business of manufacturing bearings. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is Rs. 40,00,000 having a useful life of 5 years with the salvage value of Rs. 8,00,000. The full purchase value of machine can be financed by 20% loan repayable in five equal instalments falling due at the end of each year. Alternatively, the machine can be procured on a 5 years lease, year-end lease rentals being Rs. 12,00,000 per annum. The Company follows the written down value method of depreciation at the rate of 25%. Company's tax rate is 35 per cent and cost of capital is 16 per cent:

- (i) Advise the company which option it should choose – lease or borrow.
- (ii) Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 14% cost of capital (Detailed working notes should be given. Calculations can be rounded off to Rs. lakhs). (20 marks)(November, 2002)

Answer

- (i) P.V. of Cash outflow under lease option

(in Rs.)			
Year	Lease Rental after tax	PVIFA @ 13%	Total P.V.
1 – 5	12,00,000 (I – T)	20% (I – T)	
	= 7,80,000	3.517	27,43,260

Cash Outflow under borrowing option

5 equal instalments

Rs. 40,00,000 ÷ 2.991 (PVIFA 20%) = 13,37,345

Tax Advantage

Year	Loan Instalments	On Interest	On Depreciation	Net Cash Outflow	PVIF 13%	Total PV
1	13,37,345	2,80,000	3,50,000	7,07,345	.885	6,26,000
2	13,37,345	2,48,386	2,62,500	8,26,459	.783	6,47,117
3	13,37,345	1,97,249	1,96,875	9,43,221	.693	6,53,652
4	13,37,345	1,43,085	1,47,656	10,46,604	.613	6,41,568
5	13,37,345	78,087	1,10,742	11,48,516	.543	<u>6,23,644</u>
						<u>31,91,981</u>

Total PV 31,91,981

Less: PV Salvage value adjusted for Tax savings on loss of sale of machinery

4,62,759

(Rs. 8,00,000 × .543 = Rs. 4,34,400) + (Rs.

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28,359)

(See Working Note on Depreciation)

$9,49,219 - 8,00,000 =$

$1,49,219 \times .35 \times .543 = 28,359$

Total present value of cash outflow	<u>27,29,222</u>
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Decision: PV of cash outflow of lease option is greater than borrow option and hence borrow option is recommended.

Working Notes:

1. Debt and Interest Payments

Year	Loan Instalments	Loan at the beginning of the year	Interest	Principal	Balance at the end of year
1	13,37,345	40,00,000	8,00,000	5,37,345	34,62,655
2	13,37,345	34,62,655	6,92,531	6,44,814	28,17,841
3	13,37,345	28,17,841	5,63,568	7,73,777	20,44,064
4	13,37,345	20,44,064	4,08,813	9,28,532	11,15,532
5	13,37,345	11,15,532	2,23,106	11,14,239	-

2.

Year	Depreciation
1	$40,00,000 \times .25$ 10,00,000
2	$30,00,000 \times .25$ 7,50,000
3	$22,50,000 \times .25$ 5,62,500
4	$16,87,500 \times .25$ 4,21,875
5	$12,65,625 \times .25$ 3,16,406

B.V. of machine = $12,65,625 - 3,16,406 = 9,49,219$.

Project Planning and Capital Budgeting

(ii) Proposal From the View Point of Lessor

Lessor's Cash Flow

	1	2	3	4	5
Lease Rentals	12,00,000	12,00,000	12,00,000	12,00,000	12,00,000
Less: Dep.	<u>10,00,000</u>	<u>7,50,000</u>	<u>5,62,500</u>	<u>4,21,875</u>	<u>3,16,406</u>
EBT	2,00,000	4,50,000	6,37,500	7,78,125	8,83,594
Less: Tax @ 35%	70,000	1,57,500	2,23,125	2,72,344	3,09,258
EAT	1,30,000	2,92,500	4,14,375	5,05,781	5,74,336
CFAT	11,30,000	10,42,500	9,76,875	9,27,656	8,90,742
PV factor @ 14%	.877	.760	.675	.592	.519
PV	9,91,010	7,92,300	6,59,391	5,49,172	4,62,295

Total P.V. = 34,54,168

Add: Tax Saving on sale of asset 27,106

Total PV of cash inflow 34,81,274

Cost of Machine 40,00,000

NPV (5,18,726)

Decision: Lease rate is not financially viable. Hence, not recommended.

Question 28

- (a) Cyber Company is considering two mutually exclusive projects. Investment outlay of both the projects is Rs. 5,00,000 and each is expected to have a life of 5 years. Under three possible situations their annual cash flows and probabilities are as under:

Situation	Probabilities	Cash Flow	Rs.
		Project A	Project B
Good	0.3	6,00,000	5,00,000
Normal	0.4	4,00,000	4,00,000
Worse	0.3	2,00,000	3,00,000

The cost of capital is 7 per cent, which project should be accepted? Explain with workings.

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(b) A company is considering Projects X and Y with following information:

Project	Expected NPV (Rs.)	Standard deviation
X	1,22,000	90,000
Y	2,25,000	1,20,000

- (i) Which project will you recommend based on the above data?
- (ii) Explain whether your opinion will change, if you use coefficient of variation as a measure of risk.
- (iii) Which measure is more appropriate in this situation and why?

(3 + 3 = 6 marks) (May 2003)

Answer

(a) Project A

Expected Net Cash flow (ENCF)

$$.3 (6,00,000) + .4 (4,00,000) + .3 (2,00,000) = 4,00,000$$

$$\sigma^2 = .3 (6,00,000 - 4,00,000)^2 + .4 (4,00,000 - 4,00,000)^2 + .3 (2,00,000 - 4,00,000)^2$$

$$\sigma = \sqrt{24,00,00,00,000}$$

$$\sigma = 1,54,919.33$$

$$\text{ENPV} = 4,00,000 \times 4.100 = 16,40,000$$

$$\text{NPV} = 16,40,000 - 5,00,000 = 11,40,000$$

Project B

$$\text{ENCF} = .3 (5,00,000) + .4 (4,00,000) + .3 (3,00,000) = 4,00,000$$

$$\sigma^2 = .3 (5,00,000 - 4,00,000)^2 + .4 (4,00,000 - 4,00,000)^2 + .3 (3,00,000 - 4,00,000)^2$$

$$\sigma = \sqrt{6,00,00,00,000}$$

$$\sigma = 77,459.66$$

$$\text{ENPV} = 4,00,000 \times 4.100 = 16,40,000$$

$$\text{NPV} = 16,40,000 - 5,00,000 = 11,40,000$$

Recommendation:

NPV in both projects being the same, the project should be decided on the basis of standard deviation and hence project 'B' should be accepted having lower standard deviation, means less risky.

- (b) (i) On the basis of standard deviation project X be chosen because it is less risky than Project Y having higher standard deviation.

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$$(ii) \quad CV_x = \frac{SD}{ENPV} = \frac{90,000}{1,22,000} = .738$$

$$CV_y = \frac{1,20,000}{2,25,000} = .533$$

On the basis of Co-efficient of Variation (C.V.) Project X appears to be more risky and Y should be accepted.

- (iii) However, the NPV method in such conflicting situation is best because the NPV method is in compatibility of the objective of wealth maximisation in terms of time value.

Question 29

Armada Leasing Company is considering a proposal to lease out a school bus. The bus can be purchased for Rs. 5,00,000 and, in turn, be leased out at Rs. 1,25,000 per year for 8 years with payments occurring at the end of each year:

- (i) Estimate the internal rate of return for the company assuming tax is ignored.
- (ii) What should be the yearly lease payment charged by the company in order to earn 20 per cent annual compounded rate of return before expenses and taxes?
- (iii) Calculate the annual lease rent to be charged so as to amount to 20% after tax annual compound rate of return, based on the following assumptions:
 - (i) Tax rate is 40%;
 - (ii) Straight line depreciation;
 - (iii) Annual expenses of Rs. 50,000; and
 - (iv) Resale value Rs. 1,00,000 after the turn.

(16 marks)(May 2003)

Answer

$$(i) \quad \text{Payback period} = \frac{5,00,000}{1,25,000} = 4.00$$

PV factor closest to 4.00 in 8 years is 4.078 at 18%

Thus IRR = 18%

Note: Students may also arrive at the answer of 18.63% instead of 18% if exact calculation are made as follows:-

PV factor in 8 years at 19% is 3.9544

Interpolating for 4.00

$$IRR = 18\% + \frac{4.0776 - 4.000}{4.0776 - 3.9544} = 18.63\%$$

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(ii) Desired lease rent to earn 20% IRR before expenses and taxes:

$$\text{Lease Rent} = \frac{5,00,000}{\text{PVIFA } 8 \text{ yr, } 20\%} = \frac{5,00,000}{3.837} = \text{Rs. } 1,30,310.13 \text{ p.a.}$$

(iii) Revised lease rental on school bus to earn 20% return based on the given conditions.

$$\text{PV factor } [(X - E - D) (1 - T) + D] + (\text{PV factor} \times \text{S.V.}) = \text{Co}$$

$$3.837 [(x - 50,000 - 50,000) (1 - .4) + 50,000] + (.233 \times 1,00,000) = 5,00,000$$

$$3.837 [.6x - 60,000 + 50,000] + 23,300 = 5,00,000$$

$$2.3022x = 5,15,070$$

$$x = 2,23,729.47$$

This may be confirmed as lease rental 2,23,729.47

Less: Expenses + Depreciation 1,00,000.00

EBT 1,23,729.47

Less tax 40% 49,491.79

PAT 74,237.68

Add: Depreciation 50,000.00

CFAT 1,24,237.68

$$\frac{\text{Co} - \text{PV of SV}}{\text{CFAT}} = \frac{5,00,000 - 23,300}{1,24,237.68} = 3.837 \text{ or } 20\%$$

Question 30

The Textile Manufacturing Company Ltd., is considering one of two mutually exclusive proposals, Projects M and N, which require cash outlays of Rs. 8,50,000 and Rs. 8,25,000 respectively. The certainty-equivalent (C.E) approach is used in incorporating risk in capital budgeting decisions. The current yield on government bonds is 6% and this is used as the risk free rate. The expected net cash flows and their certainty equivalents are as follows:

Year-end	Project M			Project N	
	Cash Rs.	Flow	C.E.	Cash Flow Rs.	C.E.
1	4,50,000		0.8	4,50,000	0.9
2	5,00,000		0.7	4,50,000	0.8
3	5,00,000		0.5	5,00,000	0.7

Present value factors of Re. 1 discounted at 6% at the end of year 1, 2 and 3 are 0.943, 0.890 and 0.840 respectively.

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Required:

- (i) Which project should be accepted?
- (ii) If risk adjusted discount rate method is used, which project would be appraised with a higher rate and why? (12 marks)(November, 2003)

Answer

- (i) Statement Showing the Net Present Value of Project M

Year end	Cash Flow (Rs.) (a)	C.E. (b)	Adjusted Cash flow (Rs.) (c) = (a) × (b)	Present value factor at 6% (d)	Total Present value (Rs.) (e) = (c) × (d)
1	4,50,000	0.8	3,60,000	0.943	3,39,480
2	5,00,000	0.7	3,50,000	0.890	3,11,500
3	5,00,000	0.5	2,50,000	0.840	<u>2,10,000</u>
					8,60,980
	Less: Initial Investment				<u>8,50,000</u>
	Net Present Value				<u>10,980</u>

Statement Showing the Net Present Value of Project N

Year end	Cash Flow (Rs.) (a)	C.E. (b)	Adjusted Cash flow (Rs.) (c) = (a) × (b)	Present value factor (d)	Total Present value (Rs.) (e) = (c) × (d)
1	4,50,000	0.9	4,05,000	0.943	3,81,915
2	4,50,000	0.8	3,60,000	0.890	3,20,400
3	5,00,000	0.7	3,50,000	0.840	<u>2,94,000</u>
					9,96,315
	Less: Initial Investment				<u>8,25,000</u>
	Net Present Value				<u>1,71,315</u>

Decision : Since the net present value of Project N is higher, so the project N should be accepted.

- (ii) Certainty - Equivalent (C.E.) Co-efficient of Project M (2.0) is lower than Project N (2.4). This means Project M is riskier than Project N as "higher the riskiness of a cash flow, the lower will be the CE factor". If risk adjusted discount rate (RADR) method is used, Project M would be analysed with a higher rate.

RADR is based on the premise that riskiness of a proposal may be taken care of, by

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adjusting the discount rate. The cash flows from a more risky proposal should be discounted at a relatively higher discount rate as compared to other proposals whose cash flows are less risky. Any investor is basically risk averse. However, he may be ready to take risk provided he is rewarded for undertaking risk by higher returns. So, more risky the investment is, the greater would be the expected return. The expected return is expressed in terms of discount rate which is also the minimum required rate of return generated by a proposal if it is to be accepted. Therefore, there is a positive correlation between risk of a proposal and the discount rate.

Question 31

Write short note on Social Cost Benefit analysis.

(4 marks) (November, 2003)

Answer

Social Cost Benefit Analysis: It is increasingly realised that commercial evaluation of projects is not enough to justify commitment of funds to a project especially when the project belongs to public utility and irrespective of its financial viability it needs to be implemented in the interest of the society as a whole. Huge amount of funds are committed every year to various public projects of all types—industrial, commercial and those providing basic infrastructure facilities. Analysis of such projects has to be done with reference to the social costs and benefits since they cannot be expected to yield an adequate commercial rate of return on the funds employed at least during the short period. A social rate of return is more important. The actual costs or revenues do not necessarily reflect the monetary measurement of costs or benefits to the society. This is because the market price of goods and services are often grossly distorted due to various artificial restrictions and controls from authorities, hence a different yardstick has to be adopted for evaluating a particular project of social importance and its costs and benefits are valued at 'opportunity cost' or shadow prices to judge the real impact of their burden as costs to the society. Thus, social cost benefit analysis conducts a monetary assessment of the total cost and revenues or benefits of a project, paying particular attention to the social costs and benefits which do not normally feature in conventional costing.

United Nations Industrial Development Organisation (UNIDO) and Organisation of Economic Cooperation and Development (OECD) have done much work on Social Cost Benefit analysis. A great deal of importance is attached to the social desirability of projects like employment generation potential, value addition, foreign exchange benefit, living standard improvement etc. UNIDO and OECD approaches need a serious consideration in the calculation of benefits and costs to the society. This technique has got more relevance in the developing countries where public capital needs precedence over private capital.

Question 32

Write a brief note on project appraisal under inflationary conditions.

(8 marks) (November, 2003)

Answer

Project Appraisal under Inflationary Conditions

Project Appraisal normally involves feasibility evaluation from technical, commercial, economic and financial aspects. It is generally an exercise in measurement and analysis of cash flows expected to occur over the life of the project. The project cash outflows usually occur initially and inflows come in the future.

During inflationary conditions, the project cost increases on all heads viz. labour, raw material, fixed assets such as equipments, plant and machinery, building material, remuneration of technicians and managerial personnel etc. Beside this, inflationary conditions erode purchasing power of consumers and affect the demand pattern. Thus, not only cost of production but also the projected statement of profitability and cash flows are affected by the change in demand pattern. Even financial institutions and banks may revise their lending rates resulting in escalation in financing cost during inflationary conditions. Under such circumstances, project appraisal has to be done generally keeping in view the following guidelines which are usually followed by government agencies, banks and financial institutions.

- (i) It is always advisable to make provisions for cost escalation on all heads of cost, keeping in view the rate of inflation during likely period of delay in project implementation.
- (ii) The various sources of finance should be carefully scrutinised with reference to probable revision in the rate of interest by the lenders and the revision which could be effected in the interest bearing securities to be issued. All these factors will push up the cost of funds for the organization.
- (iii) Adjustments should be made in profitability and cash flow projections to take care of the inflationary pressures affecting future projections.
- (iv) It is also advisable to examine the financial viability of the project at the revised rates and assess the same with reference to economic justification of the project. The appropriate measure for this aspect is the economic rate of return for the project which will equate the present value of capital expenditures to net cash flows over the life of the projects. The rate of return should be acceptable which also accommodates the rate of inflation per annum.
- (v) In an inflationary situation, projects having early payback periods should be preferred because projects with long payback period are more risky.

Under conditions of inflation, the project cost estimates that are relevant for a future date will suffer escalation. Inflationary conditions will tend to initiate the measurement of future cash flows. Either of the following two approaches may be used while appraising projects under such conditions:

- (i) Adjust each year's cash flows to an inflation index, recognising selling price increases and cost increases annually; or
- (ii) Adjust the 'Acceptance Rate' (cut-off) suitably retaining cash flow projections at current price levels.

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An example of approach (ii) above can be as follows:

Normal Acceptance Rate :	15.0%
Expected Annual Inflation:	5.0%
Adjusted Discount Rate :	15.0×1.05 or 15.75%

It must be noted that measurement of inflation has no standard approach nor is easy. This makes the job of appraisal a difficult one under such conditions.

Question 33

A & Co. is contemplating whether to replace an existing machine or to spend money on overhauling it. A & Co. currently pays no taxes. The replacement machine costs Rs. 90,000 now and requires maintenance of Rs. 10,000 at the end of every year for eight years. At the end of eight years it would have a salvage value of Rs. 20,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

Year	Maintenance (Rs.)	Salvage (Rs.)
Present	0	40,000
1	10,000	25,000
2	20,000	15,000
3	30,000	10,000
4	40,000	0

The opportunity cost of capital for A & Co. is 15%.

Required:

When should the company replace the machine?

(Notes: Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% : 4.4873; present value of Re. 1 to be received after 8 years at interest rate of 15% : 0.3269).

(10 marks)(May 2004)

Answer

A & Co.

Equivalent cost of (EAC) of new machine

	Rs.
(i) Cost of new machine now	90,000
Add: p.v. of annual repairs @ Rs. 10,000 per annum for 8 years (Rs. 10,000 $\times$ 4.4873)	<u>44,873</u>
	<u>1,34,873</u>

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Less: p.v. of salvage value at the end of 8 years	6,538
(Rs.20,000×0.3269)	
	<u>1,28,335</u>
Equivalent annual cost (EAC) (Rs. 1,28,335/4.4873)	<u>28,600</u>

Equivalent Cost (EAC) of keeping the machine

Present value (p.v)	I Year (Rs.)	II Year (Rs.)	III Year (Rs.)	IV Year (Rs.)
Value Present	40,000	25,000	15,000	10,000
Add p.v. of annual maintenance (Annual Maintenance/1.15)	<u>8,696</u>	<u>17,391</u>	<u>26,087</u>	<u>34,783</u>
Total	48,696	42,391	41,087	44,783
Less: p.v. of salvage value at the end of the year (p.v. /1.15)	<u>21,739</u>	<u>13,043</u>	<u>8,696</u>	<u>Nil</u>
	26,957	29,348	32,391	44,783
×	<u>1.15</u>	<u>1.15</u>	<u>1.15</u>	<u>1.15</u>
Equivalent Annual Cost (EAC)	<u>31,000</u>	<u>33,750</u>	<u>37,250</u>	<u>51,500</u>

Advice: The company should replace the old machine immediately because the Equivalent Annual Cost (EAC) of the new machine at Rs. 28,600 is lower than the cost of using the existing machine in first year, second year, third year and fourth year.

Question 34

- (a) Explain briefly Capital Rationing.
- (b) A firm has an investment proposal, requiring an outlay of Rs. 80,000. The investment proposal is expected to have two years economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be Rs. 50,000 and 0.6 probability that cash inflow after tax will be Rs. 60,000. The probability assigned to cash inflow after tax for the year 2 are as follows:

The cash inflow year 1	Rs. 50,000		Rs. 60,000	
The cash inflow year 2	Probability		Probability	
	Rs. 24,000	0.2	Rs. 40,000	0.4
	Rs. 32,000	0.3	Rs. 50,000	0.5
	Rs. 44,000	0.5	Rs. 60,000	0.1

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The firm uses a 10% discount rate for this type of investment.

Required:

- (i) Construct a decision tree for the proposed investment project and calculate the expected net present value (NPV).
- (ii) What net present value will the project yield, if worst outcome is realized? What is the probability of occurrence of this NPV?
- (iii) What will be the best outcome and the probability of that occurrence?
- (iv) Will the project be accepted?

(Note: 10% discount factor 1 year 0.909; 2 year 0.826) (4 + 16 = 20 marks)(May 2004)

Answer

- (a) Capital Rationing: Generally, firms fix up maximum amount that can be invested in capital projects, during a given period of time, say a year. The firm then attempts to select a combination of investment proposals, that will be within the specific limits providing maximum profitability, and put them in descending order according to their rate of return, such a situation is then considered to be capital rationing.

A firm should accept all investment projects with positive NPVs, with an objective to maximize the wealth of shareholders. However, there may be resource constraints due to which a firm may have to select from among various projects with positive NPVs. Thus there may arise a situation of capital rationing where there may be internal or external constraints on procurement of necessary funds to invest in all investment proposals with positive NPVs.

Capital rationing can also be experienced due to external factors, mainly imperfections in capital markets which can be attributed to non-availability of market information, investor attitude etc. Internal capital rationing is due to the self-imposed restrictions imposed by management like not to raise additional debt or laying down a specified minimum rate of return on each project.

There are various ways of resorting to capital rationing. For instance, a firm may effect capital rationing through budgets. It may also put up a ceiling when it has been financing investment proposals only by way of retained earnings (ploughing back of profits). Since the amount of capital expenditure in that situation cannot exceed the amount of retained earnings, it is said to be an example of capital rationing.

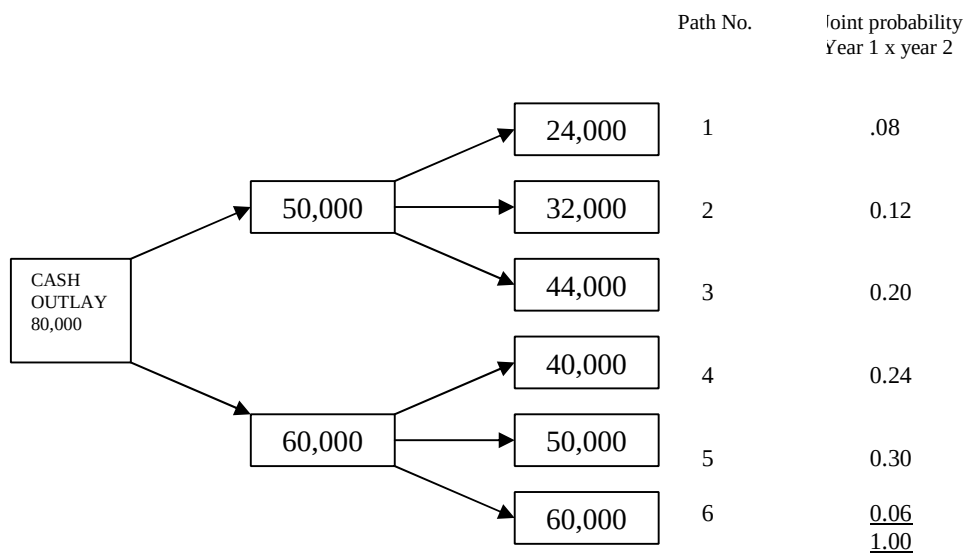
Capital rationing may also be introduced by following the concept of 'responsibility accounting', whereby management may introduce capital rationing by authorizing a particular department to make investment only upto a specified limit, beyond which the investment decisions are to be taken by higher-ups.

In capital rationing it may also be more desirable to accept several small investment proposals than a few large investment proposals so that there may be full utilization of budgeted amount. They may result in accepting relatively less profitable investment

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proposals if full utilization of budget is a primary consideration. Similarly, capital rationing may also mean that the firm foregoes the next most profitable investment following after the budget ceiling even though it is estimated to yield a rate of return much higher than the required rate of return. Thus capital rationing does not always lead to optimum results.

- (b) (i) The decision tree diagram is presented in the chart, identifying various paths and outcomes, and the computation of various paths/outcomes and NPV of each path are presented in the following tables:



The Net Present Value (NPV) of each path at 10% discount rate is given below:

Path	Year 1 Cash Flows (Rs.)	Year 2 Cash Flows (Rs.)	Total Cash Inflows (PV) (Rs.)	Cash Inflows (Rs.)	NPV (Rs.)
1	$50,000 \times .909 = 45,450$	$24,000 \times .826 = 19,824$	65,274	80,000	(—) 14,726
2	45,450	$32,000 \times .826 = 26,432$	71,882	80,000	(—) 8,118
3	45,450	$44,000 \times .826 = 36,344$	81,794	80,000	1,794
4	$60,000 \times .909 = 54,540$	$40,000 \times .826 = 33,040$	87,580	80,000	7,580
5	54,540	$50,000 \times .826 = 41,300$	95,840	80,000	15,840
6	54,540	$60,000 \times .826 = 49,560$	1,04,100	80,000	24,100

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Statement showing Expected Net Present Value

			Rs.
z	NPV(Rs.)	Joint Probability	Expected NPV
1	—14,726	0.08	—1,178.08
2	—8,118	0.12	—974.16
3	1,794	0.20	358.80
4	7,580	0.24	1,819.20
5	15,840	0.30	4,752.00
6	24,100	0.06	<u>1,446.00</u>
			<u>6,223.76</u>

Conclusions:

- (ii) If the worst outcome is realized the project will yield NPV of – Rs. 14,726. The probability of occurrence of this NPV is 8% and a loss of Rs. 1,178 (path 1).
- (iii) The best outcome will be path 5 when the NPV is at Rs. 15,840. The probability of occurrence of this NPV is 30% and a expected profit of Rs. 4,752.
- (iv) The project should be accepted because the expected NPV is positive at Rs. 6,223.76 based on joint probability.

Question 35

Your company is considering to acquire an additional computer to supplement its time-share computer services to its clients. It has two options:

- (i) To purchase the computer for Rs. 22 lakhs.
- (ii) To lease the computer for three years from a leasing company for Rs. 5 lakhs as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of Rs. 6 lakhs at the end of the third year. Lease rents are payable at the year-end, and the computer reverts to the lessor after the contract period.

The company estimates that the computer under review will be worth Rs. 10 lakhs at the end of third year.

Forecast Revenues are:

Year	1	2	3
Amount (Rs. in lakhs)	22.5	25	27.5

Annual operating costs excluding depreciation/lease rent of computer are estimated at Rs. 9 lakhs with an additional Rs. 1 lakh for start up and training costs at the beginning of the first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of the computer. Repayments are to be made according to the following schedule:

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Year end	1	2	3
Principal (Rs.'000)	500	850	850
Interest (Rs.'000)	352	272	136

The company uses straight line method (SLM) to depreciate its assets and pays 50% tax on its income. The management approaches you to advice. Which alternative would be recommended and why?

Note: The PV factor at 8% and 16% rates of discount are:

Year	1	2	3
8%	0.926	0.857	0.794
16%	0.862	0.743	0.641

(20 marks) (May 2004)

Answer

Working Notes:

- (a) Depreciation : Rs. 22,00,000 – 10,00,000/3 Rs. 4,00,000 p.a.
- (b) Effective rate of interest after tax shield : $.16 \times (1 - .50) = .08$ or 8%.
- (c) Operating and training costs are common in both alternatives hence not considered while calculating NPV of cash flows.

Calculation of NPV

1. Alternative I: Purchase of Computer

Particulars	Year 1 Rs.	Year 2 Rs.	Year 3 Rs.
Instalment Payment			
Principal	5,00,000	8,50,000	8,50,000
Interest	<u>3,52,000</u>	<u>2,72,000</u>	<u>1,36,000</u>
Total (A)	<u>8,52,000</u>	<u>11,22,000</u>	<u>9,86,000</u>
Tax shield @ 50%;			
Interest payment	1,76,000	1,36,000	68,000
Depreciation	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>
Total (B)	<u>3,76,000</u>	<u>3,36,000</u>	<u>2,68,000</u>
Net Cash outflows (A – B)	4,76,000	7,86,000	7,18,000
PV factor at 8%	0.926	0.857	0.794
PV of Cash outflows	<u>4,40,776</u>	<u>6,73,602</u>	<u>5,70,092</u>
Total PV of Cash outflows:			16,84,470
Less: PV of salvage value (Rs. 10 lakhs × 0.794)			<u>7,94,000</u>
Net PV of cash outflows			<u>8,90,470</u>

2. Alternative II: Lease of the Computer

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Particulars	Year 1	Year 2	Year 3
	Rs.	Rs.	Rs.
Lease rent	5,00,000	5,00,000	5,00,000
10% of gross revenue	2,25,000	2,50,000	2,75,000
Lump sum payment	—	—	6,00,000
Total Payment	7,25,000	7,50,000	13,75,000
Less: Tax shield @ 50%	<u>3,62,500</u>	<u>3,75,000</u>	<u>6,87,500</u>
Net Cash outflows	<u>3,62,500</u>	<u>3,75,000</u>	<u>6,87,500</u>
PV of Cash outflows @ 8%	<u>3,35,675</u>	<u>3,21,375</u>	<u>5,45,875</u>
Total PV of cash outflows			12,02,925

Recommendation:

Since the Present Value (PV) of net cash outflow of Alternative I is lower, the company should purchase the computer.

Question 36

You own an unused Gold mine that will cost Rs. 10,00,000 to reopen. If you open the mine, you expect to be able to extract 1,000 ounces of Gold a year for each of three years. After that the deposit will be exhausted. The Gold price is currently Rs. 5,000 an ounce, and each year the price is equally likely to rise or fall by Rs. 500 from its level at the start of year. The extraction cost is Rs.4,600 an ounce and the discount rate is 10 per cent.

Required:

- Should you open the mine now or delay one year in the hope of a rise in the Gold price?
- What difference would it make to your decision if you could costlessly (but irreversibly) shut down the mine at any stage? Show the value of abandonment option.

(20 marks)(November, 2004)

Answer

- (i) Assume we open the mine now at $t = 0$. Taking into account the distribution of possible future price of gold over the next three years, we have

$$\begin{aligned}
 NPV = & -Rs.10,00,000 + \frac{1,000 \times [0.5 \times 5,500 + 0.5 \times 4,500] - 4,600}{1.10} \\
 & + \frac{1,000 \times [(0.5)^2 (6,000 + 5,000 + 5,000 + 4,000) - 4,600]}{(1.10)^2} \\
 & + \frac{1,000 \times [(0.5)^3 (6,500 + 5,500 + 5,500 + 4,500 + 4,500 + 5,500 + 4,500 + 3,500) - 4,600]}{(1.10)^3} \\
 = & -Rs. 5,260
 \end{aligned}$$

Because the NPV is negative, we should not open the mine at $t = 0$. It does not make sense to open the mine at any price less than or equal to Rs. 5,000 per ounce.

- (ii) Assume that we delay one year until $t = 1$, and open the mine if the price is Rs.

Project Planning and Capital Budgeting

5,500.

At that point :

$$NPV = - \text{Rs. } 10,00,000 + \sum_{t=1}^3 \frac{(1,000) \times (5,500 - 4,600)}{(1.10)^t} = \text{Rs. } 12,38,167$$

If the price at t_1 reaches Rs. 5,500, then expected price for all future periods is Rs. 5,500.

NPV at $t_0 = \text{Rs. } 12,38,167 / 1.10 = \text{Rs. } 11,25,606$

If the price rises to Rs. 5,500 at $t = 1$, we should open the mine at that time.

The expected NPV of this strategy is:

$$(0.50 \times \text{Rs. } 11,25,606) + (0.50 \times 0) = \text{Rs. } 5,62,803$$

As already stated mine should not be opened if the price is less than or equal to Rs. 5,000 per ounce.

If the price at t_1 reaches Rs. 4,500, then expected price for all future periods is Rs. 4,500. In that situation we should not open the mine.

- (b) Suppose we open the mine at $t = 0$, when the price is Rs. 5,000. At $t = 2$, there is a 0.25 probability that the price will be Rs. 4,000. Then since the price at $t = 3$ cannot rise above the extraction cost, the mine should be closed. If we open the mine at $t = 0$, when the price was Rs. 5,000 with the closing option the NPV will be:

$$\begin{aligned} NPV &= - \text{Rs. } 10,00,000 + \sum_{t=1}^2 \frac{(5,000 - 4,600) \times 1,000}{(1.10)^t} \\ &\quad + \frac{.125 \times [1,900 + 900 + 900 + 900 - 100 - 100] \times 1,000}{(1.10)^3} \\ &= \text{Rs. } 1,07,438 \end{aligned}$$

Therefore, the NPV with the abandonment option is Rs. 1,07,438.

The value of the abandonment option is:

$$0.25 \times 1,000 \times (600) / (1.10)^3 = \text{Rs. } 1,12,697$$

The NPV of strategy (2), that to open the mine at $t = 1$, when price rises to Rs. 5,500 per ounce, even without abandonment option, is higher than option 1. Therefore, the strategy (2) is preferable.

Under strategy 2, the mine should be closed if the price reaches Rs. 4,500 at $t = 3$, because the expected profit is $(\text{Rs. } 4,500 - 4,600) \times 1,000 = - \text{Rs. } 1,00,000$.

The value of the abandonment option is:

$$0.125 \times (1,00,000) / (1.10)^4 = \text{Rs. } 8,538$$

Note: Students may also assume that the price of the gold remains at Rs. 5,000 to solve the question.

Management Accounting and Financial Analysis

Question 37

Fair finance, a leasing company, has been approached by a prospective customer intending to acquire a machine whose Cash Down price is Rs. 3 crores. The customer, in order to leverage his tax position, has requested a quote for a three year lease with rentals payable at the end of each year but in a diminishing manner such that they are in the ratio of 3 : 2 : 1.

Depreciation can be assumed to be on straight line basis and Fair Finance's marginal tax rate is 35%. The target rate of return for Fair Finance on the transaction is 10%.

Required:

Calculate the lease rents to be quoted for the lease for three years.

(8 marks) (November, 2004)

Answer

Capital sum to be placed under Lease

		Rs. in lakhs
Cash Down price of machine		300.00
Less: Present value of depreciation Tax Shield		
$100 \times .35 \times \frac{1}{(1.10)}$	31.82	
$100 \times .35 \times \frac{1}{(1.10)^2}$	28.93	
$100 \times .35 \times \frac{1}{(1.10)^3}$	<u>26.30</u>	87.05
		<u>212.95</u>

If the normal annual lease rent per annum is x, then cash flow will be:

Year	Post-tax cash flow	P.V. of post-tax cash flow
1	$3x \times (1 - .35) = 1.95x$	$1.95 \times (1/1.10) = 1.7727x$
2	$2x \times (1 - .35) = 1.3x$	$1.30 \times [(1/(1.10)^2)] = 1.0743x$
3	$x \times (1 - .35) = 0.65x$	$0.65 \times [1/(1.10)^3] = 0.4884x$
		<u><u>= 3.3354x</u></u>

Therefore $3.3354 x = 212.95$ OR $x = \text{Rs. } 63.8454 \text{ lakhs}$

Year-wise lease rentals:

		Rs. in lakhs
Year 1	$3 \times 63.8454 \text{ lakhs}$	= 191.54
2	$2 \times 63.8454 \text{ lakhs}$	= 127.69
3	$1 \times 63.8454 \text{ lakhs}$	= 63.85

Project Planning and Capital Budgeting

Question 38

ABC Ltd. is considering a proposal to acquire a machine costing Rs. 1,10,000 payable Rs. 10,000 down and balance payable in 10 annual equal instalments at the end of each year inclusive of interest chargeable at 15%. Another option before it is to acquire the asset on a lease rental of Rs. 15,000 per annum payable at the end of each year for 10 years. The following information is also available.

- (i) Terminal Scrap value of Rs. 20,000 is realizable, if the asset is purchased.
- (ii) The company provides 10% depreciation on straight line method on the original cost.
- (iii) Income tax rate is 50%.

You are required to compute the analyse cash flows and to advise as to which option is better.

(20 marks) (May ,2005)

Answer

Option I : To buy the asset:

In this option the firm has to pay Rs. 10,000 down and the balance Rs. 1,00,000 together with interest @ 15% is payable in 10 annual equal instalments. The instalment amount may be calculated by dividing Rs. 1,00,000 by the PVAF for 10 years at 15% i.e.

Annual repayment = $\text{Rs. } 1,00,000 / 5.0188 = \text{Rs. } 19,925$

The cash flows of the borrowing and purchase option may be computed as follows:

Year	Instalment Rs.	Interest Rs.	Repayment Rs.	Balance Rs.
1	19,925	15,000	4,925	95,075
2	19,925	14,261	5,664	89,411
3	19,925	13,412	6,513	82,898
4	19,925	12,435	7,490	75,408
5	19,925	11,311	8,614	66,794
6	19,925	10,019	9,906	56,888
7	19,925	8,533	11,392	45,496
8	19,925	6,824	13,101	32,395
9	19,925	4,859	15,066	17,329
10	19,925	2,596*	17,329	—

* Difference between the outstanding balance and the last instalment (i.e. Rs. 19,925 – Rs. 17,329 = Rs. 2,596)

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Year	Instalment	Interest	Depreciation	Tax Shield 50% (2 + 3)	Net CF (1-4)	PVF	PV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Rs.	Rs.	Rs.	Rs.	Rs.		Rs.
0	10,000	—	—	—	—	1.000	10,000
1	19,925	15,000	11,000	13,000	6,925	.870	6,025
2	19,925	14,261	11,000	12,631	7,294	.756	5,514
3	19,925	13,412	11,000	12,206	7,719	.658	5,079
4	19,925	12,435	11,000	11,718	8,207	.572	4,694
5	19,925	11,311	11,000	11,156	8,769	.497	4,358
6	19,925	10,019	11,000	10,510	9,415	.432	4,067
7	19,925	8,533	11,000	9,767	10,158	.376	3,819
8	19,925	6,824	11,000	8,912	11,013	.327	3,601
9	19,925	4,859	11,000	7,930	11,995	.284	3,407
10	19,925	2,596	11,000	6,798	13,127	.247	<u>3,242</u>
	Present value of total outflows						—53,806
10	Salvage value (after tax)		10,000	—	—	.247	<u>+2,470</u>
	Net present value of outflows						<u>—51,336</u>

It may be noted that (i) depreciation of Rs. 11,000 has been provided for all the 10 years. This is 10% of the original cost of Rs. 1,10,000. (ii) The asset is fully depreciated during its life of 10 years, therefore, the book value at the end of 10th year would be zero. As the asset is having a salvage value of Rs. 20,000, this would be capital gain and presuming it to be taxable at the normal rate of 50%, the net cash inflow on account of salvage value would be Rs. 10,000 only. This is further discounted to find out the present value of this inflow.

Option II – Evaluation of Lease Option:

In case the asset is acquired on lease, there is a lease rent of Rs. 15,000 payable at the end of next 10 years. This lease rental is tax deductible, therefore, the net cash outflow would be only Rs. 7,500 (after tax). The PVAF for 10 years @ 15% is 5.0188. So, the present value of annuity of Rs. 7,500 is

Present value of annuity of outflow = Rs. 7,500 × 5.0188 = Rs. 37,641.

Advice:

If the firm opts to buy the asset, the present value of outflow comes to Rs. 51,336; and in case of lease option, the present value of outflows comes to Rs. 37,641. Hence, the firm should opt

Project Planning and Capital Budgeting

for the lease option. In this way, the firm will be able to reduce its costs by Rs. 13,695 i.e. Rs. 51,336 – Rs. 37,641. This may also be referred to as Net Benefit of Leasing.

Note: Students may also discount cash flows under both alternatives at after tax cost i.e. 15% $(1 - 05) = 7.5\%$. Discounting will not have any impact on this decision since any discount factor will lead to pv of lease to be less than that of pv of debt).

Question 39

A firm has projected the following cash flows from a project under evaluation:

Year	Rs. lakhs
0	(70)
1	30
2	40
3	30

The above cash flows have been made at expected prices after recognizing inflation. The firm's cost of capital is 10%. The expected annual rate of inflation is 5%.

Show how the viability of the project is to be evaluated. (Marks 8)(May ,2005)

Answer

It is stated that the cash flows have been adjusted for inflation; hence they are "nominal". The cost of capital or discount rate is "real". In order to be compatible, the cash flows should be converted into "real flow". This is done as below:

Year	Nominal cash flows	Adjusted Inflation* factor	Real cash flows	PVF @ 10%	PV of cash flows
0	(70)	—	(70)	1.000	(70)
1	30	0.952	28.56	0.909	25.96
2	40	0.907	36.28	0.826	29.97
3	30	0.864	25.92	0.751	19.47
				Total	75.40
				Less: Cash out flow	<u>70.00</u>
				NPV (+)	<u>5.40</u>

* $1/1.05$; $1/(1.05)^2$; $1/(1.05)^3$;

with positive NPV, the project is financially viable.

Alternatively, instead of converting cash flows into real terms, the discount rate can be converted into nominal rate. Result will be the same.

An alternative solution is presented herewith

Management Accounting and Financial Analysis

Alternative solution:

Year	Nominal cash flows	PVF @ 10% adjusted by the inflation factor i.e. 5%*	PV of cash flows
0	(70)	1.000	(70)
1	30	0.866	25.98
2	40	0.749	29.96
3	30	0.649	<u>19.47</u>
	Cash inflow		75.41
	Less: Cash out flow		<u>70.00</u>
	Net present value		<u>5.41</u>

$$* \frac{0.909}{1.05} = 0.866, \frac{0.826}{1.1025} = 0.749, \frac{0.751}{1.1576} = 0.649$$

with positive NPV, the project is financially viable.

Question 40

Project X and Project Y are under the evaluation of XY Co. The estimated cash flows and their probabilities are as below:

Project X : Investment (year 0) Rs. 70 lakhs

Probability weights	0.30	0.40	0.30
Years	Rs. lakhs	Rs. lakhs	Rs. lakhs
1	30	50	65
2	30	40	55
3	30	40	45

Project Y : Investment (year 0) Rs. 80 lakhs.

Probability weighted	Annual cash flows through life
	Rs. lakhs
0.20	40
0.50	45
0.30	50

- Which project is better based on NPV, criterion with a discount rate of 10%?
- Compute the standard deviation of the present value distribution and analyse the inherent risk of the projects
(12 Marks) (May ,2005)

Project Planning and Capital Budgeting

Answer

Calculation of NPV xy Co.:

	Project X	Cash flow	PVF	PV
Year				
1	$(30 \times 0.3) + (50 \times 0.4) + (65 \times 0.3)$	48.5	0.909	44.09
2	$(30 \times 0.3) + (40 \times 0.4) + (55 \times 0.3)$	41.5	0.826	34.28
3	$(30 \times 0.3) + (40 \times 0.4) + (45 \times 0.3)$	38.5	0.751	<u>28.91</u>
				<u>107.28</u>
		NPV: $(107.28 - 70.00) =$		(+) <u>37.28</u>

Project Y

1-3	$(40 \times 0.2) + (45 \times 0.5) + (50 \times 0.3)$	45.5	2.486	<u>113.11</u>
		NPV $(113.11 - 80.00)$		(+) <u>33.11</u>

(b) Calculation of Standard deviation

σ

Project X

Year		
1	$\sqrt{((30 - 48.5)^2 + (50 - 48.5)^2 + (65 - 48.5)^2)}$	24.83
2	$\sqrt{((30 - 41.5)^2 + (40 - 41.5)^2 + (55 - 41.5)^2)}$	17.80
3	$\sqrt{((30 - 38.5)^2 + (40 - 38.5)^2 + (45 - 38.5)^2)}$	10.81

Project Y

$\sqrt{(40 - 45.5)^2 + (45 - 45.5)^2 + (50 - 45.5)^2}$	7.12
--	------

As per Hillier's model

$$M = \sum_{i=0}^n (1+r)^{-i} M_i$$

$$\sigma^2 = \sum_{i=0}^n (1+r)^{-2i} \sigma_i^2$$

Management Accounting and Financial Analysis

Hence

Project X Year	$(1+r)^{-2\circ}$	$\sigma^{2\circ}$	
0	1.00	4,900	4,900
1	0.83	617	512
2	0.69	317	219
3	0.56	117	<u>66</u>
			<u>5,697</u>

$$\text{Standard deviation} = \sqrt{5,697} = 75.48$$

Project Y

Year			
0	1.00	6,400	6,400
1	0.83	51	42
2	0.69	51	35
3	0.56	51	<u>29</u>
			<u>6,506</u>

$$\text{Standard deviation} = \sqrt{6,506} = 80.66$$

Analysis:

Project X is recommended because of higher NPV and lower standard deviation (risk of variability)

Question 41

Engineers Ltd. is in the business of manufacturing nut bolts. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is Rs. 20,00,000 having a useful life of 5 years with the salvage value of Rs. 4,00,000 (consider short term capital loss/gain for the Income tax). The full purchase value of machine can be financed by bank loan at the rate of 20% interest repayable in five equal instalments falling due at the end of each year. Alternatively, the machine can be procured on a 5 years lease, year-end lease rentals being Rs. 6,00,000 per annum. The Company follows the written down value method of depreciation at the rate of 25 per cent. Company's tax rate is 35 per cent and cost of capital is 14 per cent.

- Advise the company which option it should choose – lease or borrow.
- Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 14 per cent cost of capital.

Detailed working notes should be given.

(14 Marks) (November ,2005)

Project Planning and Capital Budgeting

Answer

(a) Discounting Factor:

Cost of finance 20% - Tax 35% = 13%.

(i) PV of cash outflows under leasing alternative

Year-end	Lease rent after taxes P.A.	PVIFA at 13%	Total P.V.
1 – 5	Rs. 3,90,000	3.517	Rs. 13,71,630

PV of cash outflows under buying alternative

Year end	Loan Instalment	Tax advantage on Interest	Tax advantage on Depreciation	Net Cash Outflow	PVIF at 13%	Total PV
1	6,68,673	1,40,000	1,75,000	3,53,673	0.885	3,13,001
2	6,68,673	1,21,193	1,31,250	4,16,230	0.783	3,25,908
3	6,68,673	98,624	98,438	4,71,611	0.693	3,26,826
4	6,68,673	71,542	73,828	5,23,303	0.613	3,20,785
5	6,68,673	38,819	55,371	5,74,483	0.543	<u>3,11,944</u>
Total PV outflows						15,98,464
Less: PV of Salvage Value (Rs. 4,00,000 * 0.543)						<u>2,17,200</u>
						13,81,264
Less: PV of tax saving on short term capital loss (4,74,609 – 4,00,000) * 35% * .543						14,179
NPV of Cash outflow						13,67,085

Working Notes:

(1) Schedule of Debt Payment

Year-end	Opening balance	Interest @ 20%	Repayment	Closing Balance	Principal Amount
1	20,00,000	4,00,000	6,68,673	17,31,327	2,68,673
2	17,31,327	3,46,265	6,68,673	14,08,919	3,22,408
3	14,08,919	2,81,784	6,68,673	10,22,030	3,86,889
4	10,22,030	2,04,406	6,68,673	5,57,763	4,64,267
5	5,57,763	1,10,910*	6,68,673	0	5,57,763

*Balancing Figure

Management Accounting and Financial Analysis

(2) Schedule of Depreciation

Year	Opening WDV	Depreciation	Closing WDV
1	20,00,000	5,00,000	15,00,000
2	15,00,000	3,75,000	11,25,000
3	11,25,000	2,81,250	8,43,750
4	8,43,750	2,10,938	6,32,812
5	6,32,812	1,58,203	4,74,609

(3) $EMI = Rs.20,00,000 / \text{Annuity for 5 years @ } 20\% = \text{i.e. } Rs.20,00,000 / 2.991 = Rs. 6,68,673.$

Advice: Company is advised to borrow and buy not to go for leasing as NPV of cash outflows is lower in case of buying alternative.

Note: Students may note that the cost of capital of the company given in the question is 14% at which cash flows may also be discounted, the question is however, silent whether this cost of capital is pre-tax or post tax. If it is assumed that this is after tax cost and the cash flows are discounted at this rate there is no change in the advice to the company i.e. borrow and buy. However, if it is assumed that the cost of capital is pre-tax and the same is adjusted with the tax rate to discount the cash flows, the advice to the company changes to leasing.

(ii) Evaluation from Lessor's Point of View

	(1)	(2)	(3)	(4)	(5)
Lease Rent	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000
Less: Depreciation	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
EBT	1,00,000	2,25,000	3,18,750	3,89,062	4,41,797
Less: Tax @ 35%	35,000	78,750	1,11,563	1,36,172	1,54,629
EAT	65,000	1,46,250	2,07,187	2,52,890	2,87,168
Add: Depreciation	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
Cash Inflows	5,65,000	5,21,250	4,88,437	4,63,828	4,45,371
PV factor @ 14%	0.877	0.769	0.675	0.592	0.519
PV of inflows	4,95,505	4,00,841	3,29,695	2,74,586	2,31,148

Evaluation:

Aggregate PV of cash inflows	17,31,775
Add: PV of salvage value $(4,00,000 \times 0.519)$	2,07,600
Add: Tax shelter on short-term capital loss $(4,74,609 - 4,00,000) \times 0.35 \times 0.519$	<u>13,553</u>

Project Planning and Capital Budgeting

PV of all cash inflows	19,52,928
Cost of the machine	20,00,000
NPV	−47,072

Hence, leasing at this rate is not feasible.

Working Note: Depreciation @ 25% WDV.

Cost = Rs. 20,00,000

(Amount in Rs.)			
		Depreciation	Balance
1	20,00,000	5,00,000	15,00,000
2	15,00,000	3,75,000	11,25,000
3	11,25,000	2,81,250	8,43,750
4	8,43,750	2,10,938	6,32,812
5	6,32,812	1,58,203	4,74,609

Question 41

Determine the risk adjusted net present value of the following projects:

	X	Y	Z
Net cash outlays (Rs.)	2,10,000	1,20,000	1,00,000
Project life	5 years	5 years	5 years
Annual Cash inflow (Rs.)	70,000	42,000	30,000
Coefficient of variation	1.2	0.8	0.4

The Company selects the risk-adjusted rate of discount on the basis of the coefficient of variation:

Coefficient of Variation	Risk-Adjusted Rate of Return	P.V. Factor 1 to 5 years At risk adjusted rate of discount
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

(6 Marks)(November ,2005)

Management Accounting and Financial Analysis

Answer

Statement showing the determination of the risk adjusted net present value

Projects	Net cash outlays	Coefficient of variation	Risk adjusted discount rate	Annual cash inflow	PV factor 1-5 years	Discounted cash inflow	Net present value
	Rs.			Rs.		Rs.	Rs.
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii) = (v) × (vi)	(viii) = (vii) – (ii)
X	2,10,000	1.20	16%	70,000	3.274	2,29,180	19,180
Y	1,20,000	0.80	14%	42,000	3.433	1,44,186	24,186
Z	1,00,000	0.40	12%	30,000	3.605	1,08,150	8,150

Question 42

ABC Company has decided to acquire a Rs.5,00,000 pulp control device that has a useful life of ten years. A subsidy of Rs.50,000 is available at the time the device is acquired and placed into service. The device would be depreciated on straight-line basis and no salvage value is expected. The company is in the 50% tax bracket. If the acquisition is financed with a lease, lease payments of Rs.55,000 would be required at the beginning of each year. The company can also borrow at 10% repayable in equal instalments. Debt payments would be due at the beginning of each year:

- What is the present value of cash outflow for each of these financing alternatives, using the after-tax cost of debt?
- Which of the two alternatives is preferable? (15 Marks) (May, 2006)

Answer

Initial amount borrowed = Rs.5,00,000 – Rs.50,000 = Rs.4,50,000

This amount of Rs.4,50,000 is the amount which together with interest at the rate of 10% on outstanding amount is repayable in equal installments i.e., annuities in the beginning of each of 10 years. The PVAF at the rate of 10% for 9 years is 5.759 and for the year 0 it is 1.000. So, the annuity amount may be ascertained by dividing Rs.4,50,000 by (5.759 + 1.000).

So Annual payment = Rs.4,50,000/6.759 = Rs.66,578

Amount owed at time 0 = Rs.4,50,000 – Rs. 66,578 = Rs.3,83,422.

SCHEDULE OF DEBT PAYMENT			
End of Year	Total Payment	Interest	Principal Amount
	Rs.	Rs.	Outstanding Rs.
0	66,578	0	3,83,422
1	66,578	38,342	3,55,186

Project Planning and Capital Budgeting

2	66,578	35,519	3,24,127
3	66,578	32,413	2,89,962
4	66,578	28,996	2,52,380
5	66,578	25,238	2,11,040
6	66,578	21,104	1,65,566
7	66,578	16,557	1,15,545
8	66,578	11,555	55,023
9	66,578	5,502	NIL

SCHEDULE OF CASH OUTFLOWS : DEBT ALTERNATIVE

(Amount in Rs.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
End of year	Debt Payment	Interest	Dep	Tax Shield [(3)+(4)]0.5	Cash outflows (2) – (5)	PV factors @ 5%	PV
0	66,578	0	0	0	66,578	1.000	66,578
1	66,578	38,342	50,000	44,171	22,407	0.952	21,331
2	66,578	35,519	50,000	42,759	23,819	0.907	21,604
3.	66,578	32,413	50,000	41,206	25,372	0.864	21,921
4	66,578	28,996	50,000	39,498	27,080	0.823	22,287
5	66,578	25,238	50,000	37,619	28,959	0.784	22,704
6	66,578	21,104	50,000	35,552	31,026	0.746	23,145
7	66,578	16,557	50,000	33,279	33,299	0.711	23,676
8	66,578	11,555	50,000	30,777	35,801	0.677	24,237
9	66,578	5,502	50,000	27,751	38,827	0.645	25,043
10	-	0	50,000	25,000	(-25,000)	0.614	(-15,350)
Total present value of Outflows = Rs.2,57,176							

SCHEDULE OF CASH OUTFLOWS: LEASING ALTERNATIVE

(Amount in Rs.)

End of year	Lease Payment	Tax Shield	Cash Outflow	PVIFA @ 5%	PV
0	55,000	0	55,000	1.000	55,000
1-9	55,000	27,500	27,500	7.109	1,95,498
10	0	27,500	-27,500	0.614	(-16,885)
Total Present value of Outflows =2,33,613					

Management Accounting and Financial Analysis

The present values of cash outflow are Rs.2,57,176 and Rs.2,33,613 respectively under debt and lease alternatives. As under debt alternatives the cash outflow would be more, the lease is preferred.

- Note:
- (i) The repayment of loan as well as payment of lease rental is made in the beginning of the years. So, at the end of year 10, there will not be any payment in either option, but the tax benefit of depreciation for the year 10 as well as of lease rentals paid in the beginning of year 10, will be available only at the end of year 10.
 - (ii) Students may also calculate depreciation after subtracting the amount of subsidy from original cost, however, even in this situation, lease alternative is preferable.

Question 43

What is Capital rationing?

(3 Marks) (May ,2006)

Answer

Capital Rationing: When there is a scarcity of funds, capital rationing is resorted to. Capital rationing means the utilization of existing funds in most profitable manner by selecting the acceptable projects in the descending order or ranking with limited available funds. The firm must be able to maximize the profits by combining the most profitable proposals. Capital rationing may arise due to (i) external factors such as high borrowing rate or non-availability of loan funds due to constraints of Debt-Equity Ratio; and (ii) Internal Constraints Imposed by management. Project should be accepted as a whole or rejected. It cannot be accepted and executed in piecemeal.

IRR or NPV are the best basis of evaluation even under Capital Rationing situations. The objective is to select those projects which have maximum and positive NPV. Preference should be given to interdependent projects. Projects are to be ranked in the order of NPV. Where there is multi-period Capital Rationing, Linear Programming Technique should be used to maximize NPV. In times of Capital Rationing, the investment policy of the company may not be the optimal one.

In nutshell Capital Rationing leads to:

- (i) Allocation of limited resources among ranked acceptable investments.
- (ii) This function enables management to select the most profitable investment first.
- (iii) It helps a company use limited resources to the best advantage by investing only in the projects that offer the highest return.
- (iv) Either the internal rate of return method or the net present value method may be used in ranking investments.

Question 44

ABC Leasing Ltd. has been approached by a client to write a five years lease on an asset costing Rs.10,00,000 and having estimated salvage value of Rs.1,00,000 thereafter. The

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company has a after tax required rate of return of 10% and its tax rate is 50%. It provides depreciation @33 $\frac{1}{3}$ % on written down value of the asset. What lease rental will provide the company its after tax required rate of return? (7 Marks) (May ,2006)

Answer

- (a) In order to find out the annual lease rent, the cash flows from the asset must be evaluated as follows:

Year	Depreciation (Rs.)	Tax Shield (Rs.)	Cash flow (Rs.)	PVF(10%)	PV (Rs.)
1.	3,33,333	1,66,667	1,66,666	.909	1,51,500
2.	2,22,222	1,11,111	1,11,111	.826	91,778
3.	1,48,148	74,074	74,074	.751	55,630
4.	98,766	49,383	49,383	.683	33,728
5.	65,844	32,922	32,922	.621	20,444
6.	Salvage Value		1,00,000	.621	<u>62,100</u>
Present Value of Inflows					<u>4,15,180</u>
Outflow					 <u>10,00,000</u>
Net Present value					<u>.5,84,820</u>

The firm therefore, should have total recovery of Rs.5,84,820 through the lease rentals. The annual lease rental after tax may be calculated as follows:

$$\begin{aligned} \text{Lease rental (after tax)} &= \text{Total recovery required} \div \text{PVAF}_{(10\%n)} \\ &= \text{Rs.5,84,820} \div 3.791 = \text{Rs.1,54,265} \end{aligned}$$

$$\begin{aligned} \text{Now, the lease rental before tax} &= \text{Rs.1,54,265} \div 0.5 \\ &= \text{Rs.3,08,530} \end{aligned}$$

Therefore, the firm should charge a lease rental of Rs.3,08,530 in order to earn a required rate of return of 10% after tax.

Question 45

Following are the estimates of the net cash flows and probability of a new project of M/s X Ltd.:

	Year	P=0.3	P=0.5	P=0.2
Initial investment	0	4,00,000	4,00,000	4,00,000
Estimated net after tax cash inflows per year	1 to 5	1,00,000	1,10,000	1,20,000
Estimated salvage value (after tax)	5	20,000	50,000	60,000

Management Accounting and Financial Analysis

Required rate of return from the project is 10%. Find:

- the expected NPV of the project.
- the best case and the worst case NPVs.
- the probability of occurrence of the worst case if the cash flows are perfectly dependent overtime independent overtime.
- Standard deviation and coefficient of variation assuming that there are only three streams of cash flow, which are represented by each column of the table with the given probabilities.
- Coefficient of variation of X Ltd. on its average project which is in the range of 0.95 to 1.0. If the coefficient of variation of the project is found to be less riskier than average, 100 basis points are deducted from the Company's cost of Capital

Should the project be accepted by X Ltd ?

(16 Marks) (November ,2006)

Answer

- (a) (i) Expected cash flows:-

Year			Net cash flows	P.V.	PV. @ 10%
0	(4,00,000 x 1)	=	(-)4,00,000	1.000	(-)4,00,000
1 to 4	(1,00,000x0.3+1,10,000x0.5 + 1,20,000 x 0.2)	=	1,09,000	3.169	3,45,421
5	[1,09,000 + (20,000 x 0.3 + 50,000 x 0.5 + 60,000 x 0.2)]	=	1,52,000	0.621	94,392
			NPV=		39,813

- (ii) ENPV of the worst case

$1,00,000 \times 3.790 = \text{Rs.}3,79,000$ (Students may have 3.791 also the values will change accordingly)

$20,000 \times 0.621 = \text{Rs.}12,420/-$

$\text{ENPV} = (-)4,00,000 + 3,79,000 + 12,420 = (-)\text{Rs.}8,580/-$

ENPV of the best case

$\text{ENPV} = (-)4,00,000 + 1,20,000 \times 3.79 + 60,000 \times 0.621 = \text{Rs.}92,060/-$.

- (iii) (a) Required probability = 0.3

(b) Required probability = $(0.3)^5 = 0.00243$

- (iv) The base case NPV = $(-)4,00,000 + (1,10,000 \times 3.79) + (50,000 \times 0.621)$

= Rs.47,950/-

$\text{ENPV} = 0.30 \times (-) 8580 + 0.5 \times 47950 + 92060 \times 0.20$

= Rs.39,813/-

Therefore,

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$$\sigma \text{ENPV} = \sqrt{0.3(-8580 - 39,813)^2 + 0.5(47950 - 39,813)^2 + 0.2(92,060 - 39,813)^2}$$

$$= \text{Rs.}35,800/-$$

Therefore, $CV = 35,800/39,813 = 0.90$

- (v) Risk adjusted out of cost of capital of X Ltd. = $10\% - 1\% = 9\%$.

NPV

Year	Expected net cash flow	PV @ 9%	
0	(-)4,00,000	1.000	(-)4,00,000
1 to 4	1,09,000	3.239	3,53,051
5	1,52,000	0.650	<u>98,800</u>
		ENPV =	<u>51,851</u>

Therefore, the project should be accepted.

Question 46

ABC Ltd. is considering a project in US, which will involve an initial investment of US \$ 1,10,00,000. The project will have 5 years of life. Current spot exchange rate is Rs.48 per US \$. The risk free rate in US is 8% and the same in India is 12%. Cash inflow from the project are as follows:

Year	Cash inflow
1	US \$ 20,00,000
2	US \$ 25,00,000
3	US \$ 30,00,000
4	US \$ 40,00,000
5	US \$ 50,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%. (5 Marks)) (November,2006)

Answer

$$(1 + 0.12) (1 + \text{Risk Premium}) = (1 + 0.14)$$

$$\text{Or, } 1 + \text{Risk Premium} = 1.14/1.12 = 1.0179$$

Therefore, Risk adjusted dollar rate is $= 1.0179 \times 1.08 = 1.099 - 1 = 0.099$

Calculation of NPV

Year	Cash flow (Million) US\$	PV Factor at 9.9%	P.V.
1	2.00	0.910	1.820
2	2.50	0.828	2.070
3	3.00	0.753	2.259

Management Accounting and Financial Analysis

4	4.00	0.686	2.744
5	5.00	0.624	<u>3.120</u>
			12.013
		Less: Investment	<u>11.000</u>
		NPV	<u>1.013</u>

Therefore, Rupee NPV of the project is = Rs. (48 x 1.013) Million
= Rs.48.624 Million

Question 47

What are the characteristic features of Financial and Operating Lease? (4 Mark) (November ,2006)

Answer

Salient features of Financial Lease

- (i) s an intermediate term to long-term arrangement.
- (ii) During the primary lease period, the lease cannot be cancelled.
- (iii) The lease is more or less fully amortized during the primary lease period.
- (iv) The cost of maintenance, taxes, insurance etc., are to be incurred by the lessee unless the contract provides otherwise.
- (v) The lessee is required to take the risk of obsolescence.
- (vi) The lessor is only the Financier and is not interested in the asset.

Salient features of Operating Lease

- (i) The lease term is significantly less than the economic life of the equipment.
- (ii) It can be cancelled by the lessee prior to its expiration date.
- (iii) The lease rental is generally not sufficient to fully amortize the cost of the asset.
- (iv) The cost of maintenance, taxes, insurance are the responsibility of the lessor.
- (v) The lessee is protected against the risk of obsolescence.
- (vi) The lessor has the option to recover the cost of the asset from another party on cancellation of the lease by leasing out the asset.

Question 48

XYZ Ltd. is considering a project for which the following estimates are available:

	Rs.
Initial Cost of the project	10,00,000
Sales price/unit	60
Cost/unit	40

Project Planning and Capital Budgeting

Sales volumes

Year 1	20000 units
Year 2	30000 units
Year 3	30000 units

Discount rate 10% p.a.

You are required to measure the sensitivity of the project in relation to each of the following parameters:

- (a) Sales Price/unit
- (b) Unit cost
- (c) Sales volume
- (d) Initial outlay and
- (e) Project lifetime

Taxation may be ignored.

(16 Marks)(May, 2008)

Answer

Calculation of NPV:-

$$\begin{aligned}\text{NPV} &= -10,00,000 + \frac{20,000 \times 20}{1.1} + \frac{30,000 \times 20}{1.21} + \frac{30,000 \times 20}{1.331} \\ &= -10,00,000 + 3,63,636 + 4,95,868 + 4,50,789 \\ &= 13,10,293 - 10,00,000 \\ &= \text{Rs.} 3,10,293/-\end{aligned}$$

Measurement of sensitivity is as follows:

- (a) Sales Price:-

Let the sale price/Unit be S so that the project would break even with 0 NPV.

$$\begin{aligned}\therefore 10,00,000 &= \frac{20,000 \times (S - 40)}{1.1} + \frac{30,000 \times (S - 40)}{1.21} + \frac{30,000 \times (S - 40)}{1.331} \\ &= S - 40 = 10,00,000/65,512 \\ &= \text{Rs.} 15.26 \\ &= S = \text{Rs.} 55.26 \text{ which represents a fall of } (60 - 55.26)/60 \\ &\quad \text{Or } 0.079 \text{ or } 7.9\%\end{aligned}$$

Alternative Method

$$\frac{10,00,000 \times 20}{13,10,293} = \text{Rs.} 15.26$$

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$$S = \text{Rs.}40 + \text{Rs.}15.26$$

$$= \text{Rs.}55.26$$

(b) Unit Cost:-

If sales price = Rs. 60 the cost price required to give a margin of Rs.15.26 is (Rs.60 – Rs.15.26) or Rs.44.74 which would represent a rise of 11.85% i.e., $\left(\frac{44.74 - 40}{40} \times 100 \right)$

(c) Sales volume:-

The requisite percentage fall is:-

$$3,10,293/13,10,293 \times 100 = 23.68\%$$

(d) Since PV of inflows remains at Rs.13,10,293 the initial outlay must also be the same.

$$\therefore \text{Percentage rise} = 3,10,293/10,00,000 \times 100 = 31.03\%.$$

(e) Present value for 1st two years.

$$= -10,00,000 + 4,00,000 \times 909 + 6,00,000 \times 0.826$$

$$= -10,00,000 + 3,63,600 + 4,95,600$$

$$= -10,00,000 + 8,59,200$$

$$= -1,40,800$$

$\therefore$ The project needs to run for some part of the third year so that the present value of return is Rs.1,40,800. Let us consider that fraction of the year be x.

$$\therefore 6,00,000 \times (1.1)^{2+x} = 1,40,800$$

Putting x = 0.2 in above equation the present value of the return is Rs.97,301.

Putting x = 0.3 the present value becomes Rs.1,44,578.

By interpolating we get X = 0.292

Thus if the project run for 2.292 years then break even would be achieved.

Note: The above calculation may also be made as follows:

$$(i) = 30,000 \text{ units} \times \text{Rs.}20 \times .751 = \text{Rs.}4,50,600$$

$$(ii) \text{ Per day Production in (Rs.) assuming a year of 360 days} = \frac{\text{Rs.}4,50,600}{360} = \text{Rs.}1,252$$

$$(iii) \text{ Days needed to recover Rs.}1,40,800 = \frac{\text{Rs.}1,40,800}{\text{Rs.}1,252} = 112$$

Thus, if the project runs for 2 years and 112 days then break even would be achieved.

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Question 49

ABC Co. is considering a new sales strategy that will be valid for the next 4 years. They want to know the value of the new strategy. Following information relating to the year which has just ended, is available:

Income Statement	Rs.
Sales	20,000
Gross margin (20%)	4,000
Administration, Selling & distribution expense (10%)	2,000
PBT	2,000
Tax (30%)	600
PAT	1,400
Balance Sheet Information	
Fixed Assets	8,000
Current Assets	4,000
Equity	12,000

If it adopts the new strategy, sales will grow at the rate of 20% per year for three years. The gross margin ratio, Assets turnover ratio, the Capital structure and the income tax rate will remain unchanged.

Depreciation would be at 10% of net fixed assets at the beginning of the year.

The Company's target rate of return is 15%.

Determine the incremental value due to adoption of the strategy. (8 Marks) (May, 2007)

Answer

Projected Balance Sheet

	Year 1	Year 2	Year 3	Year 4
Fixed Assets (40%) of Sales	9,600	11,520	13,824	13,824
Current Assets (20%) of Sales	4,800	5,760	6,912	6,912
Total Assets	14,400	17,280	20,736	20,736
Equity	14,400	17,280	20,736	20,736

Projected Cash Flows:-

	Year 1	Year 2	Year 3	Year 4
Sales	24,000	28,800	34,560	34,560
PBT (10%) of sale	2,400	2,880	3,456	3,456

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PAT (70%)	1,680	2,016	2,419.20	2,419.20
Depreciation	800	960	1,152	1,382
Addition to Fixed Assets	2,400	2,880	3,456	1,382
Increase in Current Assets	800	960	1,152	-
Operating cash flow	(720)	(864)	(1,036.80)	2,419.20

Present value of Projected Cash Flows:-

Cash Flows	PV at 15%	PV
-720	0.870	-626.40
-864	0.756	-653.18
-1,036.80	0.658	<u>-682.21</u>
		-1,961.79

Residual Value - $2419.20/0.15 = 16,128$

Present value of Residual value = $16128/(1.15)^3$

= $16128/1.521 = 10603.55$

Total shareholders value = $10,603.55 - 1,961.79 = 8,641.76$

Pre strategy value = $1,400 / 0.15 = 9,333.33$

∴ Value of strategy = $8,641.76 - 9,333.33 = 691.57$

Conclusion: The strategy is not financially viable

Question 50

A Company is planning to acquire a machine costing Rs.5,00,000. Effective life of the machine is 5 years. The Company is considering two options. One is to purchase the machine by lease and the other is to borrow Rs.5,00,000 from its bankers at 10% interest p.a. The Principal amount of loan will be paid in 5 equal instalments to be paid annually. The machine will be sold at Rs.50,000 at the end of 5th year. Following further informations are given:

- (a) Principal, interest, lease rentals are payable on the last day of each year.
- (b) The machine will be fully depreciated over its effective life.
- (c) Tax rate is 30% and after tax. Cost of Capital is 8%.

Compute the lease rentals payable which will make the firm indifferent to the loan option.

(12 marks) (May, 2007))

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Answer

(a) Borrowing option:

Annual Instalment = Rs.50,00,000/- / 5 = Rs.1,00,000/-

Annual depreciation = Rs.50,00,000/- / 5 = Rs.1,00,000/-

Computation of net cash outflow:

Year	Principal	Interest	Total	Tax Saving Depn. & Interest	Net cash Outflow	PV @ 8%	Total PV
1	1,00,000	50,000	1,50,000	45,000	1,05,000	0.926	97,230
2	1,00,000	40,000	1,40,000	42,000	98,000	0.857	93,986
3	1,00,000	30,000	1,30,000	39,000	91,000	0.794	72,254
4	1,00,000	20,000	1,20,000	36,000	84,000	0.735	61,740
5	1,00,000	10,000	1,10,000	33,000	77,000	0.681	52,437
							3,67,647
Less: Present value of Inflows at the end of 5 th year (Rs.50,000/- x 0.7) or Rs.35,000 x 0.681 =							23,835
PV of Net Cash outflows							Rs.3,43,812

Calculation of lease rentals:

Therefore, Required Annual after tax outflow = $3,43,812 / 3.993 = \text{Rs.}86,104/-$.

Therefore, Annual lease rental = $86,104 / 0.70 = \text{Rs.}1,23,006/-$

Question 51

ABC Ltd. Sells computer services to its clients. The company has recently completed a feasibility study and decided to acquire an additional computer, the details of which are as follows:

- (1) The purchase price of the computer is Rs.2,30,000; maintenance, property taxes and insurance will be Rs.20,000 per year. The additional expenses to operate the computer are estimated at Rs.80,000. If the computer is rented from the owner, the annual rent will be Rs.85,000, plus 5% of annual billings. The rent is due on the last day of each year.
- (2) Due to competitive conditions, the company feels that it will be necessary to replace the computer at the end of three years with a more advanced model. Its resale value is estimated at Rs.1,10,000.
- (3) The corporate income tax rate is 50% and the straight line method of depreciation is followed.

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- (4) The estimated annual billing for the services of the new computer will be Rs.2,20,000 during the first year, and Rs.2,60,000 during the subsequent two years.
- (5) If the computer is purchased, the company will borrow to finance the purchase from a bank with interest at 16% per annum. The interest will be paid regularly, and the principal will be returned in one lump sum at the end of the year 3.

Should the company purchase the computer or lease it? Assume (i) cost of capital as 12%, (ii) straight line method of depreciation, (iii) salvage value of Rs.1,10,000 and evaluate the proposal from the point of view of lessor also. (20 Marks) (Nov, 2007)

Answer

Alternative 1

1. Evaluation of ABC Ltd's position under buying option considered.

Cost of Capital 12% as per question.

$$\text{Depreciation p.a.} = \frac{2,30,000 - 1,10,000}{3} = 40,000$$

Particulars	Y	E	A	R
	1	2	3	NPV
Recurrent Cash Flow				
Service Charges Receivable	2,20,000	2,60,000	2,60,000	
Tax, Insurance etc	(-)20,000	(-)20,000	(-)20,000	
Cost of operation	(-)80,000	(-)80,000	(-)80,000	
Depreciation	(-)40,000	(-)40,000	(-)40,000	
Interest on Loan @ 16%	(-)36,800	(-)36,800	(-)36,800	
Incremental PBT	43,200	83,200	83,200	
Corporate tax @ 50%	(-)21,600	(-)41,600	(-)41,600	
Incremental PAT	21,600	41,600	41,600	
Depreciation added back	40,000	40,000	40,000	
Incremental recurrent cash flow	61,600	81,600	81,600	
Terminal Cash Flow				
Repayment of Loan			(-)2,30,000	
Disposal of the computer			1,10,000	
Cash flows of buying option	61,600	81,600	38,400	
Discounting factors @ 12%	*0.893	*0.797	*0.712	
NPV of buying option	55,009	65,035	27,341	92,703

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2. Evaluation of ABC Ltd's position under leasing option.

Particulars	Y 1	E 2	A 3	R NPV
Service Charges Receivable	2,20,000	2,60,000	2,60,000	
Cost of operation	(-)80,000	(-)80,000	(-)80,000	
Lease Rent	(-)96,000	(-)98,000	(-)98,000	
Incremental PBT	44,000	82,000	82,000	
Corporate tax @ 50%	(-)22,000	(-)41,000	(-)41,000	
	22,000	41,000	41,000	
Discounting factor @ 12%	*0.893	*0.797	*0.712	
NPV of Leasing option	19,646	32,677	29,192	81,515
Higher NPV under buying option				<u>11,188</u>

In view of above buying option is recommended

Note:

1. Maintenance and particularly insurance are to be paid by the owner. So, cash outflow of Rs.10,000 = Rs.20,000* (1 - 0.5) is not considered under leasing option.
2. Cash flows on account of Service Charges Receivable and Cost of Operation of the computer are common to both of the alternatives. These could therefore, have been eliminated. The NPV's of the options will change but the net NPV of Rs.11,188 will be the same. Full credit should be given for such answers also.

Evaluation from the lessor's point of view

The lessor is also supposed to buy the computer under the same terms of financing. His position is analysed below:

Particulars	Y 1	E 2	A 3	R NPV
Lease Rental	96,000	98,000	98,000	
Taxes & Insurance – being the owner, will be borne by the lessor	(-)20,000	(-)20,000	(-)20,000	
Loan Interest	(-)36,800	(-)36,800	(-)36,800	
Depreciation	(-)40,000	(-)40,000	(-)40,000	
Incremental PBT	(-)800	1,200	1,200	
Corporate tax	400	(-)600	(-)600	

(Assuming that the less will get adjusted with other profits for leasing out other assets)

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	(-)400	600	600	
Depreciation added back	40,000	40,000	40,000	
	39,600	40,600	40,600	
Terminal Disposal			1,10,000	
Repayment of Loan			(-)2,30,000	
Cash Flow	39,600	40,600	79,400	
Discount factor @ 16 (1- 0.5)% = 8%	*0.926	*0.857	*0.794	
NPV of leasing	36,670	36,670	(-)63,044	8,420

The NPV being positive, the proposal would be acceptable to the lessor also.

Alternative answer

	Y	E	A	R
Particulars	1	2	3	NPV
Lease Rental	96,000	98,000	98,000	
Taxes & Insurance – being the owner, will be borne by the lessor	(-)20,000	(-)20,000	(-)20,000	
Loan Interest	(-)36,800	(-)36,800	(-)36,800	
Depreciation	(-)40,000	(-)40,000	(-)40,000	
Incremental PBT	(-)800	1,200	1,200	
Corporate Tax @50%		(-) 200	(-) 600	
PAT	(-) 800	1,000	600	
Depreciation added back	40,000	40,000	40,000	
			40,600	
			(-) 1,20,000	
	39,200	41,000	(-) 79,400	
	*0.926	*0.857	*0.794	
	36,299	35,137	(-) 63,044	8,392

In view of the positive NPV , the proposal should be accepted by lessor.

Alternative 2

Evaluation from the point of view of lessee. The lessee has two alternatives: (i) To acquire the computer out of borrowed funds, and (ii) To acquire the computer on lease basis. The financial implications of these two options can be evaluated as follows:

Project Planning and Capital Budgeting

Option I: To acquire computer out of borrowed funds. In this case, the company has to pay interest @ 16% annually and repayment of loan at the end of 3rd year. However, the salvage value of Rs.1,10,000 will be available to it. The information can be presented as follows:

Year	Interest	Depreciation	Expenses	Tax Shield (5)=50% of (2+3+4)	Cash outflows	PVF (8%)	PV (Rs.)
(1)	(2)	(3)	(4)	(5)	6=(2+4-5)		
1.	Rs.36,800	Rs.40,000	Rs.20,000	Rs.48,400	Rs.8,400	.926	7,778
2.	36,800	40,000	20,000	48,400	8,400	.857	7,199
3.	36,800	40,000	20,000	48,400	8,400	.794	6,670
4.	Repayment – Savage (2,30,000 – 1,10,000)				Rs.1,20,000	.794	95,280
Present Value of Outflows							1,16,927

Option II: To acquire the Computer on lease basis: In this case, the Company will be required to pay an annual lease rent of Rs.85,000 + 5% of annual billing at the end of year. The financial implications can be evaluated as follows:

Year	Rental	5% of Billing	Tax Shield	Cash Outflow	PV (8%)	{PV}
	(1)	(2)	(3)= (50% of 1+2)	(4)= (1+2+3)		
1	Rs.85,000	Rs.11,000	Rs.48,000	Rs.48,000	.926	Rs.44,448
2	85,000	13,000	49,000	49,000	.857	41,993
3	85,000	13,000	49,000	49,000	.794	38,906
Present Value of Outflows						1,25,347

As the PV of outflows is less in case of buying option, the Company should borrow funds to buyout the computer.

Note: It may be noted that the additional expenses of Rs.80,000 to operate the computer have not been considered in the above calculation. These expenses are required in both the options and are considered to be irrelevant to decide between lease or buy.

Evaluation from the point of view of lessor:

	Year 1	Year 2	Year 3
Lease Rental	85,000	85,000	85,000

Management Accounting and Financial Analysis

5% of Billing	11,000	13,000	13,000
Total Income	96,000	98,000	98,000
Less: Maintenance Expenses	20,000	20,000	20,000
Depreciation	40,000	40,000	40,000
Income before tax	36,000	38,000	38,000
Tax @ 50%	18,000	19,000	19,000
Net Income after Tax	18,000	19,000	19,000
Depreciation added back	40,000	40,000	40,000
Cash Inflow (Annual)	58,000	59,000	59,000
Scrap Value	-	-	1,10,000
	58,000	59,000	1,69,000
PVF (12%)	.893	.797	.712
Present Value	51,794	47,023	1,20,328
Total Present Value			2,19,145
Less: Initial Cost			2,30,000
Net Present Value			<u>-10,855</u>

As the NPV for the lessor is negative, he may not accept the proposal.

Question 52

XY Ltd. which is specialized in manufacturing garments is planning for expansion to handle a new contract which it expects to obtain. An investment bank have approached the company and asked whether the Co. had considered venture Capital financing. In 2001, the company borrowed Rs.100 lacs on which interest is paid at 10% p.a. The Company shares are unquoted and it has decided to take your advice in regard to the calculation of value of the Company that could be used in negotiations using the following available information and forecast.

Company's forecast turnover for the year to 31st March, 2005 is Rs.2,000 lacs which is mainly dependent on the ability of the Company to obtain the new contract, the chance for which is 60%, turnover for the following year is dependent to some extent on the outcome of the year to 31st March, 2005. Following are the estimated turnovers and probabilities:

Year - 2005		Year – 2006	
Turnover Rs. (in lacs)	Prob.	Turnover Rs.(in lacs)	Prob.
2,000	0.6	2,500	0.7
		3,000	0.3
1,500	0.3	2,000	0.5
		1,800	0.5

Project Planning and Capital Budgeting

1,200	0.1	1,500	0.6
		1,200	0.4

Operating costs inclusive of depreciation are expected to be 40% and 35% of turnover respectively for the years 31st March, 2005 and 2006. Tax is to be paid at 30%. It is assumed that profits after interest and taxes are free cash flows. Growth in earnings is expected to be 40% for the years 2007, 2008 and 2009 which will fall to 10% each year after that. Industry average cost of equity (net of tax) is 15%.
(10 Marks), (Nov,2007)

Answer

Estimation of earnings for the years ended 31st March, 2005 & 2006

(Rs. In lacs)					
Prob.	Turnover	Expected Turnover	Prob.	Turnover	Expected Turnover
0.6	2000	1200	0.6 x 0.7	2500	1050
			0.6 x 0.3	3000	540
0.3	1500	450	0.3 x 0.5	2000	300
			0.3 x 0.5	1800	270
0.1	1200	120	0.1 x 0.6	1500	90
			0.1 x 0.4	1200	48
		<u>1770</u>			<u>2298</u>
Operating Costs (40%)		(708)	(35%)		(804)
Interest 100 x 1		(10)			(10)
Profit after Interest		1052			1484
Tax		316			445
Earnings/Cash flows		736			1039

Estimated Cash flows for 2007 2008 & 2009:-

(Rs. In Lacs)			
2007 -	1039 x 1.4 = 1455		
2008 -	1455 x 1.4 = 2037		
2009 -	2037 x 1.4 = 2852		
Discounted Cash flows for the year 2005-2009		(Rs. in Lacs)	
Year	Cash flows	Disc. Factor at 15%	PV
2005	-	0.870	640

Management Accounting and Financial Analysis

2006	-	1039	0.756	785
2007	-	1455	0.658	957
2008	-	2037	0.572	1165
2009	-	2852	0.497	<u>1417</u>
				<u>4964</u>

Estimates of value of Cash flows from 2010 to infinity

Earnings in 2010	-	$2852 \times 1.1 = 3137$
In today's money	-	$3137 \times 0.497 = 1559$

$$P_0 = D_1 / (K_e - G)$$

$$= 1559 / (0.15 - 0.10) = 31180 \text{ Rs. Lacs}$$

Present value of all future estimated cash flows:-

2005 - 2009	-	4964
2009 onwards	-	<u>31180</u>
		<u>36144</u>

∴ Company valuation is 36144 Rs. Lacs

Question 53

A USA based company is planning to set up a software development unit in India. Software developed at the Indian unit will be bought back by the US parent at a transfer price of US \$10 millions. The unit will remain in existence in India for one year; the software is expected to get developed within this time frame.

The US based company will be subject to corporate tax of 30 per cent and a withholding tax of 10 per cent in India and will not be eligible for tax credit in the US. The software developed will be sold in the US market for US \$ 12.0 millions. Other estimates are as follows:

Rent for fully furnished unit with necessary hardware in India	Rs.15,00,000
Man power cost (80 software professional will be working for 10 hours each day)	Rs.400 per man hour
Administrative and other costs	Rs.12,00,000

Advise the US company on financial viability of the project. The rupee-dollar rate is Rs.48/\$.

(4 Marks)(Nov, 2007)

Answer

Proforma profit and loss account of the Indian software development unit.

	Rs.	Rs.
Revenue		48,00,00,000

Project Planning and Capital Budgeting

Less: Costs:

Rent	15,00,000	
Manpower (Rs.400 x 80 x 10 x 365)	11,68,00,000	
Administrative and other costs	12,00,000	11,95,00,000
Earning before tax		36,05,00,000
Less: Tax		10,81,50,000
Earning after tax		25,23,50,000
Less: Withholding tax(TDS)		2,52,35,000
Repatriation amount (in rupees)		22,71,15,000
Repatriation amount (in dollars)		\$4.7 million

Note : Students may assume the year of 360 days instead of 365 days as has been done in the answer provided above. In such a case where a year is assumed to be of 360 days, manpower cost is Rs 11,52,00,000 and repatriated amount Rs 22,87,15,000.

Conclusion : The cost of development software in India for the US based company is \$5.268 million. As the USA based Company is expected to sell the software in the US at \$12.0 million, it is advised to develop the software in India.

Question 54

DL Services is in the business of providing home Services like plumbing, sewerage line cleaning etc. There is a proposal before the company to purchase a mechanized sewerage cleaning line for a sum of Rs. 20 lacs. The life of the machine is 10 years. The present system of the company is to use manual labour for the job. You are provided the following information:

Cost of machine	20 lakhs
Depreciation	20% p.a. straight line
Operating cost	Rs. 5 lacs per annum
Present system	
Manual labour	200 persons
Cost of Manual labour	Rs. 10,000 (ten thousand) per person per annum
The company has an after tax cost of funds of 10% per annum. The applicable rate of tax inclusive of surcharge and cess is 35%.	

Based on the above you are required to:

- (i) State whether it is advisable to purchase the machine.
- (ii) Compute the savings/additional cost as applicable, if the machine is purchased.

(12 Marks)(May, 2008)

Management Accounting and Financial Analysis

Answer

Present System

Cost per annum	
200 persons @ Rs.10,000 per annum	20,00,000
Cumulative Annuity factor at 10%	6.1446
Present value of cash outflow over a period of ten years at 10%	122,89,200
Tax benefit at 35% for 10 years	43,01,220
Net cost over ten years	79,87,980

If machine is purchased

Cost of Machine	20,00,000
Depreciation per annum	4,00,000
Annual cost of operation	5,00,000

Present value of operating cost for 10 years at 10%	30,72,300
Tax saving on operating cost at 35% for 10 years	10,75,305
Net operating cost	19,96,995
Annuity factor for 5 years at 10%	3.7908
Tax saving on depreciation at 35%	5,30,712
Summary	
Outflow on machine	20,00,000
Less: Tax saving on depreciation of Machine	-5,30,712
Add: Operating cost over 10 years	19,96,995
Total cost of machine over 10 years	34,66,283
Total saving	45,21,697

Since there is a saving of Rs.45.21 lacs it is advisable to purchase the machine.

Alternative Solution:

Calculation of Savings in operating cost if the mechanized cleaning line is purchased:

Annual Cost of the present system – cost of manual labour	Rs. lakhs
200 persons × Rs.10,000	20.00
Less: Operating cost with the new line	5.00
Annual Savings	15.00

Project Planning and Capital Budgeting

Calculation of incremental cash in flows if the mechanized cleaning line is purchased:

Year 1 - 5

	Rs. lakhs
Annual Savings in operating cost (before tax)	15.00
Less: Annual depreciation @ 20% on cost	4.00
Taxable annual incremental income	11.00
Less: Tax @ 35%	3.85
After-tax annual incremental income	7.15
Add: Annual depreciation	4.00
Annual incremental cash-in-flow	11.15
Present Value Factor (of an Annuity for a period of 5 years @ 10%)	3.79

	(Rs. Lakhs)
Present Value of 5-year annual incremental cash-in-flow	42.26

Year 6 – 10

Annual Savings in operating cost (before tax)	15.00
Less: Tax @ 35%	5.25
After-tax annual incremental income/cash in flow	9.75
Present Value Factor (of an Annuity between year 6 and 10)	2.35
Present Value of cash-in-flow in years 6 to 10	(Rs. Lakhs) 22.91

(Salvage value presumed 'nil')

	Rs. in lakhs
Calculation of Net Present Value:	
Aggregate Present Value of Cash in flows in years 1 – 10	
(42.26 + 22.91)	65.17
Less: Initial investment – cost of machine	20.00
NET PRESENT VALUE	(+) 45.17

Conclusion: Since the NPV is positive, it is advisable to purchase the mechanized line.

Question 55

Comment briefly on the social cost benefit analysis in relation to evaluation of an Industrial project.

(4 Marks)(May, 2008)

Answer

Comments on Social Cost-Benefit Analysis of industrial projects:

This refers to the moral responsibility of both PSU and private sector enterprises to undertake socially desirable projects – that is, the social contribution aspect needs to be kept in view.

Management Accounting and Financial Analysis

Industrial capital investment projects are normally subjected to rigorous feasibility analysis and cost benefit study from the point of view of the investors. Such projects, especially large ones often have a ripple effect on other sections of society, local environment, use of scarce national resources etc. Conventional cost-benefit analysis ignores or does not take into account or ignores the societal effect of such projects. Social Cost Benefit (SCB) is recommended and resorted to in such cases to bring under the scanner the social costs and benefits.

SCB sometimes changes the very outlook of a project as it brings elements of study which are unconventional yet very very relevant. In a study of a famous transportation project in the UK from a normal commercial angle, the project was to run an annual deficit of more than 2 million pounds. The evaluation was adjusted for a realistic fare structure which the users placed on the services provided which changed the picture completely and the project got justified. Large public sector/service projects especially in under-developed countries which would get rejected on simple commercial considerations will find justification if the social costs and benefits are considered.

SCB is also important for private corporations who have a moral responsibility to undertake socially desirable projects, use scarce natural resources in the best interests of society, generate employment and revenues to the national exchequer.

Indicators of the social contribution include

- (a) Employment potential criterion;
- (b) Capital output ratio – that is the output per unit of capital;
- (c) Value added per unit of capital;
- (d) Foreign exchange benefit ratio.

Question 56

The Mayfair Rubber Industry Ltd. (MRIL) manufactures small rubber components for the local market. It is presently using 8 machines which were acquired 3 years ago at a cost of Rs.18 lakh each having a useful life of 8 years with no salvage value. The policy of the company is to depreciate all machines in 5 years. Their production capacity is 37 lakh units while the annual demand is 30 lakh units. The MRIL has received an order from a leading automobile company of Singapore for the supply of 20 lakh rubber bushes at Rs.15 per unit. The existing machines can be sold @Rs.12 lakh per machine. It is estimated that the removal cost of each machine would be Rs.60,000. In order to meet the increased demand, the MRIL can acquire 3 new machine at an estimated cost of Rs.100 lakh each which will have a combined production capacity of 52 lakh units.

The operating parameters of the existing machines are as follows:

- (i) Labour requirements (Unskilled-18; skilled-18; Supervisor-3; and Maintenance-2) and their per month salaries are Rs.3,500; Rs.5,500; Rs.6,500 and Rs.5,000 each respectively with an increase of 10 percent to adjust inflation.
- (ii) Raw material cost, inclusive of wastage is 60 per cent of revenues.

Project Planning and Capital Budgeting

- (iii) Maintenance cost – years 1-5 (Rs.22.5 lakh), and years 6-8 (Rs.67.5) lakh).
- (iv) Operating expenses – Rs.52.10 lakh expected to increase annually by 5 percent.
- (v) Insurance cost/premium – year 1, 2 percent of the original cost of the machine, afterwards discounted by 10 percent.
- (vi) Selling Price – Rs.15 per unit.

The projected operating parameters with the replacement by the new machines are as follows :

- (i) Additional working capital – Rs.50 lakh.
- (ii) Savings in cost of utilities – Rs.2.5 lakh.
- (iii) Maintenance cost – years 1-2 (Rs.7.5 lakh); years 3-5 (Rs.37.5 lakh).
- (iv) Raw materials cost – 55 percent of sales.
- (v) Employee requirement (6 skilled at monthly salary of Rs.7,000 each and one for maintenance at monthly salary of Rs.6,500).
- (vi) Laying off cost of 34 workers – (Unskilled-18; Skilled-12;; Supervisors-3; and maintenance-1) Rs.9,21,000, that is equivalent to six months salary.
- (vii) Insurance cost/premium-2 percent of the Purchase cost of machine in the first year and discounted by 10 percent in subsequent years.
- (viii) Life of machines – 5 years and salvage value – Rs.10 lakh per machine.

The company follows straight line method of depreciation and the same is accepted for tax purposes. Corporate tax rate is 35 percent and the cost of capital is 20 percent.

As the Finance Manager of MRIL, prepare a report for submission to the top management with your recommendations about the financial viability of the replacement of the existing machine.

(20 marks) (Nov 2008)

Answer

Incremental CFAT and NPV					(Rs. in lakhs)
Particulars	1	2	3	4	5
Sales	300	300	300	300	300
Add: Cost Savings:					
Maintenance (note 2)	15	15	30	30	30
Cost of utilities	2.5	2.5	2.5	2.5	2.5
Labour Costs (note 3)	17.16	18.87	20.76	22.84	25.12
Less: Incremental cost					
Raw materials (note 4)	142.5	142.5	142.5	142.5	142.5
Depreciation (note 5)	25.2	25.2	54	54	54
Insurance (note 6)	4.12	3.71	3.34	3	2.71

Management Accounting and Financial Analysis

Earning before Tax	163.04	165.16	153.42	155.84	158.76
Less: Taxes (0.35)	57.064	57.806	53.607	54.544	55.426
Earning after taxes	105.976	107.354	99.723	101.296	102.934
CFAT (EAT + Depreciation)	130.976	132.354	153.723	155.296	156.934
Salvage Value					30
Release of working capital					50
(x) PV factor at .20	0.833	0.694	0.579	0.482	0.402
PV	109.10	91.85	89.01	74.85	95.25
Total present value (t = 1-5)					460.06
Less: cash Outflow					276.55
NPV					183.51

Comments: Since the NPV is positive, replacement of the exiting machines is financially viable.

FINANCIAL ANALYSIS WHETHER TO REPLACE THE EXISTION MACHINES (USING NPV METHOD)

Incremental cash outflows:

Cost of 3 new machines (Rs.100 lakh × 3)	300,00,000
Additional working capital	50,00,000
Less: Sale proceeds of existing machines	96,00,000
Add: Removal cost of existing machines	4,80,000
Tax on profit on sale of machine (working note1	11,76,000
Cost of layng off 34 workers (Rs.921000 tax advantage @ .35 i.e. to Rs.3,22,350)	5,98,650
	2,76,54,650

WORKING NOTES

1. Tax on profit on sale of existing machine:

Sale proceeds of existing machine:	(8 × 12,00,000)	96,00,000
Less: Book value	(Rs.18 lakh × 8 – Original Cost accumulated depreciation 28.80 × 3)	57,60,000
	Gross profit	38,40,000
Less: Removal Cost	(60,000 × 8)	4,80,000
	Net Profit	33,60,000
	Tax rate	0.35
	Taxes payable on profit	11,76,000

Project Planning and Capital Budgeting

2. <u>Saving in Maintenance cost:</u>	(Rs. in lakhs)				
Year	1	2	3	4	5
Old Machine	22.5	22.5	67.5	67.5	67.5
New Machine	7.5	7.5	37.5	37.5	37.5
Saving in cost	15	15	30	30	30

3. Savings in Labour cost:

Existing labour cost			
Unskilled	(18 × Rs.3,500 × 12 months)		7,56,000
Skilled	(18 × Rs.5,500 × 12 months)		11,88,000
Supervisor	(3 × Rs.6,500 × 12 months)		2,34,000
Maintenance	(2 × Rs.5,000 × 12 months)		1,20,000
			22,98,000
Proposed labor cost			
Skilled	(6 × Rs.7,000 × 12 months)		5,04,000
Maintenance	(1 × Rs.6,500 × 12 months)		78,000
		Cost savings	17,16,000

Savings in subsequent years will increase by 10%

4. Incremental cost of raw material:

Raw material required for old machine:		
(3000000 × Rs.15 per unit × 0.60)		2,70,00,000
Raw material required for new machine		
(5000000 × Rs.15 per unit × 0.55)		4,12,50,000
	Additional raw material Cost	1,42,50,000

5. <u>Incremental Depreciation:</u>	(Rs. in Lakhs)	
Years	1 – 2	3 – 5
Depreciation (with new machine) (Rs.100 lakh × 3 – 10 × 3) / 5 years	54.00	54.00
Depreciation (with old machine) (Rs.18 lakh × 8/5 years)	28.80	-
Incremental Depreciation	25.20	54.00

6. Insurance:

	(Rs. in lakhs)				
Years	1	2	3	4	5
New Machine	6.00	5.40	4.86	4.37	3.94
Old Machine	1.88	1.69	1.52	1.37	1.23
Incremental Insurance	4.12	3.71	3.34	3.00	2.71

Management Accounting and Financial Analysis

Question 56

XYZ Ltd. requires an equipment costing Rs.10,00,000; the same will be utilized over a period of 5 years. It has two financing options in this regard :

- (i) Arrangement of a loan of Rs.10,00,000 at an interest rate of 13 percent per annum; the loan being repayable in 5 equal year end installments; the equipment can be sold at the end of fifth year for Rs.1,00,000.
- (ii) Leasing the equipment for a period of five years at an early rental of Rs.3,30,000 payable at the year end.

The rate of depreciation is 15 percent on Written Down Value (WDV) basis, income tax rate is 35 percent and discount rate is 12 percent.

Advise the XYZ Ltd. that which of the financing options is to be exercised and why.

(8 marks) (Nov 2008)

Answer

Option A

Year	Interest 13% 01	Depreciation 15% WDV 02	Interest + Dep. 03	Tax Shield 03 × 35% 04	Repayment 05	Net 01 + 05 – 04 = 06	PV 12%
01	130,000	150,000	280,000	98,000	200,000	232,000	(207,176)
02	104,000	127,500	231,500	81,025	200,000	222,975	(177,711)
03	78,000	108,375	186,375	65,231	200,000	212,769	(151,492)
04	52,000	92,120	144,120	50,442	200,000	201,558	(128,191)
05	26,000	78,300	104,300	36,505	200,000	189,495	(107,443)
06	Scrap	Value				100,000	56,700
							(715,313)

Option B

Lease Rent	330,000
Tax Shield	<u>(115,500)</u>
Outflow	<u>214,500</u>
	× 3,599
	Rs. 771,985

Since PV of outflows is lower in the Borrowing option, XYZ Ltd. should avail of the loan and purchase the equipment.

TYPES OF FINANCING

Question 1

Discuss briefly the impact of taxation on Corporate Financing. (8 marks) (November, 1996)

Answer

Impact of Taxation on Corporate Financing: Tax is levied on the profits of the company. Tax is also levied on the dividends distributed to shareholders. However, such dividends are exempt in their hands. Thus, the corporate entity suffers tax twice in a sense. This pushes the cost of equity capital. On the other hand interest paid on the debt capital is a deductible expenditure and hence company does not pay tax on interest on debt capital. This reduces the cost of debts. Debt is a less costly source of funds and if the finance manager prudently mixes debt and equity, the weighted average cost of capital will get greatly reduced.

Depreciation is not an outgo in cash but it is deductible in computing the income subject to tax. There will be saving in tax on depreciation and such savings could be profitably employed. Thus, both interest and depreciation provide tax shield and have a tendency to increase EPS. Further the unabsorbed depreciation can be carried forward indefinitely and this will be helpful for loss making concerns which start earning profits in future. The depreciation loss of one company can be carried forward for set off in another company's profits in the case of amalgamations in specified circumstances and such a provision will help growth of companies and rehabilitation of sick units. The finance manager of amalgamating company will bear this benefit for the tax shield it carries in planning the activities.

Thus, the impact of tax will be felt in cost of capital, earnings per share and the cash in flows which are relevant for capital budgeting and in planning the capital structure.

Tax considerations are important as they affect the liquidity of the concerns. They are relevant in deciding the leasing of the assets, transactions of sale and lease back, and also in floating joint venture in foreign countries where tax rates and concessions may be advantageous. Tax implications will be felt in choosing the size and nature of industry and in its location as the tax laws give fillip to small units producing certain products and incentives are given for backward areas. Tax considerations in these matters are relevant for purposes of preserving and protecting internal funds.

Management Accounting and Financial Analysis

Question 2

The Balance Sheet of Smart Ltd. as on March 31, 1997 is as follows:

(Figures in lakhs of rupees)

Liabilities		Assets	
Share Capital	200	Fixed Assets	500
Reserves	140	Inventories	300
Long term Loans	360	Receivables	240
Short term Loans	200	Cash and Bank	60
Payables	120		
Provisions	<u>80</u>		
	<u>1,100</u>		<u>1,100</u>

Sales for the year were 600 lakhs. For the year ending on March 31, 1998 sales are expected to increase by 20%. The profit margin and dividend pay out ratio are expected to be 4% and 50% respectively.

You are required to:

- (i) Quantify the amount of external funds required.
- (ii) Determine the mode of raising the funds given the following parameters:
 - (a) Current ratio should at least be 1.33.
 - (b) Ratio of fixed assets to long term loans should be 1.5.
 - (c) Long term debt to equity ratio should not exceed 1.05.
- (iii) The funds are to be raised in the order of short term bank borrowings, long term loans and equities.

(14 marks) (May 1997)

Answer

External funds requirement (EFR) is given by the following formula:

$$(i) \quad EFR = \left(\frac{A}{S} - \frac{L}{S} \right) \Delta S - ms_1 (1 - d)$$

Where EFR External funds requirement

- A = Total assets
S = Previous sales
L = Payables and provisions
m = Profit Margin
s₁ = Projected sales for the next year
d = Dividend payout ratio

Types of Financing

ΔS = Expected increase in sales

By substituting the figures, we get the following:

$$EFR = \left(\frac{1,100}{600} - \frac{200}{600} \right) 120 - [0.04 \times 720 \times 0.5]$$

$$= 1.5 \times 120 - 14.4$$

$$= \text{Rs. } 180 - 14.4$$

$$= \text{Rs. } 165.6 \text{ lakhs}$$

(ii) Mode of raising the funds:

Short term borrowings

(a) Current ratio should be 1.33

$$1.33 = \frac{600 \times 1.2}{200 \times 1.2 + \text{STBB}} \quad [\text{Where STBB is short term bank borrowings}]$$

$$\frac{1.33}{1} = \frac{720}{240 + \text{STBB}}$$

(By substituting and solving the equation)

STBB will be	301.35
Existing loans	<u>200.00</u>
Additional borrowings	<u>101.35</u>

(b) Long term debt:

Ratio of fixed assets to long term loans = 1.5

$$\frac{500 \times 1.2}{\text{LT}} = 1.5$$

$$1.5 \text{ LT} = \text{Rs. } 600$$

$$\text{LT} = \text{Rs. } 400$$

$$\text{Loans already existing} = \text{Rs. } 360$$

$$\text{Additional} = \underline{40}$$

(c)

Equity:

$$\text{External Funds} = 165.60$$

$$\text{Less: Additional bank borrowings} \quad 101.35$$

$$\text{Additional long term loans} \quad \underline{40.00}$$

$$\underline{141.35}$$

$$\text{Balance additional equity} \quad \underline{24.25}$$

Management Accounting and Financial Analysis

Proof: Debt equity ratio should not exceed 1.05

$$\frac{400}{224.25 + 168} = 1.02$$

Hence, the condition is satisfied.

Note:

- (i) Long term debt = 360 + 40 = 400
 - (ii) Equity share capital = 200 + 24.25 = 224.25
 - (iii) Reserves will also increase by 20% = 140 × 1.2 = 168
- (iii) The funds are to be raised in the order of

STBB	101.53
Long term loans	40.00
Equity	<u>24.25</u>
Total	<u>165.60</u>

Question 3

“Promoters’ contribution is one of the principal means of financing the project” – Discuss.

(10 marks) (May 1997)

Answer

The promoter is required to provide funds irrespective of whether the project is an existing one or a new venture.

Promoters’ contribution consists of:

- (a) Share capital to be subscribed by the promoters in the form of equity share capital and/or preference share capital.
- (b) Equity shares issued as rights shares to the existing shareholders.
- (c) Convertible debentures issued as “rights” to existing shareholders.
- (d) unsecured loans.
- (e) Seed capital assistance.
- (f) Venture capital.
- (g) Internal cash accruals.

In the case of projects established in joint or assisted sector, the contribution of state industrial investment corporation towards share capital is also considered as part of promoters’ total contribution.

The Government of India has classified the locations for establishing industrial units into three categories – A, B and C such as:

Types of Financing

Category A	As no industrial district
Category B	as districts where industrial activity has started
Category C	as districts where industrial activity has gained sufficient ground

Generally promoters are expected to contribute about 22.5% of cost of the project in the case of listed and unlisted companies. However, the promoters' contribution can be reduced for projects located in the notified backward districts/areas i.e. category 'A' areas. Similarly, it is kept low for projects promoted by technocrat entrepreneurs. In case of projects set up by existing companies, the extent of promoters' contribution is determined keeping in view the nature and location of the project, background of the promoters and the existing cash accruals and as per SEBI's guidelines for disclosure and investor's protection. Promoters' contribution is also reduced below the normal requirements to encourage non-MRTP (Now Competition Act, 2002) companies to enter in the field of certain industries. At present the minimum requirement of promoters' contributions stipulated by All India Financial Institutions is as under:

<i>Category of the project</i>	<i>Promoters' contribution as percentage of project cost</i>
1. Normal norms	22.5%
2. Concessional norms	
(i) New projects set up in notified backward districts (No Industry District) falling under Category 'A' backward areas.	17.5%
(ii) New projects set up in notified backward districts falling under Category 'A' backward areas (No Industry Districts) provided the cost of the project is above Rs. 25 crores and its is set up by non-MRTP companies. (Now as per provisions Competition Act, 2002.)	12.5%
(iii) Projects set up in notified backward districts/areas falling under Category 'B'	17.5%
(iv) Projects set up in notified backward districts/areas falling under Category 'C'	20.0%
(v) Projects sponsored by technician entrepreneurs	17.5%

Promoters' contribution indicates the extent of their involvement in a project in terms of their own financial stake. In case the promoters are unable to raise funds to meet the norms of financial institutions, they can avail the benefit of seed capital assistance under any of the schemes of RDC or IDBI or RCTC etc. The investments made by recognized mutual funds

Management Accounting and Financial Analysis

are also considered as promoters' contribution provided the investment is covered by non-disposal undertaking or buy-back clause.

Among different means of finance such as capital incentives, deferred payment guarantees, lease finance/hire purchasing, term loans from financial institutions in the form of rupee loans and foreign currency loans etc., promoters contribution is one of the most important source of finance.

Question 4

TSL Ltd. a highly profitable and tax paying company is planning to expand its present capacity by 100%. The estimated cost of the project is Rs. 1,000 lakhs out of which Rs. 500 lakhs is to be met out of loan funds. The company has received two offers from their bankers:

	Option 1	Option 2
Value of loan	Rs. 500 lakhs	US \$ 14 lakhs equal to Rs. 500 lakhs
Interest	15% payable yearly	6% payable (fixed) yearly in US \$
Period	5 years	5 years
Repayment	(In 5 instalments. First instalment is payable 1 year after draw down)	
Other expenses (to be treated as revenue expenditure)	1% of the value of the loan	1% at US \$ = Rs. 36 (Average)
Future exchange rate	—	End of 1 year 1US \$ = Rs. 38 thereafter to increase by Rs. 2 per annum

The company is liable to pay Income-tax at 35% and eligible for 25% depreciation on W.D. value. You may assume that at the end of 5th year the company will be able to claim balance in WDV for tax purposes. The company follows Accounting Standard AS-11 for accounting changes in Foreign Exchange Rate.

- (1) Compare the total outflow of cash under the above options.
- (2) Using discounted cash flow techniques, evaluate the above offers.
- (3) Is there any risk, which the company should take care of?
- (4) In case TSL has large volume of exports would your advise be different.

The following discounting table may be adopted:

Years:	0	1	2	3	4	5
Discounting Factor:	1	0.921	0.848	0.781	0.720	0.663

(20 marks) (November 1997)

Types of Financing

Answer

Option I

(Rs. in lakhs)

Years:	Repayment of Principal	Interest at 15%	Other Expenses	Tax saving	Net Outflow
0	—	—	5.00	1.75	3.25
1	100	75	—	26.25	148.75
2	100	60	—	21.00	139.00
3	100	45	—	15.75	129.25
4	100	30	—	10.50	119.50
5	<u>100</u>	<u>15</u>	<u>—</u>	<u>5.25</u>	<u>109.75</u>
Total Outflows	<u>500</u>	<u>+ 225</u>	<u>+5.00</u>	— <u>80.50</u>	= <u>649.50</u>

Option II

Exchange Rate	Year	Repayment of principal	Interest at	Other Charges	Total Amount	Repayment of principal	Balance being Premium	Interest	Other Charges	Total Payment	Tax Savings	Net Outflow
		US \$						Rs. in lakhs				
36	0	—	—	0.140	0.140	—	—	—	5.04	5.04	1.764	3.276
38	1	2.8	0.840	—	3.640	100.00	6.4	31.920		138.32	11.732	126.588
40	2	2.8	0.672	—	3.472	100.00	12.0	26.880		138.88	10.878	128.002
42	3	2.8	0.504	—	3.304	100.00	17.6	21.168		138.768	10.048	128.720
44	4	2.8	0.336	—	3.136	100.00	23.2	14.784		137.984	9.184	128.800
46	5	<u>2.8</u>	<u>0.168</u>	<u>—</u>	<u>2.968</u>	<u>100.00</u>	<u>28.8</u>	<u>7.728</u>	<u>—</u>	<u>136.528</u>	<u>24.814</u>	<u>111.714</u>
		<u>14.0</u>	<u>2.520</u>	<u>0.140</u>	<u>16.660</u>	<u>500.00</u>	<u>88.0</u>	<u>102.48</u>	<u>5.04</u>	<u>695.520</u>	<u>68.420</u>	<u>627.100</u>

As per AS 11, the premium paid on exchange rate difference, on loans acquired for the purpose of capital expenditure, should be capitalized. The same is applicable under the Indian Income-tax Act for tax calculations also.

Tax savings on Premium capitalization

(Rs. in lakhs)

Year	Opening Value	Premium	Total	Depreciation on premium at 25%	Tax saving at 35%	Closing WDV
1	—	6.40	6.40	1.60	0.56	4.80
2	4.80	12.00	16.80	4.20	1.47	12.60

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3	12.60	17.60	30.20	7.55	2.64	22.65
4	22.65	23.20	45.85	11.46	4.01	34.39
5	34.39	28.80	63.19*	63.19	22.11	Nil

*Assumed that full benefit will be claimed for tax purposes.

Tax savings on interest, other charges and Premium.

(Rs. in lakhs)				
Year	Amount of interest and other charges	Tax savings	Tax saving on premium	Total Tax savings
0	5.040	1.764	—	1.764
1	31.920	11.172	0.560	11.732
2	26.880	9.408	1.470	10.878
3	21.168	7.408	2.640	10.048
4	14.784	5.174	4.010	9.184
5	7.728	2.704	22.110	24.814

(2) Discounted Cash Flow: Option I

(Rs. in lakhs)			
Year	Net outflow	Discounting factor	Discounted value
0	03.250	1.000	3.25
1	148.750	0.921	136.99
2	139.000	0.848	117.87
3	129.250	0.781	100.94
4	119.500	0.720	86.04
5	109.750	0.663	<u>72.76</u>
			<u>517.85</u>

Discounted cash flow: Option II

(Rs. in lakhs)					
Year	Gross outflow	Total tax saving	Net outflow	Discounted factor	Discounted value
0	5.040	1.764	3.276	—	3.276
1	138.320	11.732	126.588	0.921	116.587
2	138.880	10.878	128.002	0.848	108.545

Types of Financing					
3	138.768	10.048	128.720	0.781	100.530
4	137.984	9.184	128.800	0.720	92.736
5	136.528	24.814	111.714	0.663	<u>74.066</u>
					<u>495.740</u>

- (3) The absolute and discounted value of option II seems to be better than option I. However, the company has to be careful about future exchange rate. The rate indicated is more by rule of thumb than based on any scientific approach. The company should cover the foreign exchange rate and then work out the value.
- (4) In case the company has good volume of exports, then it may help the company to hedge the future payments with outflow. In that case the company may take a lenient view of the possible exchange risk.

Question 5

X Ltd., a widely held company is considering a major expansion of its production facilities and the following alternatives are available:

	Alternative (Rs.in lakhs)		
	A	B	C
Share Capital	50	20	10
14% Debentures	—	20	15
Loan from a Financial Institution @ 18% p.a. Rate of Interest	—	10	25

Expected rate of return before tax is 25%. The rate of dividend of the company is not less than 20%. The company at present has low debt. Corporate taxation 50%.

Which of the alternatives you would choose? (8 marks) (November, 1997)

Answer

	(Rs.in lakhs)		
	A	B	C
Return on Rs. 50 lakhs @ 25%	12.50	12.50	12.50
Less: Interest on Debentures	—	2.80	2.10
Interest on loan	—	<u>1.80</u>	<u>4.50</u>
Taxable profit	12.50	7.90	5.90
Income tax 50%	<u>6.25</u>	<u>3.95</u>	<u>2.95</u>

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Profit after tax available to shareholders	6.25	3.95	2.95
Rate of return on share capital	12.5%	19.75%	29.5%

From shareholders point of view alternative C (highest) is to be chosen.

Question 6

Write short notes on

- (a) *Bridge Finance.*
(b) *Call and put option with reference to debentures. (5 + 5 = 10 marks) (November, 1997)*

Answer

- (a) **Bridge Finance:** Bridge finance refers, normally, to loans taken by a business, usually from commercial banks for a short period, pending disbursement of term loans by financial institutions, normally it takes time for the financial institution to finalise procedures of creation of security, tie-up participation with other institutions etc. even though a positive appraisal of the project has been made. However, once the loans are approved in principle, firms, in order not to lose further time in starting their projects arrange for bridge finance. Such temporary loan is normally repaid out of the proceeds of the principal term loans. It is secured by hypothecation of moveable assets, personal guarantees and demand promissory notes. Generally rate of interest on bridge finance is higher as compared with that on term loans.
- (b) **Call and put option with reference to debentures:**
- (1) A debenture is an instrument for a fixed period of time mostly at fixed rate of interest.
 - (2) Now a days the rate of interest varies significantly.
 - (3) With inflow of enormous foreign funds this has assumed greater significance.
 - (4) A call option gives a liberty to the issuer of the debenture to pay back the amount earlier to the redemption date at a pre-determined price (strike price) within the specified period. In case the option is not exercised the debenture continues.
 - (5) On the other hand, a put option means, a right to investors to demand back the money earlier to the redemption date at a pre-determined price (strike price) within the specified period.
 - (6) The debenture holder can get back the money and invest it elsewhere.
 - (7) These kinds of options are necessary to make the instrument investor friendly and to ensure liquidity in debentures market.

Types of Financing

Question 7

The following figures are made available to you:

	Rs.
Net profits for the year	18,00,000
Less: Interest on secured debentures at 15% p.a. (debentures were issued 3 months after the commencement of the year)	<u>1,12,500</u>
	16,87,500
Less: Income-tax at 35% and dividend distribution tax	<u>8,43,750</u>
Profit after tax	<u>8,43,750</u>
Number of equity shares (Rs. 10 each)	1,00,000
Market quotation of equity share	Rs. 109.70

The company has accumulated revenue reserves of Rs. 12 lakhs. The company is examining a project calling for an investment obligation of Rs. 10 lakhs. This investment is expected to earn the same rate of return as funds already employed.

You are informed that a debt equity ratio (Debt divided by debt plus equity) higher than 60% will cause the price earning ratio to come down by 25% and the interest rate on additional borrowals will cost company 300 basis points more than on their current borrowal on secured debentures.

You are required to advise the company on the probable price of the equity share, if

- (a) the additional investment were to be raised by way of loans; or
(b) the additional investment were to be raised by way of equity. (10 marks) (May 1998)

Answer

Working Note:

Present earning/share:	Rs.
Profit before taxes	16,87,500
Less: Tax at 35%	<u>5,90,625</u>
Profit after tax	<u>10,96,875</u>

No. of equity shares 1,00,000

$$\text{E.P.S.} = \frac{\text{Rs. } 10,96,875}{1,00,000}$$

$$\text{E.P.S.} = \text{Rs. } 10.97$$

Management Accounting and Financial Analysis

Market price Rs. 109.70

$$\text{Hence, P/E} = \frac{\text{Rs. 109.70}}{\text{Rs. 10.97}} = 10$$

(a) **Probable price/share, if the additional investment were to be raised by way of loans**

<i>Present capital employed:</i>	<i>Rs.</i>	
Equity	10,00,000	
Debenture (Long term)	10,00,000	
Revenue reserves	<u>12,00,000</u>	Rs. 32,00,000

Pre-interest and pre-tax profits given Rs. 18 lakhs

$$\text{Rate of return EBIT} = \frac{\text{Rs. 18 lakhs} \times 100}{\text{Rs. 32 lakhs}} = 56.25\%$$

Debt equity ratio, if Rs. 10 lakhs (additional investment) were to be borrowed (Debt Rs. 20 lakhs and equity Rs. 22 lakhs), will be

$$\frac{\text{Rs. 20 lakhs} \times 100}{\text{Rs. 42 lakhs}} = 47.6\%$$

since, the debt equity ratio will not exceed 60% P/E will remain same.

If Rs. 10 lakhs is to be borrowed, the earning will be as under:

	<i>Rs.</i>	<i>Rs.</i>
Return of 56.25% on Rs. 42 lakhs		23,62,500
Less: Interest at 15% on existing Rs. 10 lakhs debentures	1,50,000	
Interest on fresh borrowed amount of Rs. 10 lakhs at 18%	<u>1,80,000</u>	<u>3,30,000</u>
Profit after interest before tax		20,32,500
Less: Tax at 35%		<u>7,11,375</u>
Profit after tax		<u>13,21,125</u>
No. of equity shares		1,00,000

$$\text{E.P.S.} = \frac{\text{Rs. 13,21,125}}{\text{Rs. 1,00,000}} = \text{Rs. 13.21}$$

Probable price of equity share = Rs. 13.21 × 10

(Refer to working note)

$$= \text{Rs. 132.10}$$

Types of Financing

(b) Probable price/share, if additional investment were to be raised by way of equity.

If Rs. 10 lakhs were to be raised by way of equity shares at market rates. The existing market price of Rs. 109.70 may come down a little and may possibly settle at Rs. 100. Hence, new equity shares to be raised will be

Rs. 10,00,000/Rs. 100 = 10,000 shares.

If Rs. 10 lakhs is to be raised by way of equity shares, the earning will be as under:

	Rs.
Profit before interest and tax	23,62,500
Less: Interest on debentures	<u>1,50,000</u>
Profit after interest before tax	22,12,500
Less: Tax @ 35%	<u>7,74,375</u>
Profit after tax	<u>14,38,125</u>
No. of equity shares	1,10,000

$$\text{E.P.S.} = \left(\frac{\text{Rs. } 14,38,125}{1,10,000} \right) = \text{Rs. } 13.07$$

Probable price of equity share = Rs. 13.07 × 10

(Refer to working note)

= Rs. 130.70

The suggested solution will be to issue fresh debentures to finance expansion.

Question 8

The following is the Balance Sheet as at 31st March, 1998 of S Co. Ltd.

	Rs.	Rs.
Share Capital:		
10,000 equity shares of Rs. 100 each fully paid up	10,00,000	
25,000 11% cum preference shares of Rs. 10 each fully paid up	<u>2,50,000</u>	12,50,000
Reserves and surplus		25,00,000
Secured loans		20,00,000
Unsecured loans		12,00,000
Trade creditors		18,00,000
Outstanding expenses		<u>7,50,000</u>
		<u>95,00,000</u>
Represented by		

Management Accounting and Financial Analysis

Fixed assets	55,00,000	
Current assets	37,00,000	
Advances and deposits	<u>3,00,000</u>	<u>95,00,000</u>

The company plans to manufacture a new product in line with its current production, the capital cost of which is estimated to be Rs. 25 lakhs. The company desires to finance the new project to the extent of Rs. 16 lakhs by issue of equity shares at a premium of Rs. 100 per share and the balance to be raised from internal sources.

Additional informations made available to you are:

- (a) Rate of dividends declared in the past five years i.e. year ended 31st March, 1998, 31st March, 1997, 31st March, 1996, 31st March, 1995 and 31st March, 1994 were 24%, 24%, 20%, 20% and 18% respectively.
- (b) Normal earning capacity (net of tax) of the business is 10%.
- (c) Turnover in the last three years was Rs. 80 lakhs (31.3.1998), Rs. 60 lakhs (31.3.1997) and Rs. 50 lakhs (31.3.1996).
- (d) Anticipated additional sales from the new project Rs. 30 lakhs annually.
- (e) Net profit before tax from the existing business which was 10% in the last three years is expected to increase to 12% on account of new product sales.
- (f) Income-tax rate is 35%.
- (g) The trend of market price of the equity share of the company, quoted on the Stock Exchange was:

Year	High	Low
	Rs.	Rs.
1997-98	300	190
1996-97	250	180
1995-96	240	180

You are required to examine whether the company's proposal is justified. Do you have any suggestions to offer in this regard? All workings must form part of your answer.

(20 marks) (November, 1998)

Answer

- (a) Earning per share for the year ended 31st March, 1998 of S Co. Ltd.

	Rs.
Turnover	80,00,000
Net Profit (10% of Rs. 80,00,000)	8,00,000

Types of Financing

Less: Income tax @ 35%	<u>2,80,000</u>
Profit after tax	5,20,000
Less: Preference dividend (11% of Rs. 2,50,000)	<u>27,500</u>
Profit available for equity shareholders: (A)	<u>4,92,500</u>
Number of equity shares: (B)	10,000
Earning per share: (A)/(B)	Rs. 49.25

(b) Expected earning per share after the manufacture of new product

(New project financed to the extent of Rs. 16 lakhs by issue of equity shares)

	Rs.
Anticipated turnover	1,10,00,000
(Refer to Working Note 1)	
Net Profit (12% of Rs. 1,10,00,000)	13,20,000
Less: Income tax @ 35%	<u>4,62,000</u>
Profit after tax	8,58,000
Less: Preference dividend (11% of Rs. 2,50,000)	<u>27,500</u>
Profit available for equity shareholders: (A)	<u>8,30,500</u>
Number of equity shares: (B)	18,000
(Refer to Working Note 2)	
Expected earning per share: (A)/(B)	Rs. 46.14

(c) Price earning ratio for the year ended as on 31st March 1998 of S Co. Ltd.

Average price per share $(300 + 190)/2$: (A)	Rs. 245
Earning per share : (B)	Rs. 49.25
(Refer to (a) above)	
Price earning ratio : (A)/(B)	4.974 or
	5 times (rounded off)

Justification: On the basis of (a), (b) and (c) above.

- There will be decline in market value of share after the new project financed by issue of equity shares and internal sources become operational. Expected market value of share will be E.P.S. $\times$ P/E ratio i.e. Rs. 46.14 $\times$ 5 = Rs. 230.70.

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2. The stock exchange quotation reveal that the company share has been quoted at below book value of Rs. 350 per share (*Refer to working note 3*). The proposed financing pattern is not going to increase E.P.S. It will on the other hand decline marginally. Thus, the existing equity shareholders will not be benefited much from the new issue. However, in case shares are offered to the outsiders, they will gain since a share with intrinsic (book) value of Rs. 350 is being offered at a price of Rs. 200.

Thus, the company's proposal to finance the new project to the extent of Rs. 16 lakhs by issue of equity shares at premium of Rs. 100 per share and balance from internal sources is not justified and the company should, therefore, reconsider the scheme of financing the project by a new equity issue.

The S Co. Ltd. present debt equity ratio is 0.53 (*Refer to working note 5*). As per the prudential norm, the debt equity ratio shall not exceed 2 : 1. Accordingly, the company seems to possess debt capacity/leverage. It can raise the required funds say, by issue of debentures @ 12% to 13% interest.

Expected earnings per share after the manufacture of new product

(*New project financed to the extent of 16 lakhs by issue of debentures @ 12%*)

	Rs.
Anticipated turnover	1,10,00,000
(<i>Refer to Working Note 1</i>)	
Expected profit on turnover	13,20,000
Less: Interest on debentures (12% on Rs. 16 lakhs)	<u>1,92,000</u>
Net Profit before tax	11,28,000
Less: Income tax @ 35%	<u>3,94,800</u>
Net profit after tax	7,33,200
Less: Preference dividends	<u>27,500</u>
Profit available for equity shareholders	7,05,700
No. of equity shares	10,000
Earning per share	Rs. 70.57

Justification:

1. There will be increase in the market value of share after the new project financed by issue of debentures and internal accruals become operational. Expected market value of share will be E.P.S. $\times$ P/E ratio i.e. Rs. 70.57 $\times$ 5 times = Rs. 352.85.
2. The E.P.S. will increase to Rs. 70.57.

Types of Financing

3. The debt equity ratio of the S Co. Ltd. will be 0.96 (*Refer to working note 6*) after the new project is financed by issue of debentures. The ratio 0.96 is within the prudential norm of 2 : 1.

Suggestion: On the basis of the above workings, it is suggested that it will be better if the company raise the funds, required for financing the new project, by issuing debentures instead of equity shares. This is because the market price per share and earning per share is higher in case of debenture financing without undue risk.

Working Notes:

	Rs.
1. <i>Anticipated turnover</i>	
Present turnover	80,00,000
Add: Anticipated additional sales of new product	<u>30,00,000</u>
	<u>1,10,00,000</u>
2. <i>Number of new equity shares to be issued</i>	
Funds required by issue of equity shares : (A)	Rs. 16,00,000
Funds raised by issue of 1 new equity share: (B)	Rs. 200
No. of new equity share to be issued: (A)/(B)	8,000
	Rs.
3. <i>Book value of one equity share</i>	
10,000 equity shares of Rs. 100 each fully paid up	10,00,000
Add: Reserves and surplus	<u>25,00,000</u>
	35,00,000
No. of equity shares	10,000
Book value of one equity share	350

<i>Alternatively</i>	Rs.
Fixed assets	55,00,000
Current assets	37,00,000
Advances and deposits	<u>3,00,000</u>
	<u>95,00,000</u>
Less: Preference share capital	2,50,000
Secured loans	20,00,000

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Unsecured loans	12,00,000	
Trade creditors	18,00,000	
Outstanding expenses	<u>7,50,000</u>	<u>60,00,000</u>
		35,00,000
No. of equity shares		10,000
Book value of one share		350

4. Present debt equity ratio

$$\begin{aligned} &= \frac{\text{Secured loans}}{\text{Share Capital + Reserves and surplus}} \\ &= \frac{\text{Rs. 20 lakhs}}{\text{Rs. 37.50 lakhs}} \\ &= 0.53 \end{aligned}$$

5. Expected debt equity ratio

$$\begin{aligned} &= \frac{\text{Secured loans + Proposed debentures}}{\text{Share Capital + Reserves and surplus}} \\ &= \frac{\text{Rs. 20 lakhs + Rs. 16 lakhs}}{\text{Rs. 37.50 lakhs}} \\ &= 0.96 \end{aligned}$$

Question 9

The Modern Chemicals Ltd. requires Rs. 25,00,000 for a new plant. This plant is expected to yield earnings before interest and taxes of Rs. 5,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per share. It has three alternatives to finance the project—by raising debt of Rs. 2,50,000 or Rs. 10,00,000 or Rs. 15,00,000 and the balance, in each case, by issuing equity shares. The company's share is currently selling at Rs. 150, but is expected to decline to Rs. 125 in case the funds are borrowed in excess of Rs. 10,00,000. The funds can be borrowed at the rate of 10% upto Rs. 2,50,000, at 15% over Rs. 2,50,00 and upto Rs. 10,00,000 and at 20% over Rs. 10,00,000. The tax rate applicable to the company is 50%. Which form of financing should be the company choose?
(7 marks) (November, 1999)

Types of Financing

Answer

Calculation of Earning per share for three alternatives to finance the project

Particulars	<u>Alternatives</u>		
	I	II	III
	To raise debt of Rs. 2,50,000 and equity of Rs. 22,50,000 Rs.	To raise debt of Rs. 10,00,000 and equity of Rs. 15,00,000 Rs.	To raise debt of Rs. 15,00,000 and equity of Rs. 10,00,000 Rs.
Earnings before interest and tax	5,00,000	5,00,000	5,00,000
Less: Interest on debt at the rate of	25,000 (10% on Rs. 2,50,000)	1,37,500 (10% on Rs. 2,50,000) (15% on Rs. 2,50,000)	2,37,500 (10% on Rs. 2,50,000) (15% on Rs. 7,50,000) (20% on Rs. 5,00,000)
Earning before tax	4,75,000	3,62,500	2,62,500
Less: Tax @ 50%	<u>2,37,500</u>	<u>1,81,250</u>	<u>1,31,250</u>
Earnings after tax: (A)	2,37,500	1,81,250	1,31,250
Number of shares: (B) (Refer to working note)	15,000	10,000	8,000
Earning per share: (A) / (B)	15.833	18.125	16.406

Decision: The earning per share is higher in alternative II i.e. if the company finance the project by raising debt of Rs. 10,00,000 and issue equity shares of Rs. 15,00,000. Therefore the company should choose this alternative to finance the project.

Working Note:

	<u>Alternatives</u>		
	I	II	III
	Rs. 22,50,000	Rs. 15,00,000	Rs. 10,00,000
Equity financing : (A)			
Market price per share: (B)	Rs. 150	Rs. 150	Rs. 125
Number of equity shares : (A)/(B)	15,000	10,000	8,000

Management Accounting and Financial Analysis

Question 10

The following is the capital structure of Simons Company Ltd. as on 31.12.1998:

	Rs.
Equity shares: 10,000 shares (of Rs. 100 each)	10,00,000
10% Preference Shares (of Rs. 100 each)	4,00,000
12% Debentures	<u>6,00,000</u>
	<u>20,00,000</u>

The market price of the company's share is Rs. 110 and it is expected that a dividend of Rs. 10 per share would be declared for the year 1998. The dividend growth rate is 6%:

- (i) If the company is in the 50% tax bracket, compute the weighted average cost of capital.
- (ii) Assuming that in order to finance an expansion plan, the company intends to borrow a fund of Rs. 10 lakh bearing 14% rate of interest, what will be the company's revised weighted average cost of capital? This financing decision is expected to increase dividend from Rs. 10 to Rs. 12 per share. However, the market price of equity share is expected to decline from Rs. 110 to Rs. 105 per share. (10 marks) (November, 1999)

Answer

(i) Computation of the weighted average cost of capital			
Source of finance	Proportion	After tax cost (%) (1-tax rate i.e. 50%)	Weighted average cost of capital (%)
(a)	(b)	(c)	(d)= (b) × (c)
Equity share	0.5	15.09	7.54
		(Refer to working note 1)	
10% Preference share	0.2	10.00	2.00
12% Debentures	0.3	6.00	<u>1.80</u>
Weighted average cost of capital			<u>11.34</u>

Types of Financing

(ii) Computation of Revised weighted average cost of capital

Source of finance	Proportion	After tax cost (%) (1-tax rate i.e. 50%)	Weighted average cost of capital (%)
(a)	(b)	(c)	(d)= (b) × (c)
Equity share	0.333	17.42	5.80
(Refer to working note 2)			
10% Preference share	0.133	10.00	1.33
12% Debentures	0.200	6.00	1.20
14% Loan	0.333	7.00	<u>2.33</u>
Revised weighted average cost of capital			<u>10.66</u>

Working Notes:

(1) Cost of equity shares (K_e)

$$\begin{aligned}
 K_e &= \frac{\text{Dividend per share}}{\text{Market price per share}} + \text{Growth rate} \\
 &= \frac{10}{110} + 0.06 \\
 &= 0.1509 \text{ or } 15.09\%
 \end{aligned}$$

(2) Revised cost of equity shares (K_e)

$$\begin{aligned}
 \text{Revised } K_e &= \frac{12}{105} + 0.06 \\
 &= 0.1742 \text{ or } 17.42\%
 \end{aligned}$$

Question 11

Harbour Company, is a medium-sized producer of chemicals and vinyl coatings used in a variety of industrial processes.

Last year, the company recorded over Rs. 1,500 lakhs in sales, showed net income after tax of Rs. 250 lakhs and concluded a very successful year. For the year coming up, the firm expects a 10 per cent improvement in its sales and operating income figures. Other relevant details – Total assets Rs. 2,200 lakhs, Debt Asset Ratio (i.e. Total Debts including current liabilities) 31.8%, Earnings per share Rs. 3.16 (No. of equity shares of Rs. 10 paid up 80 lakhs); Dividend per share Rs. 1.50 (These all relate to the last year).

Harbour Co. has been invited to bid on a long-term contract to produce a line of plastics for a large chemical company. It appears that the firm can easily get Rs. 600 lakhs contract, which will yield an additional Rs. 180 lakhs in operating income (EBIT). These figures are for next year only and the firm estimates even higher sales and profits in future years.

Management Accounting and Financial Analysis

The production manager knows of a small plastics company located about three kilometers away from the present factory and has all the equipment needed to produce the new line of plastics and the company is presently for sale with a Rs. 1,050 lakhs asking price (which represents largely the value of the assets). The company is available at the negotiated price of Rs. 900 lakhs.

Harbour Co. has sufficient working capital to add the new plastic line, but does not have the cash to buy Rs. 900 lakhs for machinery and equipment. The following financing options are available:

- (i) Harbour Co. can borrow Rs. 400 lakhs through a 12% mortgage on its main facilities. A mortgage company has indicated that it would help finance the plastic machinery with a Rs. 500 lakhs, 12% mortgage. Harbour as per its policy wants to keep debt asset ratio between 40 per cent.
- (ii) The company can probably issue upto Rs. 1,000 lakhs in 13% preferred stock or class A equity shares. If equity shares are issued, it could net Rs. 50 per share.

Harbour Co. shares has traditionally traded at a 15/1 price-earnings multiple and it is expected that this will hold in the future. (Corporate Income-tax 50%).

Required:

1. Analysis needed to decide whether to accept the plastic project.
2. Recommendation on the financing method of the project. (20 marks) (May 2000)

Answer

(1) Analysis of the decision whether to accept the plastic project

Current position:

Sales Rs. 1,500 lakhs, Net profit after tax Rs. 250 lakhs

Net profit before tax Rs. 500 lakhs (Tax 50%)

Total assets Rs. 2,200 lakhs,

Debt asset ratio (i.e. total debts including Current Liabilities) = 31.8%

Hence Debt = 31.8% × Rs. 2,200 lakhs = Rs. 700 lakhs

Equity Balance = Rs. 2,200 lakhs – 700 lakhs = Rs. 1,500 lakhs.

Return on capital employed Rs. $\frac{500}{2,200}$ lakhs × 100 = 22.7%

Project details:

Sales Rs. 600 lakhs, Operating income Rs. 180 lakhs, Investment Rs. 900 lakhs

Return on new project = $\frac{\text{Operating income}}{\text{investment}} \times 100 = \text{Rs. } \frac{180}{900} \text{ lakhs} \times 100 = 20\%$

Types of Financing

Cost of capital for the project for alternative financing methods:

- (i) Loan against Mortgage 12% interest
- (ii) Preference shares 13% i.e. 13% out of post tax profits i.e. pre-tax cost 26% (exceeds the return of 20% on new project)
- (iii) Equity shares at Rs. 50 per share
 $\left(\text{no. of shares to be issued} \frac{\text{Rs. 900 lakhs}}{\text{Rs. 50}} \text{ i.e. 18 lakhs} \right)$

Dividend 15%, hence post-tax cost $\frac{15}{5} = 3\%$, pre - tax cost = 6%

$$\text{Or } K_e = \frac{\text{Div.}}{P_0}$$

Where,

Div. = Dividend per share,

P_0 = Price per share

K_e = Cost of equity

$$K_e = \frac{1.50}{50}$$

= 3%, Pre-tax cost = 6%.

Since the earnings are more than the cost against loan and equity, one should go for the project by financing either by loan/equity or combination of both.

(2) Computation of Earning per share when new project is financed by either loan or equity

	Debt Rs. 900 lakhs	Equity Rs. 900 lakhs
	(Rs. in lakhs)	
Expected operating profit of project	180	180
Less: Interest on debt (12% on Rs. 900 lakhs)	<u>108</u>	<u>—</u>
Profit before tax	72	180
Less: Taxation (50%)	<u>36</u>	<u>90</u>
Profit after tax	36	90
Existing profit after tax	<u>250</u>	<u>250</u>
Profit available to equity shareholders	<u>286</u>	<u>340</u>

Management Accounting and Financial Analysis

No. of shares	80 lakhs	80 lakhs + 18 lakhs = 98 lakhs
Earnings per share	Rs. 3.575	Rs. 3.469
Market price	Rs. 3.575 × 15 = Rs. 53.62	Rs. 3.469 × 15 = Rs. 52.03
Debt asset ratio	$\frac{\text{Rs. 700} + \text{Rs. 900}}{\text{Rs. 2,200} + \text{Rs. 900}}$	$\frac{\text{Rs. 700}}{\text{Rs. 2,200} + \text{Rs. 900}}$
	51.6%	22.6%

Since the debt option exceeds the debt asset ratio of 40% we cannot go fully on financing by debt option though it gives higher earning per share.

Computation of maximum debt for new project

In order to keep debt asset ratio of 40%, total debt including the project

should not exceed (Rs. 2,200 + Rs. 900) lakhs × 40% Rs. 1,240 lakhs

Less: Existing debt Rs. 700 lakhs

Maximum debt which can be taken on the new project Rs. 540 lakhs

Against mortgage of plastic machinery Rs. 500 lakhs can be obtained @ 12% and balance Rs. 400 lakhs can be raised by issue of equity shares @ Rs. 50 per share

Computation of Earning per share when new project is financed by debt of Rs. 500 lakhs and equity of Rs. 400 lakhs

	(Rs. in lakhs)
Expected operating profit of project	180
Less: Interest on debt (12% on Rs. 500 lakhs)	<u>60</u>
Profit before tax	120
Less: Taxation (50%)	<u>60</u>
Profit after tax	60
Existing profit after tax	<u>250</u>
Profit available to equity shareholders	<u>310</u>
No. of shares 80 lakhs + 8 lakhs	88 lakhs
Earning per share	Rs. 3.523

Debt asset ratio $\text{Rs. } \frac{700 + 500}{2,200 + 900} \text{ lakhs} = \text{Rs. } \frac{1,200}{3,100} \text{ lakhs} = 38.7\% \text{ (less than 40\%)}$

Market price = Rs. 3.523 × 15 = Rs. 52.85

Types of Financing

Recommendation: Since Earning per share (EPS) is higher when company raises funds for investment in new project by borrowing against mortgage of Rs. 500 lakhs and raising equity capital of Rs. 400 lakhs. The company should opt for this alternative.

Question 12

A company is evaluating a new venture that will cost Rs. 10 crores. The venture will have a return on investment of 20 per cent and the firm forecasts a 12 per cent growth in earnings from the project. The treasurer has identified the following sources for financing the project:

- (a) Equity shares to be sold at Rs. 400 per share.
- (b) Convertible debentures with a 6 per cent coupon to net Rs. 980 (face value Rs. 1,000), and convertible at Rs. 500 per share after 2002.
- (c) Debentures with warrants with a 6 per cent coupon to net Rs. 980 (face value Rs. 1,000), and with each bond having one warrant entitling the holder to buy one equity share at Rs. 500 after 2002.

The financing decision is being made in the fourth quarter of 2000. Over the past ten years, a company has been growing at a 10 per cent rate of sales and earnings.

The treasurer expects the company to continue to grow at 10 per cent even though the firm has traditionally paid 40 per cent of its earnings as dividends. The treasurer expects A's equity shares to continue to rise in price. Using the price trend over the past 5 years, he has projected probable market price ranges for the next three years. The historical data and the projections of the treasurer are given below:

Year	Historical Market price	Year	Forecasted Probability Price	Market
	Rs.			Rs.
1995	220	2001	20%	450
1996	250		60%	500
1997	330		20%	600
1998	270	2002	20%	480
1999	380		60%	550
Current	450		20%	620
		2003	20%	500
			60%	600
			20%	700

Management Accounting and Financial Analysis

The proforma Balance Sheet and Income Statement prepared by the treasurer for the year 2000 is shown below:

A Company Ltd. Proforma Balance Sheet (December 31, 2000)

					(Rs.'000)
	2000	1999		2000	1999
Equity Shares (Rs. 10)	10,000	10,000	Plant and Equipment	2,52,000	2,31,000
Share Premium	40,000	40,000	(Less: Accumulated		
Retained Earnings	1,36,000	1,27,000	Depreciation	<u>(62,000)</u>	<u>(59,000)</u>
Bonds (7%)	90,000	52,000		1,90,000	1,72,000
Mortgage (6%)	30,000	55,000	Inventories	64,000	62,000
Accounts Payable	7,000	6,000	Receivables	44,000	45,000
Other Current Liabilities	11,000	10,000	Cash and Bank	22,000	18,000
			Balances		
			Other Current Assets	<u>4,000</u>	<u>3,000</u>
	<u>3,24,000</u>	<u>3,00,000</u>		<u>3,24,000</u>	<u>3,00,000</u>

Proforma Income Statement (Rs.'000)

	Sales	EBIT	Interest*	EBT	NIAT	EPS
2000	4,20,000	71,500	8,000	63,500	31,750	31.75
1999	3,80,000	65,000	7,000	58,000	29,000	29.00

*Rounded off.

The management of A Ltd. was initially impressed by the fact that the new venture will increase sales by Rs. 12 crores. Management is also interested in the expected 12 per cent growth rate of the venture. As per Company's Financial Policy, the firm's debt-asset ratio should not be above 40 per cent.

With the above information and detailed analysis for next 3 years, what will be the long-term sources of financing for the new proposal?

Make suitable assumptions in your answer, wherever necessary figures could be rounded off. Income-tax rate applicable to the company is to be taken at 50%. (20 marks) (November, 2000)

Answer

The various steps for detailed analysis of given information for next 3 years for determining the long term sources of financing for the new proposal costing Rs. 10 crore are as follows:

Step 1 : Determining the size of offering for various sources of financing

- (i) Equity shares to be sold at Rs. 400 per share
 Cost of new venture = Rs. 10 crore
 No. of equity shares to be offered = $\frac{\text{Rs. 10 crores}}{\text{Rs. 400}}$
 = 2,50,000 shares
- (ii) *Convertible debentures with a 6% coupon to net Rs. 980 (face value Rs. 1,000), and convertible at Rs. 500 per share after 2002..*
 No. of debentures to be offered = $\frac{\text{Rs. 10 crores}}{\text{Rs. 980}} = 1,02,000$ (rounded off)
- (iii) *Debentures with warrants with a 6 per cent coupon to net Rs. 980 (face value Rs. 1,000) and with each bond having one warrant entitling the holder to buy one equity share at Rs. 500 after 2002.*
 No. of debentures to be offered = $\frac{\text{Rs. 10 crores}}{\text{Rs. 980}} = 1,02,000$ (rounded off)

Step 2 : Computation of earnings before interest and tax (EBIT) for next year

$$\begin{aligned} \text{EBIT (without new venture)} &= \text{Current EBIT} \times \text{Growth factor} \\ &= \text{Rs. 7.15 crores} \times 1.10 \\ &= \text{Rs. 7.865 crores} \\ \text{EBIT (with new venture)} &= \text{Current EBIT} \times \text{Growth factor} + \text{Investment in new venture} \\ &\quad \times \text{R.O.I of new venture} \\ &= \text{Rs. 7.15 crores} \times 1.10 + \text{Rs. 10 crores} \times 20\% \\ &= \text{Rs. 7.865 crores} + \text{Rs. 2 crores} \\ &= \text{Rs. 9.865 crores} \end{aligned}$$

Step 3 : Computation of Earnings before interest and tax (EBIT) after 3 years (at the end of planning horizon)

$$\begin{aligned} \text{EBIT (without new venture)} &= \text{Current EBIT} \times (\text{Growth factor})^3 \\ &= \text{Rs. 7.15 crores} \times (1.10)^3 \\ &= \text{Rs. 9.517 crores} \\ \text{EBIT (with new venture)} &= \text{Current EBIT} \times (\text{Growth factor})^3 + \text{Investment in new} \\ &\quad \text{venture} \times (\text{R.O.I of new venture})^2 \\ &= \text{Rs. 7.15 crores} \times (1.10)^3 + \text{Rs. 10 crores} \times \\ &\quad (20\%) \times (1.12)^2 \end{aligned}$$

Management Accounting and Financial Analysis

= Rs. 9.5166 crores + Rs. 2.5088 crores

= Rs. 12.0254 crores

Step 4: To determine likelihood of issue of equity shares by conversion of debentures into equity or by exercise of warrants after year 2002

Expected price of equity shares during 3 year planning period.

Year	2001	2002	2003
	Rs.	Rs.	Rs.
	Rs. $450 \times 20\% = 90$	Rs. $480 \times 20\% = 96$	Rs. $500 \times 20\% = 100$
	Rs. $500 \times 60\% = 300$	Rs. $550 \times 60\% = 330$	Rs. $600 \times 60\% = 360$
	Rs. $600 \times 20\% = \underline{120}$	Rs. $620 \times 20\% = \underline{124}$	Rs. $700 \times 20\% = \underline{140}$
Expected price	<u>510</u>	<u>550</u>	<u>600</u>

Since the expected price of equity shares is more than the conversion and option price of Rs. 500 per share, it is likely that some equity will be created by 2003 as a result of conversion or exercise of warrants, if one of these financing method is used.

Step 5 : Calculation of the effect on EBIT due to exercise of warrants

In forecasting future earnings per share, the firm must consider a likely profit on the additional capital provided by the exercise of warrants.

EBIT (if warrants are exercised) = Rs. 5.10 crores $\times$ 12.54%

= 0.63954 crores

(Refer to working notes 1 & 2)

Step 6: Statement showing computation of Earnings per share for next years' for various alternatives

	(Rs. in crores)			
	Alternatives			
	No new venture	Equity share	Convertible debt	Warrant debt
Earning before interest and tax	7.865	9.865	9.865	9.865
Less: Interest old debt	0.810	0.810	0.810	0.810
(Refer to working note 3)				
New debt	—	—	<u>0.612</u>	<u>0.612</u>
(Refer to working note 4)				
Earning before tax (EBT)	7.055	9.055	8.443	8.443
Less: Tax @ 50%	3.5275	4.5275	4.2215	4.2215

Types of Financing

Earning after tax (EAT)	3.5275	4.5275	4.2215	4.2215
No. of shares (lakhs)	10	12.5	10	10
Earning per share (Rs.)	35.27	36.22	42.215	42.215

Step 7: Statement showing computation of Earnings per share at the end of planning horizon for various alternatives

	Alternatives			
	No new venture	Equity share	Convertible debt	Warrant debt
Earnings before interest and tax (EBIT)	9.516	12.0254	12.0254	12.0254
Add: Earnings before interest & tax by	—	—	—	0.63954
Exercise of warrants (Refer to step 5)				
Less: Interest old debt	0.810	0.810	0.810	0.810
New debt	—	—	—	<u>0.612</u>
Earning before tax (EBT)	8.706	11.2154	11.2154	11.2429
Less: Tax @ 50%	4.353	5.6077	5.6077	5.6214
Earning after tax (EAT)	4.353	5.6077	5.6077	5.6214
No. of shares (lakhs)	10	12.50	12.04	11.2
	(Refer to working note 1)		(Refer to working note 2)	
Earning per share (EPS) (Rs.)	43.53	44.86	46.57	51.00

Step 8: Computation of increase in retained earnings for various alternatives can be determined as follows:

$$\frac{1\text{st year earnings after tax} + 3\text{ years Earnings after tax (1 - Dividend payout)}}{2} \times \text{No. of years}$$

$$\begin{aligned} \text{No new venture} &= \frac{\text{Rs. 3.52 crores} + \text{Rs. 4.353 crores}}{2} \times 60\% \times 3 \text{ years} \\ &= \text{Rs. 7.085 crores} \end{aligned}$$

$$\begin{aligned} \text{Issue of equity shares} &= \frac{\text{Rs. 4.527 crores} + \text{Rs. 5.608 crores}}{2} \times 60\% \times 3 \text{ years} \\ &= \text{Rs. 9.121 crores} \end{aligned}$$

Management Accounting and Financial Analysis

$$\begin{aligned}\text{Issue of convertible debentures} &= \frac{\text{Rs. 4.2215 crores} + \text{Rs. 5.608 crores}}{2} \times 60\% \times 3 \text{ years} \\ &= \text{Rs. 8.846 crores}\end{aligned}$$

$$\begin{aligned}\text{Issue of warrant debt} &= \frac{\text{Rs. 4.2215 crores} + \text{Rs. 5.621 crores}}{2} \times 60\% \times 3 \text{ years} \\ &= \text{Rs. 8.858 crores}\end{aligned}$$

Step 9: Analysis for measuring the degree of risk in capital structure

	(Rs. in crores)			
	No new venture	Equity share	Convertible debt	Warrant debt
<i>End of the year 2000</i>				
Old debt	12.0	12.0	12.0	12.0
New debt	—	—	<u>10.2</u>	<u>10.2</u>
	<u>12.0</u>	<u>12.0</u>	<u>22.2</u>	<u>22.2</u>
Old equity	18.6	18.6	18.6	18.6
New equity	—	<u>10.0</u>	—	—
	<u>18.6</u>	<u>28.6</u>	<u>18.6</u>	<u>18.6</u>
Debt asset ratio	39.2%	29.6%	54.5%	54.5%
<i>End of the year 2003</i>				
Old debt	12.0	12.0	12.0	12.0
New debt	—	—	—	<u>10.2</u>
	<u>12.0</u>	<u>12.0</u>	<u>12.0</u>	<u>22.2</u>
Old equity	18.6	18.6	18.6	18.6
New equity	—	10.0	10.2	5.10
Increase in retained earnings	<u>7.0865</u>	<u>9.121</u>	<u>8.846</u>	<u>8.858</u>
	<u>25.6865</u>	<u>37.721</u>	<u>37.646</u>	<u>32.558%</u>
Debt asset ratio	31.8%	24.1%	24.1%	40.5%

Working Notes:

- Equity shares from conversion of debentures:

Debentures issued × Shares per debenture (on conversion)

= 1,02,000 debentures × 2 share per debenture

= 2,04,000 shares

Equity shares from exercise of warrants

Types of Financing

Bonds issued $\times$ Shares per bond (Exercise of warrants)

= 1,02,000 bonds $\times$ 1 share per bond

= 1,02,000 shares

Value of shares = 1,02,000 shares $\times$ Rs. 500 (option price)

= Rs. 5.10 crores

2. Return on new equity shares (on exercise of warrants)

The return on additional capital provided by the exercise of warrants to issue equity shares is the lower figure between average return for the firm and the return on the new proposal if adopted.

Average return on market value of firm

$$\begin{aligned} &= \frac{\text{EBIT}}{\text{Debt} + \text{Market value of equity shares}} \\ &= \frac{\text{Rs. 7.15 crores}}{(\text{Rs. 9 crores} + \text{Rs. 3 crores}) + (10 \text{ lakhs shares} \times \text{Rs. 450})} \\ &= \frac{\text{Rs. 7.15 crores}}{\text{Rs. 12 crores} + \text{Rs. 45 crores}} \\ &= \frac{\text{Rs. 7.15 crores}}{\text{Rs. 57 crores}} \\ &= 12.54\% \end{aligned}$$

R.O.I from new proposal = 20%

Since the average return on market value of firm is lower than R.O.I. from new proposal (20%). Hence, return on new equity shares on exercise of warrants is 12.54%.

3. Interest on old debt

	(Rs. in crores)
7% Bonds of Rs. 9 crores	0.630
6% Mortgage of Rs. 3 crores	<u>0.810</u>
	<u>0.810</u>

4. Interest on new debt

6% debentures of Rs. 10.2 crores = Rs. 0.612 crores

Conclusions:

1. Issue of equity shares for financing the project offers high earnings and is within the company's Financial Policy.

Management Accounting and Financial Analysis

2. Issue of convertible debentures for financing the project offers high earnings but the firm's debt asset ratio exceeds 40% now and there is a possibility of it being within the company's Financial Policy by year 2003.
3. Issue of warrants for financing the project offers high earnings but is beyond the company Financial Policy (Debt asset ratio exceeds 40%) both now and in the year 2003.

In conclusion, the firm should consider financing the project to gain the large rise in earnings. The equity shares only or a mixture of equity shares and debt financing, represents the most attractive financing alternative. With mixed financing, the firm can achieve a significant rise in earnings without increasing the risk of exceeding the 40 per cent debt – asset guidelines.

Assumptions:

1. It is assumed that the earnings from new project occurs at the end of the year.
2. It is assumed that the debentures will be converted into shares in the year 2003.
3. It is assumed that all the holders of the warrants will buy equity shares in the year 2003.

Question 13

The HLL has Rs. 8.00 crore of 10% mortgage bonds outstanding under an open-end scheme. The scheme allows additional bonds to be issued as long as all of the following conditions are met:

- (1) *Pre-tax interest coverage $\left(\frac{\text{Income before tax} + \text{Bond Interest}}{\text{Bond Interest}} \right)$ remains greater than 4.*
- (2) *Net depreciated value of mortgage assets remains twice the amount of the mortgage debt.*
- (3) *Debt-to-equity ratio remains below 5.*

The HLL has net income after taxes of Rs. 2 crores and a 40% tax-rate, Rs. 40 crores in equity and Rs. 30 crores in depreciated assets, covered by the mortgage.

Assuming that 50% of the proceeds of a new issue would be added to the base of mortgaged assets and that the company has no Sinking Fund payments until next year, how much more 10% debt could be sold under each of the three conditions? Which protective covenant is binding?
(12 marks) (May 2001)

Answer

Let x be the crores of Rupees of new 10% debt which would be sold under each of the three given conditions. Now, the value of x under each of the three conditions is as follows:

1. Pre-tax interest coverage $\left(\frac{\text{Income before tax} + \text{Bond Interest}}{\text{Bond Interest}} \right)$ remains greater than 4.

Types of Financing

$$\frac{\text{Rs. 2 crores} / (1 - 0.4) + 8 \text{ crores} \times 0.1 + x \times 0.1}{(8 \text{ crores} \times 0.1) \times (x \times 0.1)}$$

$$\text{Or } \frac{\text{Rs. 3.33 crores} + 0.80 \text{ crores} + 0.10x}{(0.80 \text{ crores} + \text{Rs. } 0.10x)}$$

$$\text{Or } \frac{\text{Rs. 4.13 crores} + 0.10x}{\text{Rs. } 0.80 \text{ crores} + \text{Rs. } 0.10x}$$

$$\text{Or Rs. 4.13 crores} + 0.10x = 4 (\text{Rs. } 0.80 \text{ crores} + \text{Rs. } 0.10x)$$

$$\text{Or Rs. 4.13 crores} + 0.10x = \text{Rs. } 3.2 \text{ crores} + \text{Rs. } 0.40x$$

$$\text{Or Rs. } 0.30x = 0.93$$

$$\text{Or } x = \text{Rs. } 0.93/0.30$$

$$\text{Or } x = \text{Rs. } 3.10 \text{ crores}$$

Additional mortgage required shall be a maximum of Rs. 3.10 crores.

2. Net depreciated value of mortgage assets remains twice the amount of mortgage debt

(Assuming that 50% of the proceeds of new issue would be added to the base of mortgaged assets)

$$\text{i.e. } \frac{\text{Rs. 30 crores} + 0.5x}{\text{Rs. 8 crores} + x} = 2$$

$$\text{or Rs. 30 crores} + 0.5x = 2 (\text{Rs. 8 crores} + x)$$

$$\text{or Rs. } 1.5x = \text{Rs. 14 crores}$$

$$\text{or } x = \frac{\text{Rs. 14 crores}}{1.5}$$

$$\text{or } x = 9.33 \text{ crores}$$

Additional mortgage required to satisfy condition No. 2 is Rs. 9.33 crores

3. Debt to equity ratio remains below 5

$$\text{i.e. } \frac{\text{Rs. 8 crores} + x}{\text{Rs. 40 crores}} < 5$$

$$\text{or Rs. 8 crores} + x = \text{Rs. 200 crores}$$

$$\text{or } x = \text{Rs. 192 crores}$$

Since all the conditions are to be met, the least i.e. Rs. 3.10 crores (as per condition – 1) can be borrowed by issuing additional bonds.

Note: Since in the question, it is given that Debt to equity ratio remains below 5, the value of debt is computed by using this condition. However, the new additional debt (x) is exorbitant and is not comparable with the value of new additional debt (x) computed

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under conditions 1 and 2. For getting the comparable value of new additional debt x the debt to equity ratio should be read as 0.5. Accordingly, value of additional debt would be Rs. 12 crores.

Question 14

Consider the following information for Strong Ltd.

EBIT	1,120 Rs. in lakh
PBT	320 Rs. in lakh
Fixed cost	700 Rs. in lakh

Calculate the percentage of change in earnings per share, if sales increased by 5 per cent.

(6 marks) (November, 2001)

Answer

Computation of percentage of change in earnings per share, if sales increased by 5%.

$$\text{Degree of combined leverage} = \frac{\% \text{ change in Earning per share (EPS)}}{\% \text{ change in sales}}$$

$$\text{or Degree of operating leverage} \times \text{Degree of financial leverage} = \frac{\% \text{ change in Earning per share (EPS)}}{\% \text{ change in sales}}$$

$$\text{or } 1.625 \times 3.5 \text{ (Refer to working notes (i) and (ii))} = \frac{\% \text{ change in Earning per share (EPS)}}{5}$$

$$\text{or } 5.687 = \frac{\% \text{ change in Earning per share (EPS)}}{5}$$

$$\begin{aligned} \text{or } \% \text{ change in EPS} &= 5.687 \times 5 \\ &= 28.4375\% \end{aligned}$$

Working Notes:

$$\begin{aligned} \text{(i) Degree of operating leverage (DOC)} &= \frac{\text{Contribution}}{\text{EBIT}} \\ &= \frac{(\text{Rs. } 1,120 + \text{Rs. } 700 \text{ lakhs})}{\text{Rs. } 1,120 \text{ lakhs}} \\ &= 1.625 \end{aligned}$$

$$\begin{aligned} \text{(ii) Degree of financial leverage (DOF)} &= \frac{\text{EBIT}}{\text{PBT}} \\ &= \frac{\text{Rs. } 1,120}{\text{Rs. } 320} \\ &= 3.5 \end{aligned}$$

Question 15

- (a) A firm has a bond outstanding Rs. 3,00,00,000. The bond has 12 years remaining until maturity, has a 12.5 per cent coupon and is callable at Rs. 1,050 per bond; it had flotation costs of Rs. 4,20,00, which are being amortised at Rs. 30,000 annually. The flotation costs for a new issue will be Rs. 9,00,000 and the current interest rate will be 10 per cent. The after tax cost of the debt is 6 per cent. Should the firm refund the outstanding debt? Show detailed workings. Consider Corporate Income-tax rate at 50%.
- (b) IOPS has an equity capital of 12 million, total debt of 8 million and sales last year were 30 million:
- (i) It has a target Assets-to-Sales ratio of .667, a target Net Profit margin of .04, a target D.E. ratio of .667 and target earnings retention rate of .75. In a steady state, what is its sustainable growth rate?
- (ii) Suppose the company has established for the next year a target Assets-to-Sales ratio of .62, a target Net Profit margin of .05, and a target D.E. ratio of .80. It wishes to pay an annual dividend of 3 million and raise 1 million in equity capital next year. What is its sustainable growth rate for next year?
- (Million = Million Rupees) (8 + 6 = 14 marks) (November, 2001)

Answer

(a) (i) Differential Annual Interest Saving		Rs.
Interest on outstanding bonds		
(Rs. 3,00,00,000 × 12.5%)		37,50,000
Interest on new issue of bonds		
(Rs. 3,00,00,000 × 10%)		<u>30,00,000</u>
Annual interest savings (before tax)		7,50,000
Less: Tax @ 50%		<u>3,75,000</u>
Annual interest saving (after tax): (i)		3,75,000
Remaining life of outstanding bonds		12 years
Rate of return		6%
Present value of Annuity (6%, 12 years) × (ii)		8.384
Present value of annual interest saving (after tax), (i), (ii)		31,44,000

(ii) Saving of call premium

$$\begin{aligned}\text{Call premium} &= \text{Callable value} - \text{Face value} \\ &= \text{Rs. 1,050} - \text{Rs. 1,000}\end{aligned}$$

Management Accounting and Financial Analysis

= Rs. 50 per bond or 5% of face value.

= Rs. 15,00,000 (5% of Rs. 3,00,00,000)

Saving of call premium after tax = Rs. 7,50,000 (15,00,000 × 50%)

Note: The call premium can be written off as an expense in year the call is made.

(iii) Floatation Costs

The floatation costs for new issue of Rs. 9,00,000 will be cash outflow at the time of new issue.

(iv) Saving on amortisation of floatation costs

	Rs.
Floatation cost of new issue	9,00,000
Annual floatation cost of new issue	75,000
Tax rate	50%
Saving of annual floatation cost (after tax)	3,75,000
No. of years	12
PVAF for 12 years at 6% rate of interest	8.384
Saving of floatation cost (after tax):	3,14,400

(v) Differential tax saving from amortisation of old issue:

Present value of immediate tax savings	Rs. 1,80,000
Present value of tax saving (If firm retain outstanding debt) (Rs. 30,000 × 50% × 8.384)	Rs. 1,25,760
Present value of tax saving (Rs. 1,80,000 – Rs. 1,25,760)	Rs. 54,240
Net after tax saving from new issue = (A) – (B) – (C) + (D) + (F)	
= Rs. 31,44,000 – Rs. 7,50,000 – Rs. 9,00,000 + Rs. 3,14,400 + Rs. 54,240	
= Rs. 18,62,640	

Since net savings of Rs. 18,62,640 appears to be a major benefit from refunding of outstanding debt of Rs. 3,00,00,000 bond. Hence, the firm should refund the outstanding debt.

(b) (i) Sustainable growth rate (SGR)

$$= \frac{b \left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq} \right)}{\left(\frac{A}{S} \right) - \left[b \left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq} \right) \right]}$$

Types of Financing

Where,

b = Retention rate of earnings (1-b is the dividend – payout ratio)

NP/S = Net profit margin (net profits divided by sales)

D/Eq = Debt to equity ratio

S = Annual Sales

A/S = Assets to Sales ratio

Now,

Here, A/s = 0.667, NP/S = 0.04, D/E = 0.667 and b = 0.75

$$\text{SGR} = \frac{0.75(0.04)(1+0.667)}{[0.667 - (0.75)(0.04)(1+0.667)]}$$

$$= 8.11\%$$

(ii) Sustainable growth rate for next year

$$\text{SGR} = \left[\frac{(\text{Eq}_0 + \text{New Eq} - \text{Div}) \left(1 + \frac{D}{\text{Eq}}\right) \left(\frac{S}{A}\right)}{1 - \left[\left(\frac{\text{NP}}{S}\right) \left(1 + \frac{D}{\text{Eq}}\right) \left(\frac{S}{A}\right)\right]} \right] \left[\frac{1}{S_0} \right] - 1$$

NP/S, D/Eq, S, A/S are the same as stated in (i) above

Where, S_0 = Most recent annual sales.

Eq_0 = Equity in the beginning

Now, Here A/S = 0.62, NP/S = 0.05, D/Eq = 0.80, Div = 3 million and New

Eq = Rs. 1 million S_0 = 30 million

$$\text{SGR} = \left[\frac{(12 + 1 - 0.3)(1 + 0.80)(1.6129)}{1 - [(0.05)(1.80)(1.6129)]} \right] \left[\frac{1}{30} \right] - 1$$

$$= 43.77\%$$

Question 16

G Manufacturing Company is an important producer of lawn furniture and decorative objects for the patio and garden. The last year's Income Statement and Balance Sheet are as follows:

Income Statement

	Rs.
Sales	75,00,000
Variable Costs	<u>46,90,000</u>

Management Accounting and Financial Analysis

Contribution	28,10,000
Fixed Costs	<u>14,00,000</u>
Earnings before interest and Tax (EBIT)	14,10,000
Interest	<u>2,00,000</u>
Earnings before Tax (EBT)	12,10,000
Taxation	<u>6,05,000</u>
Net Income after tax	<u>6,05,000</u>

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Equity Capital	10,00,000	Fixed Assets	60,00,000
Reserves and Surplus	42,00,000	Inventory	6,00,000
Long-term Debt (10%)	20,00,000	Receivables	7,00,000
Current Liabilities	<u>5,00,000</u>	Cash	<u>4,00,000</u>
	<u>77,00,000</u>		<u>77,00,000</u>

Figures for industry comparison:

Normal Asset Turnover 1.2 : 1

Normal Profit Margin 20%.

For the Current Year, the forecasted sales are Rs. 80,00,000 and it is likely that variable costs will remain at approximately the same percentage of sales as was in the last year. (Figures could be rounded off). Fixed costs will rise by 10%.

G has short listed the following two product lines to be sold through its existing distribution channels:

- (1) Production and Sale of metal table and chair unit that will be sold for use around swimming pools. This will require an investment of Rs. 20,00,000, which would involve installation of manufacturing and packaging machinery. Sales forecast are Rs. 15,00,000 per annum, variable costs account for 2/3rd of sales value, fixed costs are Rs. 2,00,000 and no additional working capital is needed.
- (2) Hardwood Planter with three separate components, will be appropriate for medium sized shrubs. This will require an investment of Rs. 30,00,000 with forecasted sales per annum of Rs. 25,00,000, variable costs 64% of sales value and fixed costs of Rs. 5,00,000.

Two Financial Plans are available:

- (a) It could borrow on a 10 years note at 9 per cent for either or both of the projects of an amount not to exceed Rs. 60,00,000.
- (b) Cumulative Preference shares with a 10 per cent dividend upto an amount of Rs. 30,00,000.

Types of Financing

Financing through the issue of equity shares would not be possible at the present time.

Required:

- (1) Without the new proposal, what would be the company's operating, Fixed charges and Combined leverages next year? Would the Company have favourable financial leverage?*
- (2) How does the acceptance of each project affect the differing leverages including asset leverages?*
- (3) With each financing alternatives, do the Company's future earnings per share increase or decrease, Why?*
(20 marks) (November, 2001)

Answer

Working Notes:

(i)

Statement showing earnings of Company

	Last Year	Current Year
	Rs.	Rs.
Sales	75,00,000	80,00,000
Less: Variable Costs	<u>46,90,000</u>	<u>50,00,000</u>
Contribution	28,10,000	30,00,000
Less: Fixed Costs	<u>14,00,000</u>	<u>15,40,000</u>
Earnings before interest and Tax (EBIT)	14,10,000	14,60,000
Less: Interest	<u>2,00,000</u>	<u>2,00,000</u>
Earnings before Tax (EBT)	12,10,000	12,60,000
Less: Tax (50%)	<u>6,05,000</u>	<u>6,30,000</u>
Earnings after tax (EAT)	<u>6,05,000</u>	<u>6,30,000</u>

- (1) Computation of the Company's Operating, Fixed Charges and Combined leverages for next year (Refer to Working Note(i))**

$$\begin{aligned}\text{Operating Leverage} &= \frac{\text{Contribution}}{\text{EBIT}} \\ &= \frac{\text{Rs. } 30,00,000}{\text{Rs. } 14,60,000} \\ &= 2.05479\end{aligned}$$

Management Accounting and Financial Analysis

$$\text{Fixed Charges/Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

$$= \frac{\text{Rs. 14,60,000}}{\text{Rs. 12,60,000}}$$

$$= 1.58$$

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}}$$

$$= \frac{\text{Rs. 30,00,000}}{\text{Rs. 12,60,000}}$$

$$= 2.38$$

$$\text{Company's return on Capital employed} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100$$

$$= \frac{\text{Rs. 14,60,000}}{\text{Rs. 72,00,000}} \times 100$$

$$= 20.3\%$$

$$\text{Profit Margin} = \frac{\text{EBIT}}{\text{Sales}}$$

$$= \frac{\text{Rs. 14,60,000}}{\text{Rs. 80,00,000}}$$

$$= 18.25\%$$

$$\text{Assets - turnover/Asset Leverage} = \frac{\text{Sales}}{\text{Capital Employed}}$$

$$= \frac{\text{Rs. 80,00,000}}{\text{Rs. 72,00,000}}$$

$$= 1.11$$

Yes, the Company would have a favourable financial leverage. This is because the company is earning 20.3% on the capital employed and is paying 10% on long term debt.

Types of Financing

(ii) Working Note:

Statement showing earnings of the Projects

Project	Metal table and Chair Unit (Rs. 20,00,000)	Hardwood Planter (Rs. 30,00,000)
	Investments	Investments
Sales	15,00,000	25,00,000
Less: Variable Costs	<u>10,00,000</u>	<u>16,00,000</u>
Contribution	5,00,000	9,00,000
Less: Fixed Costs	<u>2,00,000</u>	<u>5,00,000</u>
Earnings before interest and Tax (EBIT)	<u>3,00,000</u>	<u>4,00,000</u>

(2) Computation of differing leverages including asset leverage of each project

(Refer to Working Note (ii))

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\begin{aligned} \text{For Metal table \& chair unit} &= \frac{\text{Rs. 5,00,000}}{\text{Rs. 3,00,000}} \\ &= 1.67 \end{aligned}$$

$$\begin{aligned} \text{For Hardwood Planter} &= \frac{\text{Rs. 9,00,000}}{\text{Rs. 4,00,000}} \\ &= 2.25 \end{aligned}$$

$$\text{Asset Leverage} = \frac{\text{Sales}}{\text{Capital Employed}}$$

$$\begin{aligned} &= \frac{\text{Rs. 15,00,000}}{\text{Rs. 20,00,000}} &= \frac{\text{Rs. 25,00,000}}{\text{Rs. 30,00,000}} \\ &= 0.75 &= 0.83 \end{aligned}$$

$$\begin{aligned} \text{Return on Capital employed} &= \frac{\text{Rs. 3,00,000}}{\text{Rs. 20,00,000}} \times 100 &= \frac{\text{Rs. 4,00,000}}{\text{Rs. 30,00,000}} \times 100 \\ &= 15\% &= 13.33\% \end{aligned}$$

$$\begin{aligned} \text{Profit Margin} &= \frac{\text{EBIT}}{\text{Sales}} = \frac{\text{Rs. 3,00,000}}{\text{Rs. 15,00,000}} = 20\% &= \frac{\text{Rs. 4,00,000}}{\text{Rs. 25,00,000}} = 16\% \end{aligned}$$

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As per the above computation the acceptance of metal table and chair product will adversely affect the operating leverage, return on capital employed and asset leverage. Similarly, acceptance of Hardwood Planter will adversely affect the return on capital employed and asset leverage.

(3) The effect of financing alternatives on Company's future earnings per share.

- (a) *To borrow on a 10 year note at 9% for either or both of the projects of an amount not to exceed Rs. 60,00,000.*
- (b) The cost of borrowing for this alternative is 9%. The return on capital employed of first project i.e. metal table and chair unit is 15% and for second project i.e. Hardwood planter is 13.33%. Since for both the projects earnings are higher than the cost of borrowing the balance earning after paying interest obligation will be available to equity shareholders. Hence, with this financing alternative the earnings per share will increase.
- (b) *To issue a cumulative preference shares with a 10% dividend upto an amount of Rs. 30,00,000.*

Since the company can raise an amount upto Rs. 30,00,000 by issue of cumulative preference shares, whereas it requires Rs. 20,00,000 and Rs. 30,00,000 respectively for two projects. Therefore, it can use this financing alternative for one of the two projects because the dividend of 10% has to come from after tax profit and tax rate is 50% therefore, pre-tax cost is 20%. The return on capital employed of first project i.e. production and sale of metal table and chair is 15% and of second project i.e. Hardwood Planter with separate components is 13.33%. Since the return of both projects are lower than the cost of 20%, hence financing of the project under this alternative will reduce the overall profits available to equity shareholders i.e. Earnings per share will decrease.

Question 17

Write short note on Restrictive covenants placed by a lender on a borrower in cases of term lending for projects.
(5 marks) (November, 2001)

Answer

Restrictive covenants placed by a lender on a borrower in cases of term lending for projects: For lending term loans for projects, in addition to asset security, a lender to protect itself placed a number of restrictive covenant on a borrower. The restrictive covenants may be categorised as follows:

- (i) *Asset-related covenants:* It requires the borrowing firm to maintain its minimum asset base. This may include to maintain minimum working capital position in terms of minimum current ratio and not to sell fixed assets without the lender's approval.
- (ii) *Liability related covenants:* It restricted borrowing firm from incurring additional debt or repay existing loan. The borrowing firm may be required to reduce its debt-equity ratio by issuing additional equity and preference capital.

Types of Financing

- (iii) *Cash-flow related covenants*: Lenders may restrain the borrowing firm cash outflow by restructuring cash dividends, capital expenditures, salaries and perks of managerial staff.
- (iv) *Control related covenants*: The lender may provide for appointment of suitable staff and the broad-base Board of Directors for managing the operation of borrowing firms.
- (v) *Convertibility*: Lenders may state the terms and conditions of conversion. For instance, FIs in India insist on the option of converting loans into equity.

Question 18

XYZ Limited pays no taxes and is entirely financed by equity shares. The equity share has a beta of 0.6, a price-earning ratio of 12.5 and is priced to offer an expected return of 20 per cent. XYZ Ltd. now decides to buy back half of the equity shares by borrowing an equal amount. If the debt yields a riskfree return of 10%, calculate:

- (i) The beta of the equity shares after the buyback.
- (ii) The required return and risk premium on the equity shares before the buyback.
- (iii) The required return and risk premium on the equity shares after the buyback.
- (iv) The required return on debt.
- (v) The percentage increase in expected earnings per share.
- (vi) The new price-earning multiple.

Assume that the operating profit of the firm is expected to remain constant in perpetuity.

(12 marks) (May 2002)

Answer

- (i) Before buyback xyz is all equity financed and the equity beta is 0.6 and the expected return on equity is 20 per cent. Thus the firm's asset beta is 0.6 and the firm's cost of capital is 20 per cent. Over all firm value will not change after the buyback and that the debt is risk-free.

$$\text{Beta}_A = \frac{D}{D+E} (\text{Beta}_D) + \frac{E}{D+E} (\text{Beta}_E)$$

$$.6 = .5 \times 0 + .5 \times \text{Beta}_E$$

$$\text{or Beta}_E = 1.20$$

- (ii) Before financing, the required rate of return on equity is 20 per cent and the risk-free rate is 10 per cent. Thus the risk premium on equity is 10 per cent.*

*If beta = .6 is considered then Risk Premium will be = .1667 i.e. 16.67%

Calculated as follows

$$r_A = r_f + (r_m - r_f) \times \beta$$

$$20 \text{ per cent} = 10 + (x - 10) \times .6$$

$$10 = (x - 10) \times (0.6)$$

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$$x = \frac{10}{0.6} = 16.67 \text{ per cent}$$

(iii) After financing

$$r_A = \frac{D}{D+E} r_{E^d} + \frac{E}{D+E} r_E$$

$$.20 = .5 \times .10 + .5 \times r_E \text{ OR } r_E = \frac{.20 - .05}{.5} = .30 \text{ or } 30\%.$$

Thus, the risk premium on Equity is 20 per cent.*

* If beta = 1.2 is considered then Risk Premium will be = .1667 i.e. 16.67% calculated as follows.

$$30 = 10 + (r_m - 10) \times 1.2$$

$$\text{Risk Premium} = \frac{20}{1.2} = 16.67\%$$

(iv) The required rate of return on debt is 10 per cent i.e. risk free rate.

(v) The percentage increase in EPS has been calculated as follows by assuming the following figures.

	<i>Before buyback</i>	<i>After buyback</i>
Equity	100	50
Debt @ 10%	<u>Nil</u>	<u>50</u>
	100	100
EBIT @ 20%	20	20
Interest	Nil	5
Earnings before tax	20	15
Tax	Nil	Nil
Earnings after tax	20	15
No. of shares	100	50
Earnings per share	0.2	0.3
P/E Ratio	5	3.33
Return on Equity	20%	30%

The percentage increase in EPS is 50 per cent i.e. $(0.3 - 0.2) / 0.2 \times 100$
= 50 per cent.

(vi) The new price-earning multiple is 3.33.

Question 19

A company has a book value per share of Rs. 137.80. Its return on equity is 15% and it follows a policy of retaining 60% of its earnings. If the Opportunity Cost of Capital is 18%, what is the price of the share today?
(6 marks) (May 2002)

Answer

The company earnings and dividend per share after a year are expected to be:

$$\text{EPS} = \text{Rs. } 137.8 \times 0.15 = \text{Rs. } 20.67$$

$$\text{Dividend} = 0.40 \times 20.67 = \text{Rs. } 8.27$$

The growth in dividend would be:

$$g = 0.6 \times 0.15 = 0.09$$

$$\text{Perpetual growth model Formula : } P_0 = \frac{\text{Dividend}}{K_e - g}$$

$$P_0 = \frac{8.27}{0.18 - 0.09}$$

$$P_0 = \text{Rs. } 91.89$$

Alternative Solution:

However, in case a student follows Walter's approach as against continuous growth model given in previous solution the answer of the question works out to be different. This can be shown as follow:

Given data:

Book value per share = Rs. 137.80

Return on equity = 15%

Dividend Payout = 40%

Cost of capital = 18%

∴ EPS = Rs. 137.80 × 15%
= Rs. 20.67

∴ Dividend = Rs. 20.67 × 40%
= Rs. 8.27

Walter's approach showing relationship between dividend and share price can be expressed by the following formula

$$V_c = \frac{D + \frac{R_a}{R_c} (E - D)}{R_c}$$

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Where,

V_c = Market Price of the ordinary share of the company.

R_a = Return on internal retention i.e. the rate company earns on retained profits.

R_c = Capitalisation rate i.e. the rate expected by investors by way of return from particular category of shares.

E = Earnings per share.

D = Dividend per share.

Hence,

$$\begin{aligned} V_c &= \frac{8.27 + \frac{.15}{.18}(20.67 - 8.27)}{.18} \\ &= \frac{18.60}{.18} \\ &= \text{Rs. } 103.35 \end{aligned}$$

Question 20

A project had an equity beta of 1.2 and was going to be financed by a combination of 30% debt and 70% equity.

Assuming debt-beta to be zero, calculate the Project beta taking risk-free-rate of return to be 10% and return on market portfolio at 18%. (4 marks) (May 2002)

Answer

$$\begin{aligned} \beta_p &= \left[\beta_{\text{equity}} \times \frac{E}{D+E} \right] + \left[\beta_{\text{debt}} \times \frac{D}{D+E} \right] \\ &= (1.2 \times .7) + (0 \times .3) = .84 \\ \text{RRR} &= R_f + \beta_p (R_m - R_f) \\ &= .10 + 0.84 (.18 - .10) \\ &= .1672 \text{ or } 16.72\% \end{aligned}$$

Question 21

A Ltd. is an all equity Financed Company. The current market price of share is Rs. 180. It has just paid a dividend of Rs. 15 per share and expected future growth in dividend is 12%. Currently, it is evaluating a proposal requiring funds of Rs. 20 lakhs, with annual inflows of Rs. 10 lakhs for 3 years. Find out the Net Present Value of the proposal, if (i) It is financed from retained earnings; and (ii) It is financed by issuing fresh equity at market price with a floatation cost of 5% of issue price. (6 marks) (May 2002)

Answer**(i) Calculation of Net Present Value****Financed From Retained Earnings:****Cost of Retained Earnings:**

$$\left[\frac{\text{Expected dividend at the end of the year}}{\text{Current Market Price of Share}} \times 100 \right] + \text{Growth Rate of Dividend}$$

$$\left[\frac{\text{Rs.15} + 1.80}{\text{Rs.180}} \times 100 \right] + 12\% = 21.33\%$$

NPV of the Proposal: Net Cash Flow

Year		Rs.
0		-20,00,000
1	(10,00,000 × .8242)	8,24,200
2	(10,00,000 × .6793)	6,79,300
3	(10,00,000 × .5599)	<u>5,59,900</u>
		<u>63,400</u>

(ii) Financed through issue of Fresh Equity:

$$\text{Cost of Equity} = \left[\frac{D_1}{P_0 (1 - \text{floatation cost})} \times 100 \right] + \text{Growth Rate}$$

$$\left[\frac{\text{Rs.15} + 1.80}{\text{Rs.180} (1 - .05)} \right] + 12\% = 21.82\%$$

NPV of the Proposal:

Year		Net Cash flow Rs.
0		-20,00,000
1	(10,00,000 × .8209)	8,20,900
2	(10,00,000 × .6738)	6,73,800
3	(10,00,000 × .5532)	<u>5,53,200</u>
	NPV	<u>47,900</u>

Management Accounting and Financial Analysis

Question 22

The net Sales of A Ltd. is Rs. 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises Rs. 10 crores of equity, Rs. 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of Rs. 6 crores. Income-tax rate is 40%.

- (i) Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).
(ii) Calculate the Operating Leverage of the Company given that combined leverage is 3.

(6 + 4 = 10 marks) (May 2002)

Answer

- (i) Net Sales : Rs. 30 crores

EBIT Rs. 3.6 crores @ 12% on sales

$$ROI = \frac{EBIT}{\text{Capital Employed}} \times 100 = \frac{3.6}{10 + 2 + 6} \times 100 = 20\%$$

	Rs. in crores
EBIT	3.6
Interest on Debt	<u>0.9</u>
EBT	2.7
Less: Tax @ 40%	<u>1.08</u>
EAT	1.62
Less: Preference dividend	<u>0.26</u>
Earnings available for Equity Shareholders	<u>1.36</u>
Return on equity = $1.36/10 \times 100 = 13.6\%$	

Segments due to the presence of Preference share capital and Borrowing (Debentures)

Segment of ROE due to Preference capital: $[.20 (1-.4) - .13] \times .2 = -.002$

Segment of ROE due to Debentures: $[.20 (1-.4) - .15 (1 - .4)] \times .6 = -.018$ or $-.2\% + 1.8\%$

= 1.6%

The weighted average cost of capital is as follows:

	Source	Proportion	Cost (%)	WACC (%)
(i)	Equity	10/18	13.60	7.56

Types of Financing

(ii)	Preference Shares	2/18	13.00	1.44
(iii)	Debt	6/18	9.00	<u>3.00</u>
			Total	<u>12.00</u>

$$(ii) \text{ Degree of Financial Leverage} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest} - \text{Preference dividend}}$$

$$= \frac{3.6}{3.6 - .9 - .26} = 1.4754$$

$$\text{Degree of Combined Leverage} = \text{DFL} \times \text{DOL}$$

$$3 = 1.4754 \times \text{DOL} \text{ or } \text{DOL} = \frac{3}{1.4754}$$

$$\therefore \text{Degree of operating leverage} = 2.033$$

Question 23

Pragya Limited has issued 75,000 equity shares of Rs. 10 each. The current market price per share is Rs. 24. The company has a plan to make a rights issue of one new equity share at a price of Rs. 16 for every four share held.

You are required to:

- Calculate the theoretical post-rights price per share;
- Calculate the theoretical value of the right alone;
- Show the effect of the rights issue on the wealth of a shareholder, who has 1,000 shares assuming he sells the entire rights; and
- Show the effect, if the same shareholder does not take any action and ignores the issue.

(8 marks)(May 2003)

Answer

- Calculation of theoretical Post-rights (ex-right) price per share:

$$\text{Ex-right value} = \left[\frac{MN + SR}{N + R} \right]$$

Where M = Market price,

N = Number of old shares for a right share

S = Subscription price

R = Right share offer

$$= \left[\frac{(\text{Rs. } 24 \times 4) + (\text{Rs. } 16 \times 1)}{4 + 1} \right]$$

$$= \text{Rs. } 22.40$$

Management Accounting and Financial Analysis

(ii) Calculation of theoretical value of the rights alone:

= Ex-right price – Cost of rights share

= Rs. 22.40 – Rs. 16 = Rs. 6.40

(iii) Calculation of effect of the rights issue on the wealth of a shareholder who has 1,000 shares assuming he sells the entire rights:

	Rs.
(a) Value of shares before right issue (1,000 shares × Rs. 24)	24,000
(b) Value of shares after right issue (1,000 shares × Rs. 22.40)	22,400
Add: Sale proceeds of rights renunciation (250 shares × Rs. 6.40)	<u>1,600</u>
	<u>24,000</u>

There is no change in the wealth of the shareholder if he does not take any action and ignores the issue.

(iv) Calculation of effect if the shareholder does not take any action and ignores the issue:

	Rs.
Value of shares before right issue (1,000 shares × Rs. 24)	24,000
Less: Value of shares after right issue (1,000 shares × Rs. 22.40)	<u>22,400</u>
Loss of wealth to shareholders, if rights ignored	<u>1,600</u>

Question 24

A company is presently working with an earning before interest and taxes (EBIT) of Rs. 45 lakhs. Its present borrowings are:

	(Rs. Lakhs)
12% term loan	150
Working capital:	
Borrowing from Bank at 15%	100
Public deposit at 11%	45

The sales of the company is growing and to support this the company proposes to obtain additional borrowing of Rs. 50 lakhs expected to cost 16%. The increase in EBIT is expected to be 16%.

Types of Financing

Calculate the change in interest coverage ratio after the additional borrowing and commitment.

(8 marks)(May 2003)

Answer

Calculation of Present Interest Coverage Ratio

Present EBIT = Rs. 45 lakhs

<i>Interest charges (Present)</i>	<i>Rs. in lakhs</i>
Term loan @ 12%	18.00
Bank Borrowings @ 15%	15.00
Public Deposit @ 11%	<u>4.95</u>
	<u>37.95</u>

$$\begin{aligned}\text{Present Interest Coverage Ratio} &= \frac{\text{EBIT}}{\text{Interest Charges}} \\ &= \frac{\text{Rs. 45 lakhs}}{\text{Rs. 37.95 lakhs}} = 1.19\end{aligned}$$

Calculation of Revised Interest Coverage Ratio

Revised EBIT (116% of Rs. 45 lakhs) = 52.2 lakhs

<i>Proposed interest charges</i>	<i>Rs. in lakhs</i>
Existing charges	37.95
Add: Additional charges (16% of additional Borrowings i.e. 50 lakhs)	<u>8.00</u>
Total	<u>45.95</u>

$$\text{Revised interest coverage Ratio} = \frac{\text{Rs. 52.2 lakhs}}{\text{Rs. 45.95 lakhs}} = 1.14$$

Analysis: With the proposed increase in the sales the burden of interest on additional borrowings of Rs. 50 lakhs will adversely affect the interest coverage ratio which has been reduced by 5% approximately (i.e. from 1.19 to 1.14).

Question 25

M/s Agfa Industries is planning to issue a debenture series on the following terms:

Face value	Rs. 100
Term of maturity	10 years
Yearly coupon rate	

Management Accounting and Financial Analysis

Years

1 – 4	9%
5 – 8	10%
9 – 10	14%

The current market rate on similar debentures is 15 per cent per annum. The Company proposes to price the issue in such a manner that it can yield 16 per cent compounded rate of return to the investors. The Company also proposes to redeem the debentures at 5 per cent premium on maturity. Determine the issue price of the debentures.

(8 marks) (November, 2003)

Answer

The issue price of the debentures will be the sum of present value of interest payments during 10 years of its maturity and present value of redemption value of debenture.

Years	Cash out flow (Rs.)	PVIF @ 16%	PV
1	9	.862	7.758
2	9	.743	6.687
3	9	.641	5.769
4	9	.552	4.968
5	10	.476	4.76
6	10	.410	4.10
7	10	.354	3.54
8	10	.305	3.05
9	14	.263	3.682
10	14 + 105 = 119	.227	<u>3.178 + 23.835</u>
			71.327

Thus the debentures should be priced at Rs. 71.327

Question 26

There is a 9% 5-year bond issue in the market. The issue price is Rs. 90 and the redemption price Rs. 105. For an investor with marginal income tax rate of 30% and capital gains tax rate of 10% (assuming no indexation), what is the post-tax yield to maturity? (5 marks)(May 2004)

Answer

Calculation of yield to Maturity (YTM)

$$YTM = \frac{\text{Coupon} + \text{Pro-rated disc.}}{(\text{Redemption price} + \text{Purchase Price})/2}$$

Types of Financing

After tax coupon = $9 \times (1 - .30) = 6.3\%$

After tax redemption price = $105 - (15 \times .10)$ or Rs. 103.5

After tax capital gain = $103.5 - 90 = \text{Rs. } 13.5$

$$\text{YTM} = \frac{6.3 + (13.5/5)}{(103.5 + 90)/2} \text{ or } \frac{9.00}{96.75} = 9.30\%$$

Question 27

Calculate economic value added (EVA) with the help of the following information of Hypothetical Limited:

Financial leverage : 1.4 times

Capital structure : Equity Capital Rs. 170 lakhs

Reserves and surplus Rs. 130 lakhs

10% Debentures Rs. 400 lakhs

Cost of Equity : 17.5%

Income Tax Rate : 30%. (6 marks)(November, 2004)

Answer

Financial Leverage = PBIT / PBT

$$1.4 = \text{PBIT} / (\text{PBIT} - \text{Interest})$$

$$1.4 = \text{PBIT} / (\text{PBIT} - 40)$$

$$1.4 (\text{PBIT} - 40) = \text{PBIT}$$

$$1.4 \text{ PBIT} - 56 = \text{PBIT}$$

$$1.4 \text{ PBIT} - \text{PBIT} = 56$$

$$0.4 \text{ PBIT} = 56$$

$$\text{or PBIT} = \frac{56}{0.4} = \text{Rs. } 140 \text{ lakhs}$$

$$\text{NOPAT} = \text{PBIT} - \text{Tax} = \text{Rs. } 140 \text{ lakhs} (1 - 0.30) = \text{Rs. } 98 \text{ lakhs.}$$

$$\begin{aligned} \text{Weighted average cost of capital (WACC)} &= 17.5\% \times (300 / 700) + (1 - 0.30) \times (10\%) \times \\ &\quad (400 / 700) \\ &= 11.5\% \end{aligned}$$

$$\begin{aligned} \text{EVA} &= \text{NOPAT} - (\text{WACC} \times \text{Total Capital}) \\ &= \text{Rs. } 98 \text{ lakhs} - 0.115 \times \text{Rs. } 700 \text{ lakhs} \\ &= \text{Rs. } 17.5 \text{ lakhs} \end{aligned}$$

Management Accounting and Financial Analysis

Question 28

ABC Limited's shares are currently selling at Rs. 13 per share. There are 10,00,000 shares outstanding. The firm is planning to raise Rs. 20 lakhs to Finance a new project.

Required:

What is the ex-right price of shares and the value of a right, if

- (i) The firm offers one right share for every two shares held.
- (ii) The firm offers one right share for every four shares held.
- (iii) How does the shareholders' wealth change from (i) to (ii)? How does right issue increases shareholders' wealth? (6 marks)(November, 2004)

Answer

- (i) Number of shares to be issued : 5,00,000

$$\text{Per - right} = \frac{\text{Rs. } 1,30,00,000 + 20,00,000}{15,00,000} = \text{Rs. } 10$$

$$\text{Subscription price Rs. } 20,00,000 / 5,00,000 = \text{Rs. } 4$$

$$\text{Value of right} = \frac{\text{Rs. } 10 - 4}{2} = 3$$

- (ii) $\text{Per - right} = \frac{\text{Rs. } 1,30,00,000 + 20,00,000}{12,50,000} = \text{Rs. } 12$

$$\text{Subscription price Rs. } 20,00,000 / 2,50,000 = \text{Rs. } 8$$

$$\text{Value of right} = \frac{\text{Rs. } 12 - 8}{4} = \text{Rs. } 1$$

- (iii) Since right issue is constructed in such a way so that shareholders' proportionate share will remain unchanged, shareholders' wealth does not change from (i) to (ii).

Right issue increases shareholders' wealth because the cost of issuing right shares is much lower than the cost of a public issue.

Question 29

- (a) The following data are available for a bond

Face value	Rs. 1,000
Coupon Rate	16%
Years to Maturity	6
Redemption value	Rs. 1,000
Yield to maturity	17%

What is the current market price, duration and volatility of this bond? Calculate the expected market price, if increase in required yield is by 75 basis points.

(8 Marks) (November, 2005)

Answer**(a) 1. Calculation of Market price:**

$$YTM = \frac{\text{Coupon interest} + \left(\frac{\text{Discount or premium}}{\text{Years left}} \right)}{\frac{\text{Face Value} + \text{Market value}}{2}}$$

Discount or premium – YTM is more than coupon rate, market price is less than Face Value i.e. at discount.

Let x be the market price

$$0.17 = \frac{160 + \left\{ \frac{(1,000 - x)}{6} \right\}}{\frac{1,000 + x}{2}}$$

$$x = \text{Rs. } 960.26$$

Alternatively, the candidate may attempt by

$$\begin{aligned} &160 (\text{PVIFA } 17,6) + 1,000 (\text{PVIFA } 17,6) \\ &= 160 (3.589) + 1,000 (.390) \\ &= 574.24 + 390 \\ &= 964.24 \end{aligned}$$

2. Duration

Year	Cash flow	P.V. @ 17%		Proportion of bond value	Proportion of bond value x time (years)
1	160	.855	136.8	0.142	0.142
2	160	.731	116.96	0.122	0.244
3	160	.624	99.94	0.104	0.312
4	160	.534	85.44	0.089	0.356
5	160	.456	72.96	0.076	0.38
6	1160	.390	<u>452.4</u>	<u>0.467</u>	<u>2.802</u>
			<u>964.4</u>	<u>1.000</u>	<u>4.236</u>

Duration of the Bond is 4.236 years

Management Accounting and Financial Analysis

3. Volatility

$$\begin{aligned}\text{Volatility of the bonds} &= \frac{\text{Duration}}{(1 + \text{yields})} = \frac{4.236}{1.17} \\ &= 3.62\end{aligned}$$

4. The expected market price if increase in required yield is by 75 basis points.

$$= \text{Rs. } 960.26 \times .75 (3.62/100)$$

$$= \text{Rs. } 26.071$$

$$\text{Hence expected market price is Rs. } 960.26 - \text{Rs. } 26.071 = \text{Rs. } 934.189$$

Hence, the market price will decrease

This portion can also be alternatively done as follows

$$= \text{Rs. } 964.4 \times .75 (3.62/100)$$

$$= \text{Rs. } 26.18$$

then the market price will be

$$= \text{Rs. } 964.4 - 26.18 = \text{Rs. } 938.22$$

Question 30

M/s Transindia Ltd. is contemplating calling Rs. 3 crores of 30 year's, Rs. 1,000 bond issued 5 years ago with a coupon interest rate of 14 per cent. The bonds have a call price of Rs. 1,140 and had initially collected proceeds of Rs. 2.91 crores due to a discount of Rs. 30 per bond. The initial floating cost was Rs. 3,60,000. The Company intends to sell Rs. 3 crores of 12 per cent coupon rate, 25 years bonds to raise funds for retiring the old bonds. It proposes to sell the new bonds at their par value of Rs. 1,000. The estimated floatation cost is Rs. 4,00,000. The company is paying 40% tax and its after cost of debt is 8 per cent. As the new bonds must first be sold and their proceeds, then used to retire old bonds, the company expects a two months period of overlapping interest during which interest must be paid on both the old and new bonds. What is the feasibility of refunding bonds? (5 Marks) (November, 2005)

Answer

NPV for bond refunding

	Rs.
PV of annual cash flow savings (W.N. 2)	
(3,49,600 × PV/FA 8,25) i.e. 10.675	37,31,980
Less: Initial investment (W.N. 1)	<u>29,20,000</u>
NPV	8,11,980

Recommendation: Refunding of bonds is recommended as NPV is positive.

Types of Financing

Working Notes:

(1) Initial investment:

(a) Call premium		
Before tax $(1,140 - 1,000) \times 30,000$	42,00,000	
Less tax @ 40%	<u>16,80,000</u>	
After tax cost of call prem.		25,20,000
(b) Floatation cost		4,00,000
(c) Overlapping interest		
Before tax $(.14 \times 2/12 \times 3 \text{ crores})$	7,00,000	
Less tax @ 40%	<u>2,80,000</u>	4,20,000
(d) Tax saving on unamortised discount on old bond $25/30 \times 9,00,000 \times .4$ (3,00,000)		
(e) Tax savings from unamortised floatation		
Cost of old bond $25/30 \times 3,60,000 \times .4$		<u>(1,20,000)</u>
		<u>29,20,000</u>

(2) Annual cash flow savings:

(a) Old bond		
(i) Interest cost $(.14 \times 3 \text{ crores})$	42,00,000	
Less tax @ 40%	<u>16,80,000</u>	25,20,000
(ii) Tax savings from amortisation of discount $9,00,000/30 \times .4$		(12,000)
(iii) Tax savings from amortisation of floatation cost $3,60,000/30 \times .4$		<u>(4,800)</u>
Annual after cost payment of Debt (A)		25,03,200
(b) New bond		
(i) Interest cost before tax $(.12 \times 3 \text{ crores})$	36,00,000	
Less tax @ 40%	<u>14,40,000</u>	
After tax interest	21,60,000	
(ii) Tax savings from amortisation of floatation cost $(.4 \times 4,00,000/25)$	<u>(6,400)</u>	<u>21,53,600</u>
Annual after tax payment		<u>3,49,600</u>

Management Accounting and Financial Analysis

Question 31

What is a re-financing? Briefly explain indicating at least two institutions which offer such re-financing. (4 Marks) (November, 2006)

Answer

RE-FINANCING

“Re-financing” is a process by which a large financial institution provides funds or reimburses funds to another institution to help development, relief or other similar cause identified as the purpose of the former. It can also, in another way, be described as a wholesale distribution of financial assistance to a retailing institution. Often, governmental support or subsidized funding is reached to the ultimate beneficiaries, through such channel.

NABARD is a governmental organization established with the primary objective of financing the farm sector; it is an arm through which government extends certain concessions/privileges to the farming community. NABARD does not deal with farmers directly but deals with many banks such as scheduled and nationalized banks providing re-financing for quite a few schemes intended for the benefit of the agricultural sector. This is one example.

SIDBI is another governmental organization whose objective is to assist the development of small industries. It is another institution which is engaged in refinancing activities; it funds a few schemes intended for SSIs through scheduled/nationalized banks.

Question 32

Find the current market price of a bond having face value Rs.1,00,000 redeemable after 6 year maturity with YTM at 16% payable annually and duration 4.3202 years. Given $1.16^6 = 2.4364$. (6 Marks) (May, 2007)

Answer

$$\text{Duration } 4.3202 = (1.16/0.16) - [1.16 + 6(c - 0.16)] / (c [(1.16)^6 - 1] + 0.16)$$

$$4.3202 = \frac{1.16}{0.16} - \frac{1.16 + 6(c - 0.16)}{c[(1.16)^6 - 1] + 0.16}$$

$$\frac{1.16 + 6c - 0.96}{1.4364c + 0.16} = 2.9298$$

$$0.2 + 6c = 4.20836472c + 0.468768$$

$$1.79163528c = 0.268768$$

$$C = 0.150012679$$

$$\therefore c = 0.15$$

Where c = Coupon rate

$$\begin{aligned} \text{Therefore, current price} &= \text{Rs.}(1,00,000/- \times 0.15 \times 3.685 + 1,00,000/- \times 0.410) \\ &= \text{Rs.}96,275/- \end{aligned}$$

Question 33

- (a) MP Ltd. issued a new series of bonds on January 1, 2000. The bonds were sold at par (Rs.1,000), having a coupon rate 10% p.a. and mature on 31st December, 2015. Coupon payments are made semiannually on June 30th and December 31st each year. Assume that you purchased an outstanding MP Ltd. Bond on 1st March, 2008 when the going interest rate was 12%.

Required:

- (i) What was the YTM of MP Ltd. Bonds as on January 1, 2000?
 (ii) What amount you should pay to complete the transaction? Of that amount how much should be accrued interest and how much would represent bonds basic value.
 (6 Marks)(Nov, 2007)

Answer

- (i) Since the bonds were sold at par, the original YTM was 10%.

$$Y + M = \frac{\text{Interest}}{\text{Principal}} = \frac{\text{Rs.100}}{\text{Rs.1,000}} = 10\%$$

- (ii) Price of the bond as on 1st July, 2015 = Rs.50 × 9.712 + 1,000 × 0.417
 = Rs.902.60
 Total value of the bond on the next interest date = Rs.902.60 + Rs.50
 = Rs.952.60
 ∴ Value of bond at purchase date = Rs.952 × $\frac{1}{(1+0.6)^{2/3}}$
 = Rs.952.60 × Rs.0.731004 (by using excel)
 = Rs.696.35

The amount to be paid to complete the transaction is Rs.696.35. Out of this amount Rs.16.57 represent accrued interest and Rs.679.68 represent the bond basic value.

Alternative solution:

$$B_0 = \sum_{t=1}^{2n} \frac{\frac{1}{2}(Int_t)}{(1+\frac{kd}{2})^t} + \frac{B_m}{(1+\frac{kd}{2})^{2n}}$$

$$B_0 = \sum_{t=1}^{2 \times 15} \frac{\frac{1}{2}(100)}{(1+\frac{12}{2})^t} + \frac{1000}{(1+\frac{12}{2})^{2 \times 15}}$$

Management Accounting and Financial Analysis

$$B_0 = \sum_{t=1}^{30} \frac{50}{(1.06)^t} + \frac{1000}{(1.06)^{2 \times 15}}$$

$$\begin{aligned} B_0 &= 50 \times 13.765 + 1000 \times .174 \\ &= 688.25 + 174 = 862.25 \end{aligned}$$

Therefore Value of Bond at purchase date

$$= \text{Rs } 862.25 \times \text{Rs } 0.731004$$

$$= \text{Rs. } 630.31$$

The amount to be paid to complete the transaction is Rs.630.31. Out of this amount Rs.16.57 represent accrued interest and Rs.613.64 represent the bond basic value.

Question 34

AB Ltd. has recently approached the shareholders of CD Ltd. which is engaged in the same line of business as that of AB Ltd. with a bid of 4 new shares in AB Ltd. for every 5 CD Ltd. shares or a cash alternative of Rs.360 per share. Past records of earnings of CD Ltd. had been poor and the company's shares have been out of favour with the stock market for some time. Pre bid information for the year ended 31.3.2006 are as follows:

	AB Ltd in lakhs	CD Ltd. in lakhs
Equity share capital	60	170
Number of shares	24	17
Pre-tax profit	125	110
P/E Ratio	11	7
Estimated post tax cost of Equity Capital per Annum	12%	10%

Both AB Ltd. and CD Ltd. pay income tax at 30%. Current earnings growth forecast is 4% for the foreseeable future of both the Companies.

Assuming no synergy exists, you are required to evaluate whether proposed share to share offer is likely to be beneficial to the shareholders of both the companies using merger terms available. AB Ltd.'s directors might expect their own pre bid P/E ratio to be applied to combined earnings.

Also comment on the value of the two Companies from the constant growth form of dividend valuation model assuming all earnings are paid out as dividends (14 Marks) (Nov,2007)

Types of Financing

Answer

Alternative 1 (when number of shares are 2.4 and 1.7 lakhs respectively)

Evaluation:-

Background calculations:-

	<i>(Figures in lakhs)</i>		
	<i>AB Ltd.</i>	<i>CD Ltd.</i>	<i>Total</i>
PBT	125	110	235
PAT	87.5	77	164.5
Pre bid EPS	36.46	45.29	
P/E ratio	11	7	
Pre-bid Price Per Share	401.06	317.03	
Market value of the company	962.54	538.95	1,501.49
No. of New Shares Post bid	2.4	1.36	3.76
% combined company owned by	63.83%	36.17%	
Value to the original Shareholders	958.40	543.09	1,501.49
Post bid Price per share to original shareholders i.e., 2.40 lakhs and 1.70 lakhs shareholders respectively.	399.33	319.46	

(Note: The Post bid Price per share to new shareholders as per terms of acquisition works out to Rs.399.33 for both the companies)

These figures suggest post bid acquisition share price of Rs.399.33 for AB Ltd., and 319.46 for CD Ltd.'s. Original shareholders. The price of CD Ltd share is likely to be influenced by the value of cash alternative.

The post bid share price of the new firm can be estimated by applying the P/E ratio to the combined earnings of the two old companies.

In that case,

Market Value would be = $164.5 \times 11 = 1809.50$

Price per share of the combined company would be = $\frac{1,809.50}{3.76} = \text{Rs.}481.25$

∴ Therefore share of AB Ltd., shareholders would raise by $\text{Rs.}481.25 - \text{Rs.}401.06 = \text{Rs.}80.19$ i.e., 20%.

Share value of CD Ltd., shareholder expected to rise by

$\left(\text{Rs.}481.25 \times \frac{4}{5} \right) - 317.03 = \text{Rs.}67.97$ i.e. 21.44%

With the cash offer the premium is $\frac{360 - 317.03}{317.03} = 13.55\%$ only

Management Accounting and Financial Analysis

Hence shareholders of CD Ltd are gaining more from the merger in a share exchange and cash alternative is unlikely to be accepted.

Using constant growth model the value of both the individual companies would be:

$$\text{AB Ltd., share price} = \frac{36.46(1.04)}{0.12 - 0.04} = \text{Rs.473.98}$$

$$\text{CD Ltd., share price} = \frac{45.29 \times 1.04}{0.10 - 0.04} = \text{Rs.785.03}$$

On this basis market slightly undervalues AB Ltd share but share of CD Ltd., are highly undervalued possibly because of previous disappointments. However, if AB Ltd. forecast is believed that the AB Ltd., is getting CD Ltd. shares, it will be a cheap proposal for AB Ltd. to acquire the CD Ltd. on share exchange basis and especially if any of the shareholder of CD Ltd. Accept the cash offer.

The shareholders of CD Ltd. would also be benefited post merger based on share exchange ratio since the value of their share would be going up from Rs.317.03 to Rs.399.33. However, their share price would still be undervalued as compared with the share price calculated by using constant growth model.

Alternative 2 (when number of shares are 24 and 17 lakhs respectively)

If we take into consideration the number of shares being 24 lakhs and 17 lakhs the Pre-bid share price works out to Rs.40.15 and Rs.31.71 respectively, which seems to be illogical against a cash offer @ Rs.360/- per share. However, since many students may have solved this question based on the figures of 24 lakhs and 17 lakhs number of shares, an alternative solution is provided below.

Evaluation:

Figures in lakhs

<i>Background calculations:</i>	<i>AB Ltd.</i>	<i>CD Ltd.</i>	<i>Total</i>
PBT	125	110	235
PAT	87.5	77	164.5
Pre bid EPS	3.65	4.53	
P/E Ratio	11	7	
Pre-bid Price per share	40.15	31.71	
Market value of the company	963.60	539.07	1502.67
No. of new shares Post-bid	24	13.6	37.6
% of combined company owned by	63.83	36.17	
Value to the original shareholders	959.15	543.52	1502.67
Post-bid Price to original shareholders i.e., 24 lakhs and 17 lakhs shareholders respectively	39.96	31.97	

(Note: The Post bid price per share works out to Rs.39.96 for both the companies)

Types of Financing

These figures suggest Post acquisition share price of Rs.39.96 for AB Ltd and Rs.31.97 for CD Ltd's original shareholders. The Price of CD Ltd. Share is likely to be influenced by the value of cash alternative.

The Post bid share price of the new firm can be estimated by applying the P/E ratio to the combined earnings of the two old companies.

In that case,

Market-value would be = $164.5 \times 11 = 1809.50$

Price per share of the combined company

$$\text{Would be} = \frac{1809.50}{37.6} = 48.13$$

∴ Shares of AB Ltd. shareholders would raise by $\text{Rs.}48.13 - 40.15 = 7.98$ i.e., 19.87% or 20%.

Share value of CD Ltd., shareholders expected to raise by $\text{Rs.} \left(48.13 \times \frac{4}{5} \right) - 31.71$
= Rs.7.40 or 23.34%.

However, with the cash offer the premium is $\frac{360 - 31.71}{31.71} = 1035.29\%$

Hence, the shareholders of CD Ltd., are substantially benefited by cash offer and they are unlikely to accept the share swap ratio.

Using constant growth model the value of shares of both the individual companies would be

$$\begin{aligned} \text{AB Ltd. Share Price} &= \frac{3.65(1.04)}{0.12 - 0.04} = \frac{3.80}{0.08} \\ &= \text{Rs.}47.5 \end{aligned}$$

$$\begin{aligned} \text{CD Ltd. Share Price} &= \frac{4.53(1.04)}{0.10 - 0.04} = \frac{4.71}{0.06} \\ &= \text{Rs.}78.5 \end{aligned}$$

On this basis market slightly undervalues AB Ltd. Share but share of CD Ltd., is highly undervalued possibly because of previous disappointments. However, if AB Ltd. forecast is believed that the AB Ltd. is getting CD Ltd. share it will be a cheap proposal for AB Ltd., to acquire CD Ltd., on share exchange basis.

The shareholders of CD Ltd., would however be more benefited by cash offer.

Management Accounting and Financial Analysis

Question 35

On the basis of the following information:

Current dividend (D_0) = Rs.2.50

Discount rate (k) = 10.5%

Growth rate (g) = 2%

(i) Calculate the present value of stock of ABC Ltd.

(ii) Is its stock overvalued if stock price is Rs.35, ROE = 9% and EPS = Rs.2.25? Show detailed calculation. (6 Marks) (Nov, 2007)

Answer

(i) **Present Value of the stock of ABC Ltd. is:-**

$$V_0 = \frac{2.50(1.02)}{0.105 - 0.02}$$
$$= \text{Rs.30/-}$$

(ii) Pay out ratio of ABC Ltd. = $\frac{2.5}{2.25}$

$$= 1.111$$

Hence, Retention ratio = $1 - 1.111$

$$= -0.111$$

Or -11.1%

Sustainable growth ratio is = -0.111×0.09

$$= -0.00999$$
$$= -0.999\%$$

Using the constant growth model, the value is

$$= \frac{\text{Rs.2.50}(0.99)}{0.105 - (-0.00999)}$$
$$= \frac{2.475}{0.11499}$$
$$= \text{Rs.21.52}$$

This value is less than the stock price of Rs.30/- as calculated above or Rs.35, as given in the question, which indicates that stock of ABC Ltd. is Overvalued.

Types of Financing

Alternative answer (ii)

$$(MV) \text{ of Stock in Rs.} = \frac{D_1}{k_e - g} = \frac{D_0 (1+g)}{(k_e - g)}$$

$$= \frac{2.5 \times 1.02}{0.105 - 0.02} = 30 (BV) = \frac{Rs. 225}{0.09} = Rs. 25$$

$$\text{Again } \frac{(MV)}{(BV)} = \frac{k_r - g}{k_e - g} \text{ where symbols denote their usual notations.}$$

$$\text{So, } \frac{0.09 - 0.02}{0.105 - 0.02} = \frac{(MV)}{25} \text{ or, } \frac{0.07}{0.085} = \frac{(MV)}{25}$$

$$\therefore (MV) = \frac{Rs. 0.07}{0.085} \times 25 = Rs. 20.59$$

Based on $\frac{(MV)}{(BV)}$ ratio and based on perpetual growth model the price of the share should be Rs. 20.59 and Rs. 30 respectively which are lower than the present (MV) of Rs. 35.

The stock is therefore, Overvalued.

Question 36

The following is the Balance Sheet of a Private Limited Company as at 31st March, 2008.

Capital and Liabilities	Rs.	Property and Assets	Rs.
<u>Share capital:</u>	8,00,000	<u>Fixed Assets:</u>	
Authorized: 8,000 equity shares of Rs. 100 each		Cost	6,00,000
		Less: Depreciation	<u>2,00,000</u>
			4,00,000
		<u>Current Assets:</u>	
10,000 11% Cumulative Preference shares of Rs. 100 each.	<u>10,00,000</u>	Stock in trade	2,00,000
		Sundry debtors	4,00,000
		Cash and bank balance	<u>1,00,000</u>
			7,00,000
<u>Issued, subscribed and paid up:</u>			
4,000 Equity shares of Rs. 100 each fully paid up	4,00,000		
Reserve	1,00,000		

Management Accounting and Financial Analysis

15% Unsecured

debentures 2,00,000

Trade creditors and

creditors for expenses 4,00,000

Rs. 11,00,000

Rs. 11,00,000

The company finds that a very profitable market exists for its products and with a little expansion; it could generate more sales at the present selling prices. The expansion calls for an investment of Rs. 8,00,000 in Fixed assets and Rs. 2,00,000 in Current assets. It is ascertained that the current annual profits in the region of Rs. 3,00,000 will be enhanced by 50% due to the expansion.

The debt-equity ratio applicable generally to the industry in which the Company is engaged is 2 : 1.

Please advise the management on the various methods available to it to meet the cost of financing the expansion, keeping in mind the interest of the equity shareholders. (16 Marks) (May, 2008)

Answer

	Rs.	Rs.
Resources needed for expansion:		
Fixed assets	8,00,000	
Current assets	2,00,000	
	<u>10,00,000</u>	
Less: Resources available	<u>1,00,000</u>	9,00,000

To take care of interest of the equity shareholders, EPS has to be the maximum in the circumstances.

The debt-equity ratio applicable to the industry is 2:1. The equity as on 31st March, 2008 is Rs.5,00,000 and the debt Rs.2,00,000. Some gearing is thus possible on the debt front.

It is also to be remembered that cost of servicing debt is an allowable set-off against profits while cost of servicing capital is not.

The various alternatives available are considered below:-

- (i) To raise the equity to the level authorized by the memorandum and to raise the balance by issue of preference capital.

Resources needed	9,00,000
Equity capital to the extent unissued to be issued at par	<u>4,00,000</u>
Balance needed	5,00,000
To be met by the issue of 5,000 11% cumulative preference share	<u>5,00,000</u>

EPS then will be Rs.3,00,000 + Rs.1,50,000 – 55,000 ÷ 8,000 viz. Rs.49.38

- (ii) To raise the entire requirements by issue of Preference Capital.

In this situation, EPS will be $\text{Rs.}4,50,000 - 99,000 = \frac{\text{Rs.}3,51,000}{4,000} = \text{Rs.}87.75$

Types of Financing

- (iii) To raise the resources by part issue of equity and balance by way of 15% debentures.

Resources needed	Rs.9,00,000
Unissued capital	4,00,000
Issue of debentures	5,00,000
EPS in this case will be $\text{Rs.} \frac{4,50,000 - 75,000}{8,000} = \text{Rs.} 46.88$	

- (iv) The company's debt equity ratio is 0.4:1. The acceptable limit is 2:1. The company can therefore raise a debt, on the present level of equity base to the extent of Rs.10,00,000. The existing debt being Rs.2,00,000, balance of Rs.8,00,000 could be raised. Thus there will be a short cover of Rs.1,00,000. To use the debt cover to the fullest extent, the company can issue additional equity shares of 500 making the equity base of Rs.4,50,000.

Resources needed	9,00,000
Issue of new shares	50,000
Issue of debt	<u>8,50,000</u> <u>9,00,000</u>

The rate at which debt can be raised cannot be lower than what the company is paying to the debentureholders i.e., (15%). Assuming the cost of loan at 17%, the position of EPS will be as under:

New profits	4,50,000
Less: Interest on borrowings 17% on Rs.8,50,000	<u>1,44,500</u>
Profit available to equity holders	<u>Rs.3,05,500</u>
No. of equity shares	4,500
EPS	Rs.68 (rounded off)

A yet another method could be to issue the unissued equity shares assuming at a premium, say of 20% and for the balance raise preference share capital which is the least costly amongst the various alternatives.

Resources needed	Rs.9,00,000
Issue of 4000 equity shares at Rs.120 per share	<u>4,80,000</u>
Balance needed	<u>4,20,000</u>

Issue 4200 11% cum Preference shares at par. EPS in this situation will be $\text{Rs.} \frac{4,50,000 - \text{Rs.} 46,200}{8,000} = \text{Rs.} 50.48$

$$= \frac{4,03,800}{8,000}$$

$$= \text{Rs.} 50.48$$

Tabled below are the various results.

$$\text{EPS at present} = \frac{\text{Rs.} 3,00,000}{\text{Rs.} 4,000} = \text{Rs.} 75$$

Management Accounting and Financial Analysis

	(Rs.)
(i) By Combination of issue of equity and preference at par	49.38
(ii) By Raising preference shares only	87.75
(iii) By part issue of equity and part debentures	46.88
(iv) By Predominant resort to borrowings	68.00
(v) Issue of part equity at a premium and the balance preference shares	50.48

The suggested plan, per se, will be to meet the entire costs of expansion by issuing 11% cumulative preference shares.

Question 37

ABC Ltd. has been maintaining a growth rate of 10 percent in dividends. The company has paid dividend @ Rs.3 per share. The rate of return on market portfolio is 12 percent and the risk free rate of return in the market has been observed as 8 percent. The Beta co-efficient of company's share is 1.5.

You are required to calculate the expected rate of return on company's shares as per CAPM model and equilibrium price per share by dividend growth model. (6 marks) (Nov 2008)

Answer

CAPM formula for calculation of Expected Rate of Return is :

$$\begin{aligned}ER &= R_f + B (R_m - R_f) \\&= 8 + 1.5 (12 - 8) \\&= 8 + 1.5 (4) \\&= 8 + 6 \\&= 14\% \text{ or } 0.14\end{aligned}$$

Applying Dividend Growth Model for the calculation of per share equilibrium price :

$$\begin{aligned}ER &= \frac{D_1}{P_0} + g \\0.14 &= \frac{3(1.10)}{P_0} + 0.10\end{aligned}$$

$$0.14 - 0.10 = \frac{3.30}{P_0}$$

$$0.04 P_0 = 3.30$$

$$P_0 = \frac{3.30}{0.04}$$

$$= \text{Rs.}82.50$$

Per share equilibrium price will be Rs.82.50.

Question 38

Based on the credit rating of bonds, Mr. Z has decided to apply the following discount rates for valuing bonds :

Credit Rating	Discount Rate
AAA	364 day T bill rate + 3% spread
AA	AAA + 2% spread
A	AAA + 3% spread

He is considering to invest in AA rated, Rs.1,000 face value bond currently selling at Rs.1,025.86. The bond has five years to maturity and the coupon rate on the bond is 15% p.a. payable annually. The next interest payment is due one year from today and the bond is redeemable at par. (Assume the 364 day T-bill rate to be 9%).

You are required to calculate the intrinsic value of the bond for Mr. Z. Should he invest in the bond? Also calculate the current yield and the Yield to Maturity (YTM) of the bond. (5 marks) (Nov 2008)

Answer

The appropriate discount rate for valuing the bond for Mr. Z is :

$$R = 9 + 3 + 2 = 14\%$$

TIME	CF	PVIF 14% PV (CF)	PV (CF)
1	150	877	131.55
2	150	769	115.35
3	150	675	101.25
4	150	592	88.80
5	1150	519	596.85
			$\sum PV (CF)$ i.e.
			$P_0 = 1033.80$

Since, the current market value is less than the intrinsic value; Mr. Z should buy the bond. Current yield = Annual Interest / Price = $150 / 1025.86 = 14.62\%$

The YTM of the bond is calculated as follows:

@15%

$$\begin{aligned}
 P &= 150 \times PVIFA_{15\%, 4} + 1150 \times PVIF_{15\%, 5} \\
 &= 150 \times 2.855 + 1150 \times 0.497 \\
 &= 428.25 + 571.55 = 999.80
 \end{aligned}$$

@14%

As found in sub part (a) $P_0 = 1033.80$

By interpolation we get, YTM = 14.23%

NOTE

[illegible]

**SPECIAL PROBLEMS RELATING TO FINANCING AND
MANAGEMENT OF SMALL AND MEDIUM ENTERPRISES**

Note : No questions were asked on this topic.

Management Accounting and Financial Analysis

NOTE

[illegible]

INTRODUCTION TO CAPITAL MARKETS IN INDIA INCLUDING DEPOSITORY

Question 1

Explain the role of Merchant Bankers in Public issues.

(6 marks)(May 2003)

Answer

Role of Merchant Bankers in Public Issues:

In the present day capital market scenario the merchant banks play as an encouraging and supporting force to the entrepreneurs, corporate sectors and the investors. The recent modifications of the Indian capital market environment have emerged the various financial institutions as the major sources of finance for the organisations. Several new institutions have appeared in the financial spectrum and merchant bankers have joined to expand the range of financial services. Moreover, the activities of these Merchant Bankers have developed considerably both horizontally and vertically to cope with the changing environment so that these financial institutions can be constituted as a subsidiary of the parent body. Merchant Banks help in promoting and sustaining capital markets and money markets, and they provide a variety of financial services to the corporate sector.

Management of the public issues of shares, debentures or even an offer for sales, has been the traditional service rendered by merchant bankers. Some of the services under issue management are:

- (i) Deciding on the size and timing of a public issue in the light of the market conditions.
- (ii) Preparing the base of successful issue marketing from the initial documentation to the preparation of the actual launch.
- (iii) Optimum underwriting support.
- (iv) Appointment of bankers and brokers as well as issue houses.
- (v) Professional liaison with share market functionaries like brokers, portfolio managers and financial press for pre-selling and media coverage.
- (vi) Preparation of draft prospectus and other documents.
- (vii) Wide coverage throughout the country for collection of applications.
- (viii) Preparation of advertising and promotional material.

Management Accounting and Financial Analysis

The merchant bankers presence in all the major financial centres as well his long established relationships with the underwriter and broker fraternities, makes possible the high degree of synchronisation required to ensure the success of an issue.

Question 2

Write short note on Green shoe option.

(4 marks)(November, 2003)

Answer

Green Shoe Option: It is an option that allows the underwriting of an IPO to sell additional shares if the demand is high. It can be understood as an option that allows the underwriter for a new issue to buy and resell additional shares upto a certain pre-determined quantity.

Looking to the exceptional interest of investors in terms of over-subscription of the issue, certain provisions are made to issue additional shares or bonds to underwriters for distribution. The issuer authorises for additional shares or bonds. In common parlance, it is the retention of over-subscription to a certain extent. It is a special feature of euro-issues. In euro-issues the international practices are followed.

In the Indian context, green shoe option has a limited connotation. SEBI guidelines governing public issues contain appropriate provisions for accepting over-subscriptions, subject to a ceiling, say, 15 per cent of the offer made to public. In certain situations, the green-shoe option can even be more than 15 per cent.

Examples:

- IDBI had come-up earlier with their Flexi bonds (Series 4 and 5). This is a debt-instrument. Each of the series was initially floated for Rs. 750 crores. SEBI had permitted IDBI to retain an excess of an equal amount of Rs. 750 crores.
- ICICI had launched their first tranche of safety bonds through unsecured redeemable debentures of Rs. 200 crores, with a green shoe option for an identical amount.

More recently, Infosys Technologies has exercised the green shoe option to purchase upto 7,82,000 additional ADSs representing 3,91,000 equity shares. This offer initially involved 5.22 million depository shares, representing 2.61 million domestic equity shares.

Question 3

Write a note about the functions of merchant bankers.

(6 Marks) (May, 2005)

Functions of Merchant Bankers:

The basic function of merchant banker or investment banker is marketing of corporate and other securities. In the process, he performs a number of services concerning various aspects of marketing, viz., origination, underwriting, and distribution, of securities. During the regime of erstwhile Controller of Capital Issues in India, when new issues were priced at a significant discount to their market prices, the merchant banker's job was limited to ensuring press coverage and dispatching subscription forms to every corner of the country. Now, merchant bankers are designing innovative instruments and perform a number of other services both for the issuing companies as well as the investors. The activities or services performed by

Introduction to Capital Markets in India including Depositories

merchant bankers, in India, today include:

1. Project promotion services.
2. Project finance.
3. Management and marketing of new issues.
4. Underwriting of new issues.
5. Syndication of credit.
6. Leasing services.
7. Corporate advisory services.
8. Providing venture capital.
9. Operating mutual funds and off shore funds.
10. Investment management or portfolio management services.
11. Bought out deals.
12. Providing assistance for technical and financial collaborations and joint ventures.
13. Management of and dealing in commercial paper.
14. Investment services for non-resident Indians.

Management Accounting and Financial Analysis

NOTE

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INTRODUCTION TO CAPITAL MARKETS INSTRUMENTS

Question 1

A share of Tension-free Economy Ltd. is currently quoted at, a price earning ratio of 7.5 times. The retained earning per share being 37.5% is Rs. 3 per share. Compute:

- (1) The company's cost of equity, if investors expect annual growth rate of 12%.
- (2) If anticipated growth rate is 13% p.a., calculate the indicated market price, with same cost of capital.
- (3) If the company's cost of capital is 18% and anticipated growth rate is 15% p.a., calculate the market price per share, assuming other conditions remain the same.

(Marks 8)(May, 2005)

Answer

1. Calculation of cost of capital

Retained earnings	37.5%	Rs. 3 per share
Dividend*	62.5%	Rs. 5 per share
EPS	100.0%	Rs. 8 per share
P/E ratio	7.5 times	

Market price is Rs. $7.5 \times 8 = \text{Rs. } 60$ per share

Cost of equity capital = (Dividend/price $\times 100$) + growth %

= $(5/60 \times 100) + 12\% = 20.33\%$.

$$* \left(\frac{\text{Rs. } 3}{37.5} \times 62.5 = \text{Rs. } 5 \right)$$

2. Market price = Dividend/(cost of equity capital % – growth rate %) = $5/(20.33\% - 13\%) = 5/7.33\% = \text{Rs. } 68.21$ per share.
3. Market price = Dividend/(cost of equity capital % – growth rate %) = $5/(18\% - 15\%) = 5/3\% = \text{Rs. } 166.66$ per share.

Management Accounting and Financial Analysis

NOTE

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INDIAN STOCK MARKET : AN OVERVIEW

Question 1

Write short note on Random Walk Theory.

(5 marks) (November, 1996)

Answer

Random Walk Theory: It is generally believed that stock market prices can never be predicted because they are not a result of any underlying factors but are mere statistical ups and downs. This hypothesis is known as Random Walk Hypothesis. According to this theory there is no relationship between present prices of shares and their future prices. It is argued that stock market prices are independent. M.G. Kendall found that changes in security prices behave nearly as if they are generated by a suitably designed roulette wheel for each outcome is statistically independent of past history. Successive peaks and troughs in prices are unconnected. In layman's language it may be said that prices on the stock exchange behave exactly the way a drunk would behave while going in a blind lane – up and down with an unsteady gait going in any direction he likes, bending backward and forward, going on sides now and then.

Question 2

Write short note on Advantages of a depository system.

(5 marks) (November, 2001)

Answer

Advantages of a depository system:

The different stake-holders have advantages flowing out of the depository system. They are:-

- (I) For the capital market:
 - (i) It eliminates bad delivery;
 - (ii) It helps to eliminate voluminous paper work;
 - (iii) It helps in the quick settlement of dues and also reduces the settlement time;
 - (iv) It helps to eliminate the problems concerning odd lots;
 - (v) It facilitates stock-lending and thus deepens the market.
- (II) For the investor:
 - (i) It reduces the risks associated with the loss or theft of documents and securities and eliminates forgery;

Management Accounting & Financial Management

- (ii) It ensures liquidity by speedy settlement of transactions;
 - (iii) It makes investors free from the physical holding of shares;
 - (iv) It reduces transaction costs; and
 - (v) It assists investors in securing loans against the securities.
- (III) For the corporate sector or issuers of securities:
- (i) It provides upto date information on shareholders' names and addresses;
 - (ii) It enhances the image of the company;
 - (iii) It reduces the costs of the secretarial department;
 - (iv) It increases the efficiency of registrars and transfer agents; and
 - (v) It provides better facilities of communication with members.

Question 3

Write short note on Asset Securitisation.

(4 marks) (May 2002)

Answer

Asset Securitisation: Securitisation is a process of transformation of illiquid asset into security which may be traded later in the open market. It is the process of transformation of the assets of a lending institution into negotiable instruments. The term 'securitisation' refers to both switching away from bank intermediation to direct financing via capital market and/or money market, and the transformation of a previously illiquid asset like automobile loans, mortgage loans, trade receivables, etc. into marketable instruments.

This is a method of recycling of funds. It is beneficial to financial intermediaries, as it helps in enhancing lending funds. Future receivables, EMI and annuities are pooled together and transferred to an special purpose vehicle (SPV). These receivables of the future are shifted to mutual funds and bigger financial institutions. This process is similar to that of commercial banks seeking refinance with NABARD, IDBI, etc.

Question 4

Write a note on buy-back of shares by companies.

(10 marks)(May 2003)

Answer

Buyback of shares:

Till 1998, buyback of equity shares was not permitted in India. But now they are permitted after suitably amending the Companies Act, 1956. However, the buyback of shares in India are permitted under certain guidelines issued by the Government as well as by the SEBI. Several companies have opted for such buyback including Reliance, Bajaj, Ashok Leyland etc. to name a few. In India, the corporate sector generally chooses to buyback by the tender method or the open market purchase method. The company, under the tender method, offers to buyback shares at a specific price during a specified period which is usually one month. Under the open market purchase method, a company buys shares from the secondary market

Indian Stock Market : An Overview

over a period of one year subject to a maximum price fixed by the management. Companies seem to now have a distinct preference for the open market purchase method as it gives them greater flexibility regarding time and price.

As impact of buyback, the P/E ratio may change as a consequence of buyback operation. The P/E ratio may rise if investors view buyback positively or it may fall if the investors regard buyback negatively.

Rationale of buyback: Range from various considerations. Some of them may be:

- (i) For efficient allocation of resources.
- (ii) For ensuring price stability in share prices.
- (iii) For taking tax advantages.
- (iv) For exercising control over the company.
- (v) For saving from hostile takeover.
- (vi) To provide capital appreciation to investors which may otherwise be not available.

This, however, has some disadvantages also like, manipulation of share prices by its promoters, speculation, collusive trading etc.

Question 5

Write a short note on 'Book building'.

(5 marks) (May 2001), (1 mark) (November, 2002) and (4 marks) (November, 2003)

Answer

Book Building: Book building is a technique used for marketing a public offer of equity shares of a company. It is a way of raising more funds from the market. After accepting the free pricing mechanism by the SEBI, the book building process has acquired too much significance and has opened a new lead in development of capital market.

A company can use the process of book building to fine tune its price of issue. When a company employs book building mechanism, it does not pre-determine the issue price (in case of equity shares) or interest rate (in case of debentures) and invite subscription to the issue. Instead it starts with an indicative price band (or interest band) which is determined through consultative process with its merchant banker and asks its merchant banker to invite bids from prospective investors at different prices (or different rates). Those who bid are required to pay the full amount. Based on the response received from investors the final price is selected. The merchant banker (called in this case Book Runner) has to manage the entire book building process. Investors who have bid a price equal to or more than the final price selected are given allotment at the final price selected. Those who have bid for a lower price will get their money refunded.

In India, there are two options for book building process. One, 25 per cent of the issue has to be sold at fixed price and 75 per cent is through book building. The other option is to split 25

Management Accounting & Financial Management

per cent of offer to the public (small investors) into a fixed price portion of 10 per cent and a reservation in the book built portion amounting to 15 per cent of the issue size. The rest of the book-built portion is open to any investor.

The greatest advantage of the book building process is that this allows for price and demand discovery. Secondly, the cost of issue is much less than the other traditional methods of raising capital. In book building, the demand for shares is known before the issue closes. In fact, if there is not much demand the issue may be deferred and can be rescheduled after having realised the temper of the market.

Question 6

Write short note on Stock Lending Scheme.

(6 marks)(May 2004)

Answer

Stock Lending: In 'stock lending', the legal title of a security is temporarily transferred from a lender to a borrower. The lender retains all the benefits of ownership, other than the voting rights. The borrower is entitled to utilize the securities as required but is liable to the lender for all benefits.

A securities lending programme is used by the lenders to maximize yields on their portfolio. Borrowers use the securities lending programme to avoid settlement failures.

Securities lending provide income opportunities for security-holders and creates liquidity to facilitate trading strategies for borrowers. It is particularly attractive for large institutional shareholders as it is an easy way of generating income to off set custody fees and requires little involvement of time. It facilitates timely settlement, increases the settlements, reduces market volatility and improves liquidity.

The borrower deposits collateral securities with the approved, intermediary. In case the borrower fails to return the securities, he will be declared a defaulter and the approved intermediary will liquidate the collateral deposited with it. In the event of default, the approved intermediary is liable for making good the loss caused to the lender. The borrower cannot discharge his liabilities of returning the equivalent securities through payment in cash or kind.

Current Status in India:

National Securities Clearing Corporation Ltd. launched its stock lending operations (christened Automated Lending & Borrowing Mechanism – ALBM) on February 10, 1999. This was the beginning of the first real stock lending operation in the country. Stock Holding Corporation of India, Deutsche Bank and Reliance are the other three stock lending intermediaries registered with SEBI.

Under NSCCL system only dematerialized stocks are eligible. The NSCCL'S stock lending system is screen based, thus instantly opening up participation from across the country wherever there is an NSE trading terminal. The transactions are guaranteed by NSCCL and the participating members are the clearing members of NSCCL. The main features of NSCCL system are:

Indian Stock Market : An Overview

- (i) The session will be conducted every Wednesday on NSE screen where borrowers and lenders enter their requirements either as a purchase order indicating an intention to borrow or as sale, indicating intention to lend.
- (ii) Previous day's closing price of a security will be taken as the lending price of the security.
- (iii) The fee or interest that a lender gets will be market determined and will be the difference between the lending price and the price arrived at the ALBM session.
- (iv) Corresponding to a normal market segment, there will be an ALBM session.
- (v) Funds towards each borrowing will have to be paid in on the securities lending day.
- (vi) A participant will be required to pay-in-funds equal to the total value of the securities borrowed.
- (vii) The same amount of securities has to be returned at the end of the ALBM settlement on the day of the pay-out of the ALBM settlement.
- (viii) The previous day's closing price is called the lending price and the rate at which the lending takes place is called the lending fee. This lending fee alone is determined in the course of ALBM session.
- (ix) Fee adjustment shall be made for any lender not making full delivery of a security. The lender's account shall be debited for the quantity not delivered.
- (x) The borrower account shall be debited to the extent of the securities not lend on account of funds shortage.

Question 7

- (a) Briefly explain 'Buy Back of Securities' and give the management objectives of buying Back Securities.
- (b) Explain the term 'Insider Trading' and why Insider Trading is punishable.

(5 + 5 = 10 marks)(November, 2004)

Answer

(a) Buy Back of securities:

Companies are allowed to buy back equity shares or any other security specified by the Union Government. In India Companies are required to extinguish shares bought back within seven days. In USA Companies are allowed to hold bought back shares as treasury stock, which may be reissued. A company buying back shares makes an offer to purchase shares at a specified price. Shareholders accept the offer and surrender their shares.

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The following are the management objectives of buying back securities:

- (i) To return excess cash to shareholders, in absence of appropriate investment opportunities.
- (ii) To give a signal to the market that shares are undervalued.
- (iii) To increase promoters holding, as a percentage of total outstanding shares, without additional investment. Thus, buy back is often used as a defence mechanism against potential takeover.
- (iv) To change the capital structure.

(b) Insider Trading:

Insider Trading is a buying or selling or dealing in securities of a listed company, by a director, member of management, an employee or any other person such as internal or statutory auditor, agent, advisor, analyst consultant etc. who have knowledge of material, 'inside' information not available to general public. The dealing in securities by an insider is illegal when it is predicated upon utilization of inside information to profit at the expense of other investors who do not have access to such investment information. The word insider has wide connotation. An outsider may be held to be an insider by virtue of his engaging himself in this practice on the strength of inside information.

Insider trading which is an unethical practice resorted by those in power in corporates has manifested not only in India but elsewhere in the world causing huge losses to common investors thus driving them away from capital market. Therefore, it is punishable.

Question 8

Explain the term "Offer for Sale".

(4 marks (May, 2005))

Answer

Offer for sale is also known as bought out deal (BOD). It is a new method of offering equity shares, debentures etc., to the public. In this method, instead of dealing directly with the public, a company offers the shares/debentures through a sponsor. The sponsor may be a commercial bank, merchant banker, an institution or an individual. It is a type of wholesale of equities by a company. A company allots shares to a sponsor at an agreed price between the company and sponsor. The sponsor then passes the consideration money to the company and in turn gets the shares duly transferred to him. After a specified period as agreed between the company and sponsor, the shares are issued to the public by the sponsor with a premium. After the public offering, the sponsor gets the shares listed in one or more stock exchanges. The holding cost of such shares by the sponsor may be reimbursed by the company or the sponsor may get the profit by issue of shares to the public at premium.

Thus, it enables the company to raise the funds easily and immediately. As per SEBI guidelines, no listed company can go for BOD. A privately held company or an unlisted

company can only go for BOD. A small or medium size company which needs money urgently chooses to BOD. It is a low cost method of raising funds. The cost of public issue is around 8% in India. But this method lacks transparency. There will be scope for misuse also. Besides this, it is expensive like the public issue method. One of the most serious short coming of this method is that the securities are sold to the investing public usually at a premium. The margin thus between the amount received by the company and the price paid by the public does not become additional funds of the company, but it is pocketed by the issuing houses or the existing shareholders.

Question 9

Write short notes on the following:

1. *Debt Securitisation.*
2. *Stock Lending Scheme – its meaning, advantages and risk involved.*

(4 Marks)(May, 2005)

Answer

(1) Debt Securitisation:

Debt securitisation is a method of recycling of funds. It is especially beneficial to financial intermediaries to support the lending volumes. Assets generating steady cash flows are packaged together and against this assets pool market securities can be issued. The process can be classified in the following three functions.

1. *The origination function:* A borrower seeks a loan from finance company, bank or housing company. On the basis of credit worthiness repayment schedule is structured over the life of the loan.
2. *The pooling function:* Similar loans or receivables are clubbed together to create an underlying pool of assets. This pool is transferred in favour of a SPV (Special Purpose Vehicle), which acts as a trustee for the investor. Once, the assets are transferred they are held in the organizers portfolios.
3. *The securitisation function:* It is the SPV's job to structure and issue the securities on the basis of asset pool. The securities carry coupon and an expected maturity, which can be asset based or mortgage based. These are generally sold to investors through merchant bankers. The investors interested in this type of securities are generally institutional investors like mutual fund, insurance companies etc. The originator usually keeps the spread.

Generally, the process of securitisation is without recourse i.e. the investor bears the credit risk of default and the issuer is under an obligation to pay to investors only if the cash flows are received by issuer from the collateral.

(2) Stock Lending Scheme:

Stock lending means transfer of security. The legal title is temporarily transferred from a lender to a borrower. The lender retains all the benefits of ownership, except voting

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power/rights. The borrower is entitled to utilize the securities as required but is liable to the lender for all benefits such as dividends, rights etc. The basic purpose of stock borrower is to cover the short sales i.e. selling the shares without possessing them. SEBI has introduced scheme for securities lending and borrowing in 1997.

Advantages:

- (1) Lenders to get return (as lending charges) from it, instead of keeping it idle.
- (2) Borrower uses it to avoid settlement failure and loss due to auction.
- (3) From the view-point of market this facilitates timely settlement, increase in settlement, reduce market volatility and improves liquidity.
- (4) This prohibits fictitious bull run.

The borrower has to deposit the collateral securities, which could be cash, bank guarantees, government securities or certificates of deposits or other securities, with the approved intermediary. In case, the borrower fails to return the securities, he will be declared a defaulter and the approved intermediary will liquidate the collateral deposited with it.

In the event of default, the approved intermediary is liable for making good the loss caused to the lender.

The borrower cannot discharge his liabilities of returning the equivalent securities through payment in cash or kind.

National Securities Clearing Corporation Ltd. (NSCCL), Stock Holding Corporation of India (SHCIL), Deutsche Bank, Reliance Capital etc. are the registered and approved intermediaries for the purpose of stock lending scheme. NSCCL proposes to offer a number of schemes, including the Automated Lending and Borrowing Mechanism (ALBM), automatic borrowing for settlement failures and case by case borrowing.

Question 10

Following information is available in respect of dividend, market price and market condition after one year.

<i>Market condition</i>	<i>Probability</i>	<i>Market Price</i>	<i>Dividend per share</i>
		<i>Rs.</i>	<i>Rs.</i>
<i>Good</i>	<i>0.25</i>	<i>115</i>	<i>9</i>
<i>Normal</i>	<i>0.50</i>	<i>107</i>	<i>5</i>
<i>Bad</i>	<i>0.25</i>	<i>97</i>	<i>3</i>

The existing market price of an equity share is Rs. 106 (F.V. Re. 1), which is cum 10% bonus debenture of Rs. 6 each, per share. M/s. X Finance Company Ltd. had offered the buy-back of debentures at face value.

Find out the expected return and variability of returns of the equity shares.

And also advise-Whether to accept buy back after?

(8 Marks) (November, 2005)

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Answer

The Expected Return of the equity share may be found as follows:

Market Condition	Probability	Total Return	Cost (*)	Net Return
Good	0.25	Rs. 124	Rs. 100	Rs. 24
Normal	0.50	Rs. 112	Rs. 100	Rs. 12
Bad	0.25	Rs. 100	Rs. 100	Rs. 0

$$\text{Expected Return} = (24 \times 0.25) + (12 \times 0.50) + (0 \times 0.25)$$

$$= \left(\frac{12}{100} \right) \times 100 = 12\%$$

The variability of return can be calculated in terms of standard deviation.

$$V SD = 0.25 (24 - 12)^2 + 0.50 (12 - 12)^2 + 0.25 (0 - 12)^2$$

$$= 0.25 (12)^2 + 0.50 (0)^2 + 0.25 (-12)^2$$

$$= 36 + 0 + 36$$

$$SD = \sqrt{72}$$

$$SD = 8.485 \text{ or say } 8.49$$

(*) The present market price of the share is Rs. 106 cum bonus 10% debenture of Rs. 6 each; hence the net cost is Rs. 100 (There is no cash loss or any waiting for refund of debenture amount).

M/s X Finance company has offered the buy back of debenture at face value. There is reasonable 10% rate of interest compared to expected return 12% from the market. Considering the dividend rate and market price the creditworthiness of the company seems to be very good. The decision regarding buy-back should be taken considering the maturity period and opportunity in the market. Normally, if the maturity period is low say up to 1 year better to wait otherwise to opt buy back option.

Question 11

Explain the terms ESOS and ESPS with reference to the SEBI guidelines for The Employees Stock Option Plans (ESOPs).
(4 Marks) (November, 2005)

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Answer

ESOS and ESPS

ESOS	ESPS
1. Meaning Employee Stock Option Scheme means a scheme under which the company grants option to employees.	Employee Stock Purchase Scheme means a scheme under which the company offers shares to employees as a part of public issue.
2. Auditors' Certificate Auditors' Certificate to be placed at each AGM stating that the scheme has been implemented as per the guidelines and in accordance with the special resolution passed.	No such Certificate is required.
3. Transferability It is not transferable.	It is transferable after lock in period.
4. Consequences of failure The amount payable may be forfeited. If the option are not vested due to non-fulfillment of condition relating to vesting of option then the amount may be refunded to the employees.	Not applicable.
5. Lock in period Minimum period of 1 year shall be there between the grant and vesting of options. Company is free to specify the lock in period for the shares issued pursuant to exercise of option.	One year from the date of allotment. If the ESPS is part of public issue and the shares are issued to employees at the same price as in the public issue, the shares issued to employees pursuant to ESPS shall not be subject to any lock in.

Question 12

Distinguish between:

- (i) *Forward and Futures contracts.*
- (ii) *Intrinsic value and Time value of an option.*

(8 Marks) (May, 2006)

Answer

(i) Forward and Future Contracts:

Forward contracts are private bilateral contracts which have well established commercial usage. On the other hand future contracts are standardized tradeable contract fixed in

terms of size, contract and other features and traded on an exchange.

In forward contracts, price is not publicly disclosed, whereas in future contracts, price is transparent.

Forward contract is exposed to the problem of liquidity whereas to futures there is no liquidity problem.

Forward contracts are usually settled on one specified delivery date. In the case of futures, there is a range of delivery dates.

Forward contracts are settled at the end of contract, but futures are settled daily.

In forwards, delivery or final cash settlement usually takes place whereas in futures, contract is closed out prior to maturity.

- (ii) **Intrinsic value and the time value of An Option:** Intrinsic value of an option and the time value of an option are primary determinants of an option's price. By being familiar with these terms and knowing how to use them, one will find himself in a much better position to choose the option contract that best suits the particular investment requirements.

Intrinsic value is the value that any given option would have if it were exercised today. This is defined as the difference between the option's strike price (x) and the stock actual current price (c.p). In the case of a call option, one can calculate the intrinsic value by taking $CP - X$. If the result is greater than Zero (In other words, if the stock's current price is greater than the option's strike price), then the amount left over after subtracting $CP - X$ is the option's intrinsic value. If the strike price is greater than the current stock price. Then the intrinsic value of the option is zero – it would not be worth anything if it were to be exercised today. An option's intrinsic value can never be below zero. To determine the intrinsic value of a put option, simply reverse the calculation to $X - CP$

Example: Let us assume Wipro Stock is priced at Rs.105/-. In this case, a Wipro 100 call option would have an intrinsic value of $(Rs.105 - Rs.100 = Rs.5)$. However, a Wipro 100 put option would have an intrinsic value of zero $(Rs.100 - Rs.105 = -Rs.5)$. Since this figure is less than zero, the intrinsic value is zero. Also, intrinsic value can never be negative. On the other hand, if we are to look at a Wipro put option with a strike price of Rs.120. Then this particular option would have an intrinsic value of Rs.15 $(Rs.120 - Rs.105 = Rs.15)$.

Time Value: This is the second component of an option's price. It is defined as any value of an option other than the intrinsic value. From the above example, if Wipro is trading at Rs.105 and the Wipro 100 call option is trading at Rs.7, then we would conclude that this option has Rs.2 of time value $(Rs.7 \text{ option price} - Rs.5 \text{ intrinsic value} = Rs.2 \text{ time value})$. Options that have zero intrinsic value are comprised entirely of time value.

Time value is basically the risk premium that the seller requires to provide the option buyer with the right to buy/sell the stock upto the expiration date. This component may be regarded as the Insurance premium of the option. This is also known as "Extrinsic value." Time value

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decays over time. In other words, the time value of an option is directly related to how much time an option has until expiration. The more time an option has until expiration. The greater the chances of option ending up in the money.

Question 13

What is the procedure for the book building process? Explain the recent changes made in the allotment process.
(6 Marks) (May, 2006)

Answer

The modern and more popular method of share pricing these days is the **BOOK BUILDING** route. After appointing a merchant banker as a book runner, the company planning the IPO, specifies the number of shares it wishes to sell and also mentions a price band. Investors place their orders in Book Building process that is similar to bidding at an auction. The willing investors submit their bids above the floor price indicated by the company in the price band to the book runner. Once the book building period ends, the book runner evaluates the bids on the basis of the prices received, investor quality and timing of bids. Then the book runner and the company conclude the final price at which the issuing company is willing to issue the stock and allocate securities. Traditionally, the number of shares are fixed and the issue size gets determined on the basis of price per share discovered through the book building process.

Public issues these days are targeted at various segments of the investing fraternity. Companies now allot certain portions of the offering to different segments so that everyone gets a chance to participate. The segments are traditionally three -qualified institutional bidders (QIBs), high net worth individuals (HNIs) and retail investors (general public). Indian companies now have to offer about 50% of the offer to QIBs, about 15% to high net worth individuals and the remaining 35% to retail investors. Earlier retail and high net worth individuals had 25% each. Also the QIBs are allotted shares on a pro-rata basis as compared to the earlier norm when it was at the discretion of the company management and the investment bankers. These investors (QIB) also have to pay 10% margin on application. This is also a new requirement. Once the offer is completed, the company gets listed and investors and shareholders can trade the shares of the company in the stock exchange.

Question 14

The market received rumour about ABC corporation's tie-up with a multinational company. This has induced the market price to move up. If the rumour is false, the ABC corporation stock price will probably fall dramatically. To protect from this an investor has bought the call and put options.

He purchased one 3 months call with a striking price of Rs.42 for Rs.2 premium, and paid Re.1 per share premium for a 3 months put with a striking price of Rs.40.

- (i) *Determine the Investor's position if the tie up offer bids the price of ABC Corporation's stock up to Rs.43 in 3 months.*
- (ii) *Determine the Investor's ending position, if the tie up programme fails and the price of the stocks falls to Rs.36 in 3 months.*
(7 Marks) (May, 2006)

Answer

Cost of call and put options

$$\begin{aligned} &= (\text{Rs.2 per share}) \times (100 \text{ share call}) + (\text{Re.1 per share}) \times (100 \text{ share put}) \\ &= \text{Rs.2} \times 100 + 1 \times 100 \\ &= \text{Rs.300} \end{aligned}$$

- (i) Price increases to Rs.43. Since the market price is higher than the strike price of the put, the investor will exercise it.

$$\text{Ending position} = (-\text{Rs.300 cost of option}) + (\text{Re.1 per share gain on call}) \times 100$$

$$= -\text{Rs.300} + 100$$

$$\text{Net Loss} = \text{Rs.200}$$

- (ii) The price of the stock falls to Rs.36. Since the market price is lower than the strike price, the investor may not exercise the call option.

$$\text{Ending Position:} = (-\text{Rs.300 cost of 2 option}) + (\text{Rs.4 per stock gain on put}) \times 100$$

$$= -\text{Rs.300} + 400$$

$$\text{Gain} = \text{Rs.100}$$

Question 15

Abhishek Ltd. has a surplus cash of Rs.90 lakhs and wants to distribute 30% of it to the shareholders. The Company decides to buyback shares. The Finance Manager of the Company estimates that its share price after re-purchase is likely to be 10% above the buyback price; if the buyback route is taken. The number of shares outstanding at present is 10 lakhs and the current EPS is Rs.3.

You are required to determine:

- (a) *The price at which the shares can be repurchased, if the market capitalization of the company should be Rs.200 lakhs after buyback.*
(b) *The number of shares that can be re-purchased.*
(c) *The impact of share re-purchase on the EPS, assuming the net income is same.*

(6 Marks) (May, 2006)

Answer

- (a) Let P be the buyback price decided by Abhishek Ltd.

Market Capitalisation After Buyback:

$$1.1 P (\text{Original Shares} - \text{Shares Bought back})$$

$$= \left[1.1 P (10 \text{ Lakhs} - \frac{30\% \text{ of } 90 \text{ lakhs}}{P}) \right]$$

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$$= 11 \text{ Lakhs} \times P - 27 \text{ lakhs} \times 1.1$$

$$= 11 \text{ lakhs} \times P - 29.7 \text{ lakhs}$$

Market capitalization rate after buyback is 200 lakhs.

Thus, we have:

$$11 \text{ Lakhs} \times P - 29.7 \text{ lakhs} = \text{Rs.}200 \text{ lakhs}$$

$$\text{OR } 11P = 200 + 29.7$$

$$\text{OR } P = \frac{229.7}{11} = \text{Rs.}20.88$$

(b) Number of shares to be bought back:

$$= \frac{27 \text{ Lakhs}}{20.88} = 1.29 \text{ lakhs (Approximately)}$$

(c) New Equity Shares

$$= (10 - 1.29) \text{ lakhs} = 8.71 \text{ lakhs}$$

$$\text{EPS} = \frac{3 \times 10 \text{ lakhs}}{8.71 \text{ lakhs}} = \frac{30 \text{ L}}{8.71 \text{ L}} = \text{Rs.}3.44$$

Thus EPS of Abhishek Ltd., increases to Rs.3.44

Question 16

Explain briefly the advantages of holding securities in 'demat' form rather than in physical form.

(4 Marks) (November, 2006)

Answer

ADVANTAGES OF HOLDING SECURITIES IN 'DEMAT' FORM

The Depositories Act, 1996 provides the framework for the establishment and working of depositories enabling transactions in securities in scripless (or demat) form. With the arrival of depositories on the scene, many of the problems previously encountered in the market due to physical handling of securities have been to a great extent minimized. In a broad sense, therefore, it can be said that 'dematting' has helped to broaden the market and make it smoother and more efficient.

From an individual investor point of view, the following are important advantages of holding securities in demat form:

- It is speedier and avoids delay in transfers.
- It avoids lot of paper work.
- It saves on stamp duty.

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From the issuer-company point of view also, there are significant advantages due to dematting, some of which are:

- Savings in printing certificates, postage expenses.
- Stamp duty waiver.
- Easy monitoring of buying/selling patterns in securities, increasing ability to spot takeover attempts and attempts at price rigging.

Question 17

From the following data for certain stock, find the value of a call option:

Price of stock now	=	Rs.80
Exercise price	=	Rs.75
Standard deviation of continuously compounded annual return	=	0.40
Maturity period	=	6 months
Annual interest rate	=	12%

Given

Number of S.D. from Mean, (z)	Area of the left or right (one tail)
0.25	0.4013
0.30	0.3821
0.55	0.2912
0.60	0.2578

$$e^{0.12 \times 0.05} = 1.0060$$

$$\ln 1.0667 = 0.0645$$

(8 Marks) (November, 2006)

Answer

Applying the Black Scholes Formula,

Value of the Call option now:

$$\text{The Formula } C = SN(d_1) - K_e^{(-rt)} N(d_2)$$

$$d_1 = \ln(S/K) + (r + \sigma^2 / 2)t$$

$$d_2 = d_1 - \sigma \sqrt{t}$$

Where,

C = Theoretical call premium

S = Current stock price

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t = time until option expiration

K = option striking price

r = risk-free interest rate

N = Cumulative standard normal distribution

e = exponential term

σ = Standard deviation of continuously compounded annual return.

ln = natural logarithm

$$d_1 = \frac{\ln(1.0667) + (12\% + (0.08)^{0.5})}{.40\sqrt{0.5}}$$

$$= \frac{0.0645 + (0.2)^{0.5}}{0.40 \times 0.7071}$$

$$= \frac{0.1645}{0.2828}$$

$$= 0.5817$$

$$d_2 = 0.5817 - 0.2828$$

$$= 0.2989$$

$$Nd_1 = N(0.5817)$$

$$Nd_2 = N(0.2989)$$

$$\text{Price} = S_0 N(d_1) - \frac{E}{e^{rt} \times N(d_2)}$$

$$= (80 \times Nd_1) - 75/[1.0060 \times N(d_2)]$$

Value of option

$$= 80 Nd_1 - \frac{75}{1.0060 \times Nd_2}$$

$$Nd_1 = N(0.5817)$$

$$= 0.7190 + 0.000578$$

$$= 0.7195$$

$$Nd_2 = N(0.2989)$$

$$= 0.6141 + 0.003382$$

$$= 0.6175$$

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$$\begin{aligned}\text{Price} &= 80 \times 0.7195 - \frac{75}{1.0060 \times 0.6175} \\ &= 57.56 - 74.55 \times 0.6175 \\ &= 57.56 - 46.04 \\ &= \text{Rs.}11.52\end{aligned}$$

Question 18

The 6-months forward price of a security is Rs.208.18. The borrowing rate is 8% per annum payable with monthly rests. What should be the spot price? (4 Marks) (November, 2006)

Answer

Calculation of spot price

The formula for calculating forward price is:

$$A = P (1+r/n)^n$$

Where

A = Forward price

P = Spot Price

r = rate of interest

n = no. of compoundings

t = time

Using the above formula,

$$208.18 = P (1 + 0.08/12)^6$$

$$\text{Or } 208.18 = P \times 1.0409$$

$$P = 208.18/1.0409 = 200$$

Hence, the spot price should be Rs.200.

Question 19

(a) *XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available:*

Spot rate 1 £ = \$ 2.00

180 days forward rate of £ as of today = \$1.96

Interest rates are as follows:

	U.K.	US
180 days deposit rate	4.5%	5%
180 days borrowing rate	5%	5.5%

A call option on £ that expires in 180 days has an exercise price of \$ 1.97 and a premium of \$ 0.04.

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XYZ Ltd. has forecasted the spot rates 180 days hence as below:

Future rate	Probability
\$ 1.91	25%
\$ 1.95	60%
\$ 2.05	15%

Which of the following strategies would be most preferable to XYZ Ltd.?

- (a) a forward contract
- (b) a money market hedge
- (c) an option contract
- (d) no hedging

Show calculations in each case

(16 marks) (May, 2007).

Answer

(a) Forward contract: Dollar needed in 180 days = £3,00,000 x \$ 1.96 = \$5,88,000/-

(b) Money market hedge: - Borrow \$, convert to £, invest £, repay \$ loan in 180 days

Amount in £ to be invested = 3,00,000/1.045 = £ 287081

Amount of \$ needed to convert into £ = 2,87,081 x 2 = \$ 5,74,162

Interest and principal on \$ loan after 180 days = \$5,74,162 x 1.055 = \$ 6,05,741

(c) Call option:

Expected Spot rate in 180 days	Prem./ unit	Exercise Option	Total price per unit	Total price for £3,00,000	Prob. Pi	Pixi
						xi
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250
1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01	6,03,000	0.15	90,450
						<u>5,94,900</u>

(d) No hedge option:

Expected Future spot rate	Dollar needed Xi	Prob. Pi	Pi xi
1.91	5,73,000	0.25	1,43,250
1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			<u>5,86,500</u>

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The probability distribution of outcomes for no hedge strategy appears to be most preferable because least number of \$ are needed under this option to arrange £3,00,000.

Question 20

- (i) What are Stock futures?
- (ii) What are the opportunities offered by Stock futures?
- (iii) How are Stock futures settled? (4 marks)(May, 2007)

Answer

- (i) Stock future is a financial derivative product where the underlying asset is an individual stock. It is also called equity future. This derivative product enables one to buy or sell the underlying Stock on a future date at a price decided by the market forces today.
- (ii) Stock futures offer a variety of usage to the investors. Some of the key usages are mentioned below:

Investors can take long-term view on the underlying stock using stock futures.

- (a) Stock futures offer high leverage. This means that one can take large position with less capital. For example, paying 20% initial margin one can take position for 100%, i.e., 5 times the cash outflow.
 - (b) Futures may look over-priced or under-priced compared to the spot price and can offer opportunities to arbitrage and earn riskless profit.
 - (c) When used efficiently, single-stock futures can be effective risk management tool. For instance, an investor with position in cash segment can minimize either market risk or price risk of the underlying stock by taking reverse position in an appropriate futures contract.
- (iii) Up to March 31, 2002, stock futures were settled in cash. The final settlement price is the closing price of the underlying stock. From April 2002, stock futures are settled by delivery, i.e., by merging derivatives position into cash segment.

Question 21

BSE	500
Value of portfolio	Rs.10,10,000
Risk free interest rate	9% p.a.
Dividend yield on Index	6% p.a.
Beta of portfolio	1.5

We assume that a future contract on the BSE index with four months maturity is used to hedge the value of portfolio over next three months. One future contract is for delivery of 50 times the index.

Based on the above information calculate:

- (i) Price of future contract.

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(ii) The gain on short futures position if index turns out to be 4,500 in three months.

(8 Marks)(Nov 2007)

Answer

$$\begin{aligned} \text{(i) Current future price of the index} &= 5000 + 5000 (0.09 - 0.06) \frac{4}{12} \\ &= 5000 + 50 = 5,050 \end{aligned}$$

$$\therefore \text{Price of the future contract} = \text{Rs.} 50 \times 5,050 = \text{Rs.} 2,52,500$$

$$\text{(ii) Hedge ratio} = \frac{1010000}{252500} \times 1.5 = 6 \text{ contracts}$$

Index after three months turns out to be 4500

$$\text{Future price will be} = 4500 + 4500 (0.09 - 0.06) \times \frac{1}{3} = 4,545$$

$$\begin{aligned} \text{Therefore, Gain from the short futures position is} &= 6 \times (5050 - 4545) \times 50 \\ &= \text{Rs.} 1,51,500 \end{aligned}$$

Alternative solution when BSE index is considered to be as 500

$$\text{(i) Current future price of index} = 500 + 500 (0.09 - 0.06) \frac{4}{12} = 500 + 5 = 505$$

$$\therefore \text{Price of the future contract} = \text{Rs.} 50 \times 505 = \text{Rs.} 25,250.$$

$$\text{(ii) Hedge Ratio} = \frac{10,10,000}{25,250} \times 1.5 = 60 \text{ contracts}$$

Index after three months turn out to be 4,500.

Future Price will be

$$= 4,500 + 4,500 (0.09 - 0.06) \frac{1}{3} = 4,545$$

Therefore, gain from the short future position is

$$\begin{aligned} &= 60 \times (505 - 4545) \times 50 \\ &= -12,12,00,00. \end{aligned}$$

Question 22

From the following data for Government securities, calculate the forward rates:

Face value (Rs.)	Interest rate	Maturity (Year)	Current price (Rs.)
1,00,000	0%	1	91,500

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1,00,000	10%	2	98,500
1,00,000	10.5%	3	99,000

(6 Marks) (Nov, 2007)

Answer

Consider one year treasury bill.

$$91,500 = \frac{1,00,000}{1+r_1}$$

$$1+r_1 = \frac{1,00,000}{91,500} = 1.092896$$

$$r_1 = 0.0929 \text{ or } 0.093$$

Consider two year Government Security

$$98,500 = \frac{10,000}{1.093} + \frac{1,10,000}{(1.093)(1+r_2)}$$

$$98,500 = 9149.131 + \frac{1,10,000}{1.093(1+r_2)}$$

$$\Rightarrow 89350.87 = \frac{1,00,640.4}{1+r_2}$$

$$\Rightarrow 1+r_2 = 1.126351$$

$$r_2 = 0.12635$$

$$\Rightarrow r_2 = 0.1263$$

Consider three year Government Securities:

$$99,000 = \frac{10,500}{1.093} + \frac{10,500}{1.093 \times 1.1263} + \frac{1,10,500}{1.093 \times 1.1263(1+r_3)}$$

$$\Rightarrow 99,000 = 9606.587 + 8529.65 + \frac{89,764.42}{1+r_3}$$

$$\Rightarrow 80,863.763 = \frac{89,764.42}{1+r_3}$$

$$\Rightarrow 1+r_3 = 1.1100697$$

$$\Rightarrow r_3 = 0.1100697$$

Question 23

- What are derivatives?
- Who are the users and what are the purposes of use?

Management Accounting & Financial Management

(iii) Enumerate the basic differences between cash and derivatives market.

(8 Marks) (Nov, 2007)

Answer

- (i) Derivative is a product whose value is to be derived from the value of one or more basic variables called bases (underlying assets, index or reference rate). The underlying assets can be Equity, Forex, Commodity.

	Users	Purpose
(i)	Corporation	To hedge currency risk and inventory risk
(ii)	Individual Investors	For speculation, hedging and yield enhancement.
(iii)	Institutional Investor	For hedging asset allocation, yield enhancement and to avail arbitrage opportunities.
(iv)	Dealers	For hedging position taking, exploiting inefficiencies and earning dealer spreads.

The basic differences between Cash and the Derivative market are enumerated below:-

In cash market tangible assets are traded whereas in derivative markets contracts based on tangible or intangible assets like index or rates are traded.

- In cash market tangible assets are traded whereas in derivative market contracts based on tangible or intangible assets like index or rates are traded.
- In cash market, we can purchase even one share whereas in Futures and Options minimum lots are fixed.
- Cash market is more risky than Futures and Options segment because in "Futures and Options" risk is limited up to 20%.
- Cash assets may be meant for consumption or investment. Derivative contracts are for hedging, arbitrage or speculation.
- The value of derivative contract is always based on and linked to the underlying security. Though this linkage may not be on point-to-point basis.
- In the cash market, a customer must open securities trading account with a securities depository whereas to trade futures a customer must open a future trading account with a derivative broker.
- Buying securities in cash market involves putting up all the money upfront whereas buying futures simply involves putting up the margin money.
- With the purchase of shares of the company in cash market, the holder becomes part owner of the company. While in future it does not happen.

Question 24

Given below is the Balance Sheet of S Ltd. as on 31.3.2008 :

Liabilities	Rs. (in lakh)	Assets	Rs. (in lakh)
Share capital (share of Rs. 10)	100	Land and building	40
Reserves and surplus	40	Plant and machinery	80
Creditors	30	Investments	10
		Stock	20
		Debtors	15
		Cash at bank	5
	<u>170</u>		<u>170</u>

You are required to work out the value of the Company's, shares on the basis of Net Assets method and Profit-earning capacity (capitalization) method and arrive at the fair price of the shares, by considering the following information:

- Profit for the current year Rs. 64 lakhs includes Rs. 4 lakhs extraordinary income and Rs. 1 lakh income from investments of surplus funds; such surplus funds are unlikely to recur.
- In subsequent years, additional advertisement expenses of Rs. 5 lakhs are expected to be incurred each year.
- Market value of Land and Building and Plant and Machinery have been ascertained at Rs. 96 lakhs and Rs. 100 lakhs respectively. This will entail additional depreciation of Rs. 6 lakhs each year.
- Effective Income-tax rate is 30%.
- The capitalization rate applicable to similar businesses is 15%. (16 Marks)(May, 2008)

Answer

	Rs. lakhs
Net Assets Method	
Assets: Land & Buildings	96
Plant & Machinery	100
Investments	10
Stocks	20
Debtors	15
Cash & Bank	5
Total Assets	246
Less: Creditors	30
Net Assets	<u>216</u>

Management Accounting & Financial Management

Value per share

(a) Number of shares $\frac{1,00,00,000}{10} = 10,00,000$

(b) Net Assets Rs.2,16,00,000
 $\frac{\text{Rs.2,16,00,000}}{10,00,000} = \text{Rs.21.6}$

Profit-earning Capacity Method

Profit before tax		64.00
Less: Extraordinary income	4.00	
Investment income (not likely to recur)	<u>1.00</u>	<u>5.00</u>
		59.00
Less: Additional expenses in forthcoming years		
Advertisement	5.00	
Depreciation	<u>6.00</u>	<u>11.00</u>
Expected earnings before taxes		48.00
Less: Income-tax @ 30%		<u>14.40</u>
Future maintainable profits (after taxes)		<u>33.60</u>
Value of business		224
Capitalisation factor	$\frac{33.60}{0.15} =$	
Less: External Liabilities (creditors)		<u>30</u>
		<u>194</u>

Value per share

$= \frac{1,94,00,000}{10,00,000} = \text{Rs.19.4}$

Fair Price of share

	Rs.
Value as per Net Assets Method	21.6
Value as per Profit earning capacity (Capitalisation) method	19.4
Fair Price= $\frac{21.6+19.4}{2} = \frac{41}{2} = \text{Rs.20.5}$	

Indian Stock Market : An Overview

Question 25

Distinguish between Forward and Futures contract.

(5 marks) (Nov 2008)

Answer

FORWARD AND FUTURE CONTRACTS:

S.No.	Features	Forward	Futures
1.	Trading	Forward contracts are traded on personal basis or on telephone or otherwise.	Futures Contracts are traded in a competitive arena.
2.	Size of Contract	Forward contracts are individually tailored and have no standardized size	Futures contracts are standardized in terms of quantity or amount as the case may be
3.	Organized exchanges	Forward contracts are traded in an over the counter market.	Futures contracts are traded on organized exchanges with a designated physical location.
4.	Settlement	Forward contracts settlement takes place on the date agreed upon between the parties.	Futures contracts settlements are made daily via. Exchange's clearing house.
5.	Delivery date	Forward contracts may be delivered on the dates agreed upon and in terms of actual delivery.	Futures contracts delivery dates are fixed on cyclical basis and hardly takes place. However, it does not mean that there is no actual delivery.
6.	Transaction costs	Cost of forward contracts is based on bid – ask spread.	Futures contracts entail brokerage fees for buy and sell orders.
7.	Marking to market	Forward contracts are not subject to marking to market	Futures contracts are subject to marking to market in which the loss on profit is debited or credited in the margin account on daily basis due to change in price.
8.	Margins	Margins are not required in forward contract.	In futures contracts every participants is subject to maintain margin as decided by the exchange authorities
9.	Credit risk	In forward contract, credit risk is born by each party and, therefore, every party has to bother for the creditworthiness.	In futures contracts the transaction is a two way transaction, hence the parties need not to bother for the risk.

Management Accounting & Financial Management

Question 26

Calculate the price of 3 months PQR futures, if PQR (FV Rs.10) quotes Rs.220 on NSE and the three months future price quotes at Rs.230 and the one month borrowing rate is given as 15 percent and the expected annual dividend yield is 25 percent per annum payable before expiry. Also examine arbitrage opportunities.

Answer

Future's Price = Spot + cost of carry – Dividend

$$\begin{aligned} F &= 220 + 220 \times 0.15 \times 0.25 - 0.025^{**} \times 10 \\ &= 225.75 \end{aligned}$$

** Entire 25% dividend is payable before expiry, which is Rs.2.50.

Thus we see that futures price by calculation is Rs.225.75 which is quoted at Rs.230 in the exchange.

Analysis:

Fair value of Futures less than Actual futures Price:

Futures Overvalued Hence it is advised to sell. Also do Arbitraging by buying stock in the cash market.

Step I

He will buy PQR Stock at Rs.220 by borrowing at 15% for 3 months. Therefore his outflows are :

Cost of Stock	220
Add: Interest @ 15 % for 3 months i.e. 0.25 years	8.25
($220 \times 0.15 \times 0.025$)	
Total Outflows (A)	228.25

Step II

He will sell March 2000 futures at Rs.230. Meanwhile he would receive dividend for his stock.

Hence his inflows are	230
Sale proceeds of March 2000 futures	2.50
Total inflows (B)	232.5

Inflow – Outflow = Profit earned by Arbitrageur

$$\begin{aligned} &= 232.5 - 228.25 \\ &= 4.25 \end{aligned}$$

Question 1

X Co. Ltd. issued commercial paper as per following detail:

<i>Date of issue</i>	<i>17th January, 1998</i>
<i>Date of maturity</i>	<i>17th April, 1998</i>
<i>No. of days</i>	<i>90</i>
<i>Interest rate</i>	<i>11.25% p.a.</i>

What was the net amount received by the company on issue of commercial paper?
(4 marks) (May 1998)

Answer

Note: It has been assumed that the amount of commercial paper issued is Rs. 5 crores. Hence the net amount received by the company on issue of commercial paper is as follows:

$$\text{Interest : } 11.25\% \text{ P.A.} = \frac{11.25 \times 90}{365} = 2.774\% \text{ for 90 days}$$

Hence, interest will be

$$= \frac{2.774}{100 + 2.774} \times \text{Rs. 5 crores} = \text{Rs. 13,49,563}$$

Net amount received at the time of issue

$$= \text{Rs. 5 crores} - \text{Rs. 13,49,563}$$

$$= \text{Rs. 4,86,50,437}$$

Question 2

P Co. has to make payment of Rs. 2 million (Rs. 20 lakhs) on 16th April, 1998. It has a surplus money today i.e. 15th January, 1998 and the company has decided to invest in Certificate of Deposit (CD's) of a leading nationalized bank at 8.00% p.a. What money is required to be invested now? Take year as 365 days.
(5 marks) (November, 1998)

Answer

Money required to be invested today i.e. 15th January, 1998 to make payment of Rs. 2 million (Rs. 20 lakhs) on 16th April, 1998.

For making payment of Rs. 2 million (Rs. 20 lakhs) on 16th April, 1998 the surplus money to be

Management Accounting and Financial Analysis

invested today i.e. 15th January, 1998 in Certificate of Deposits (CDs) for 91 days @ 8% p.a. is

$$\text{Rs. } \frac{20,00,000}{1.0199452} \text{ (Refer to working note)} = \text{Rs. } 19,60,889.66$$

or Rs. 19,60,890 (rounded off)

Working Note:

Interest on Re. 1 at 8% p.a. on Certificate of Deposit (CD's) of a leading nationalized bank

$$\text{Interest on Re. 1 for 91 days} \left(\text{Rs. } 0.08 \times \frac{91}{365} \right)$$

The amount to be received for Re. 1 invested now after 91 days.

Question 3

A Ltd. has a total sales of Rs. 3.2 crores and its average collection period is 90 days. The past experience indicates that bad-debt losses are 1.5% on Sales. The expenditure incurred by the firm in administering its receivable collection efforts are Rs. 5,00,000. A factor is prepared to buy the firm's receivables by charging 2% Commission. The factor will pay advance on receivables to the firm at an interest rate of 18% p.a. after withholding 10% as reserve.

Calculate the effective cost of factoring to the Firm.

(6 marks) (May 2002)

Answer

	Rs.
Average level of Receivables = $3,20,00,000 \times 90/360$	80,00,000
Factoring commission = $80,00,000 \times 2/100$	1,60,000
Factoring reserve = $80,00,000 \times 10/100$	8,00,000
Amount available for advance = Rs. $80,00,000 - (1,60,000 + 8,00,000)$	70,40,000
Factor will deduct his interest @ 18%:- Interest = $\frac{\text{Rs. } 70,40,000 \times 18 \times 90}{100 \times 360}$	= Rs. 3,16,800

$\therefore$ Advance to be paid = Rs. 70,40,000 – Rs. 3,16,800 = Rs. 67,23,200

Annual Cost of Factoring to the Firm:

	Rs.
Factoring commission (Rs. $1,60,000 \times 360/90$)	6,40,000
Interest charges (Rs. $3,16,800 \times 360/90$)	12,67,200
Total	<u>19,07,200</u>

Firm's Savings on taking Factoring Service:

	Rs.
Cost of credit administration saved	5,00,000
Cost of Bad Debts (Rs. $3,20,00,000 \times 1.5/100$) avoided	4,80,000
Total	<u>9,80,000</u>
Net cost to the Firm (Rs. $19,07,200 - \text{Rs. } 9,80,000$)	<u>9,27,200</u>

$$\text{Effective rate of interest to the firm} = \frac{\text{Rs. } 9,27,200 \times 100}{67,23,200} \quad 13.79\%$$

Note: The number of days in a year have been assumed to be 360 days.

Question 4

Write a brief note about regulation of NBFCs in India.

(8 Marks) (May, 2005)

Answer

(a) (i) **Meaning of NBFC's:** An NBFC is a company or an institution basically engaged in acceptance of deposits under different schemes and to invest these monies in any manner. NBFC may be registered as a Company under Companies Act, 1956, or may be other form of organization. The Reserve Bank of India Act defines an NBFC as (1) a financial institution which is a company. (ii) a non-banking institution which is a company having its principal business the receiving of deposits under any scheme or lending in any manner (iii) such other non-banking institution as the RBI may specify with the approval of Central Government. Non-banking financial companies, normally, provides supplementary finance to the corporate sector. For the purpose of growing economy the role of NBFC's is important. The finance and related services is the major activity of NBFC's.

(ii) By implication any non-banking financial institution engaged in deposits and lending activities is called NBFC. On the basis of types of activities, NBFCs may be consisting of

- (i) Loan Companies
- (ii) Investment companies.
- (iii) Hire purchase finance companies.
- (iv) Equipment leasing companies.
- (v) Mutual benefit finance companies.
- (vi) Housing finance companies.
- (vii) Miscellaneous finance companies.
- (viii) Other and residuary finance companies
- (ix) Chit fund companies

The RBI regulates the activities of NBFCs through the following sets of directions:

- (i) NBFC acceptance of public deposits (Reserve Bank of India) directions, 1998.
- (ii) NBFC prudential norms (Reserve Bank of India) directions, 1998.
- (iii) NBFC Auditors Report (Reserve Bank of India) directions, 1998.
- (iv) NBFC (Reserve Bank of India) directions, 1987.
- (v) Miscellaneous Non-Banking Companies (Reserve Bank of India) directions, 1977.

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The RBI has amended the NBFCs' regulations from time to time so that NBFCs grow on sound and healthy lines and to protect the interest of NBFC depositors.

(iii) Regulation of NBFCs – RBI Act

The RBI Act regulates different types of NBFCs under the provisions of Chapter III – B & Chapter C.

Silent features of Chapter III – B

The two compulsory prerequisites as per Chapter III–B are

- (a) The NBFC should obtain a certificate of registration.
- (b) It must have NOF (Net Operating Funds) of Rs. 200 lacs.

These two requirements are cumulative.

Computation of NOF (Net Operating Funds) will be as follows

NOF is defined in the Section 45, I-A of the Act. The basis of computation is the latest Balance Sheet of the Company. Following items are considered for NOF.

1. Paid up equity capital and free reserves.
2. Accumulated losses, deferred revenues expenditure and intangible assets.
3. Investment in shares of subsidiaries, companies in the same group and other NBFCs.
4. Book value of Debentures, bonds made in subsidiaries or companies in the same group.
5. Deposit with subsidiaries and companies in the same group.

The calculation of NOF is

$$X = 1 + 2$$

$$Y = 3 + 4 + 5.$$

If 10% of Y exceeds the X then excess to be find out.

The NOF of the NBFC will be X – the excess amount.

Procedure for obtaining registration.

Application must be in the form prescribed by RBI and should be submitted to the Regional Office of the RBI.

Processing of application by RBI.

RBI ensures capacity of the NBFC to meet the creditors claim in full, general character of the management and the capital structure. The activity of NBFC shall not be prejudicial to the operation and consolidation of the financial sector and also shall not be prejudicial to the public interest.

Cancellation of registration.

Registration can be cancelled under section 44IA (6) wherein certain conditions are prescribed under the section such as

- Non-compliance of directions issued by the RBI.
- Fails to maintain accounts in accordance with any law or order issued by RBI.
- Failed to submit or offer for inspection its books of accounts or other relevant documents when demanded by RBI.
- Failed to comply with any conditions specified by RBI while granting certificate of registration.

Procedure for cancellation of registration

NBFC should be given a reasonable opportunity of being heard. NBFC must generally be given an opportunity by RBI for taking necessary steps to comply with the conditions, except in cases where RBI is of the opinion that the delay in canceling the certificate of registration shall be prejudicial to public interest or to the interest of the depositors of the NBFC.

Appellate Remedy

The NBFC can prefer and appeal to Central Government within 30 days from the date on which the cancellation order was communicated to it. If no appeal has been prescribed then the decision of RBI shall be final.

Question 5

A company is considering to engage a factor, the following information is available:

- (i) *The current average collection period for the Company's debtors is 80 days and ½% of debtors default. The factor has agreed to pay money due after 60 days and will take the responsibility of any loss on account of bad debts.*
- (ii) *The annual charge for the factoring is 2% of turnover payable annually in arrears. Administration cost saving is likely to be Rs.1,00,000 per annum.*
- (iii) *Annual sales, all on credit, are Rs.1,00,00,000. Variable cost is 80% of sales price. The Company's cost of borrowing is 15% per annum. Assume the year is consisting of 365 days.*

Should the Company enter into a factoring agreement. (5 Marks) (May, 2006)

Answer

The annual change in cash flows through entering into a factoring agreement is:

(Amount in Rs.)

Savings

Administration cost saved

1,00,000

Existing average debtors

21,91,781

[Rs.1,00,00,000/365) x 80 days]

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Average New Debtors	16,43,836	
[(Rs.100,00,000/365) x 60 days]		
Reduction in debtors	5,47,945	
Cost there of @80%	4,38,356	
Add: Interest saving @15% P.A on. Rs.4,38,356		65,753
Add: Bad Debts saved @.005 of Rs.1,00,00,000		50,000
	Total	2,15,753
Less:Annual charges @2% of Rs.1,00,00,000		2,00,000
Net annual benefits of factoring		15,753

Therefore, the factoring agreement is worthwhile and should be undertaken.

Question 5

What is Credit rating?

(4 Marks) (May, 2006)

Answer

Credit rating: Credit rating is a symbolic indication of the current opinion regarding the relative capability of a corporate entity to service its debt obligations in time with reference to the instrument being rated. It enables the investor to differentiate between instruments on the basis of their underlying credit quality. To facilitate simple and easy understanding, credit rating is expressed in alphabetical or alphanumerical symbols.

Credit rating aims to (i) provide superior information to the investors at a low cost; (ii) provide a sound basis for proper risk-return structure; (iii) subject borrowers to a healthy discipline and (iv) assist in the framing of public policy guidelines on institutional investment. Thus, credit rating financial services represent an exercise in faith building for the development of a healthy financial system. In India the rating coverage is of fairly recent origin, beginning 1988 when the first rating agency CRISIL was established. At present there are few other rating agencies like .

- (i) Credit Rating Information Services of India Ltd. (CRISIL).
- (ii) Investment Information and Credit Rating Agency of India (ICRA).
- (iii) Credit Analysis and Research Limited (CARE).
- (iv) Duff & Phelps Credit Rating India Pvt. Ltd. (DCR I)
- (v) ONICRA Credit Rating Agency of India Ltd.

Question 6

MSN Ltd. has total sales of Rs.4.50 crores and its average collection period is 120 days. The past experience indicates that bad debt losses are 2 percent on sales. The expenditure incurred by the company in administering its receivable collection efforts are Rs.6,00,000. A Factor is prepared to buy the company's receivables by charging 2 percent commission. The factor will pay advance on receivables to the company at an interest rate of 18 percent per annum after withholding 10 percent as reserve.

You are required to calculate effective cost of factoring to the company. (8 marks) (Nov 2008)

Answer

MSN Ltd.

Average level of Receivables	$45000000 \times 120 / 360$	15000000
Factoring commission	$15000000 \times 2\%$	300000
Factoring Reserve	$15000000 \times 10\%$	1500000
Amount available for advance	$15000000 - (300000 + 1500000)$	13200000

Factor will deduct at interest @ 18%

Interest $(13200000 \times 18 \times 120) / 100 \times 360$	792000
Advance to be paid = Rs.13200000 – 792000	12408000

Annual cost of factoring to the firm:

Factoring commission (Rs.300000 $\times$ 360 / 1320)	900000
Factoring commission (Rs.300000 $\times$ 360 / 120)	2376000
	3276000

Firms savings on taking factoring service:

Cost of credit administration saved	600000
Cost of bad debts $(45000000 \times 2\%)$	900000
Total savings	1500000

Net cost to the firm = Rs.3276000 – 1500000 = Rs.1776000

Effective rate of interest to the firm = $1776000 \times 100 / 12408000 = 14.31\%$

Note: The number of days in a year is assumed to be 360 days.

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NOTE

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PORTFOLIO MANAGEMENT

Question 1

(a) Explain briefly the two basic principles of effective portfolio management.

(10 marks) (May 1996) & (5 marks) (November 1999)

(b) As an investment manager you are given the following information:

Investment in equity shares of	Initial price	Dividends	Market price at the end of the year	Beta risk factor
	Rs.	Rs.	Rs.	Rs.
A. Cement Ltd.	25	2	50	0.8
Steel Ltd.	35	2	60	0.7
Liquor Ltd.	45	2	135	0.5
B. Government of India Bonds	1,000	140	1,005	0.99

Risk free return may be taken at 14%

You are required to calculate:

(i) Expected rate of returns of portfolio in each using Capital Asset Pricing Model (CAPM).

(ii) Average return of portfolio. (10 marks) (May 1996)

Answer

(a) Portfolio management refers to the selection of securities and their continuous shifting in the portfolio to optimize returns to suit the objectives of the investor.

Two Basic Principles of Portfolio management:

The two basic principles for effective portfolio management are:

(i) Effective investment planning for the investment in securities by considering the following factors:

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- (a) Fiscal, financial and monetary policies of the Government of India and the *Reserve Bank of India.
- (b) Industrial and economic environment and its impact on industry prospects in terms of prospective technological changes, competition in the market, capacity utilisation with industry and demand prospects etc.
- (ii) Constant review of investment: Portfolio managers are required to review their investment in securities on a continuous basis to identify more profitable avenues for selling and purchasing their investment. For this purpose they will have to carry the following analysis:
 - (a) Assessment of quality of management of the companies in which investment has already been made or is proposed to be made.
 - (b) Financial and trend analysis of companies' balance sheets/ profits and loss accounts to identify sound companies with optimum capital structure and better performance and to disinvest the holding of those companies whose performance is found to be slackening.
 - (c) The analysis of securities market and its trend is to be done on a continuous basis.

The above analysis will help the portfolio manager to arrive at a conclusion as to whether the securities already in possession should be disinvested and new securities be purchased. This analysis will also reveal the timing for investment or disinvestment.

- (b) (i) Let us first calculate the Expected return on Market portfolio which is not given in the question paper.

	<i>Total Investment</i>	<i>Dividends</i>	<i>Capital gains</i>
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
A. Cement Ltd.	25	2	25
Steel Ltd.	35	2	25
Liquor Ltd.	45	2	90
B. Government of India Bonds	<u>1,000</u>	<u>140</u>	<u>5</u>
Total	<u>1,105</u>	<u>146</u>	<u>145</u>

$$\text{Expected return on market portfolio} = \text{Rs.} \frac{146 + 145}{1,105} = \text{Rs.} 26.33\%$$

Capital Asset Pricing Model:

$$E(R_p) = R_f + B_p [E(R_M) - R_f]$$

Where,

$$E(R_p) = \text{Expected return of the portfolio}$$

Portfolio Management

Rf = Risk free rate of return

Bp = Portfolio beta i.e. market sensitivity index

E (RM) = Expected return on market portfolio.

[E (RM – Rf)] = Market risk premium.

By substituting the figures in the above equation we can calculate expected rate of returns of portfolio in each using Capital Assets Pricing Model (CAPM) as under:

Cement Ltd.	= 14 + 0.8 (26.33 – 14)	= 23.86%
Steel Ltd.	= 14 + 0.7 (26.33 – 14)	= 22.63%
Liquor Ltd.	= 14 + 0.5 (26.33 – 14)	= 20.17%
Government of India Bonds	= 14 + 0.99 (26.33 – 14)	= 26.21%

(ii) Average return of the portfolio

$$= \frac{23.86 + 22.63 + 20.17 + 26.21}{4} = 23.22\%$$

OR

Average of Betas

$$= (0.8 + 0.7 + 0.5 + 0.99)/4 = 0.7475$$

$$\text{Average return} = 14 + 0.7475 (26.33 - 14) = 23.22\%$$

Question 2

(a) "Higher the return, higher will be the risk". In this context discuss the various risks associated with portfolio planning.

(b) Following is the data regarding six securities:

	A	B	C	D	E	F
Return (%)	8	8	12	4	9	8
Risk (%) (Standard Deviation)	4	5	12	4	5	6

(i) Which of the securities will be selected?

(ii) Assuming perfect correlation, analyse whether it is preferable to invest 5% in security A and 25% in security C. (6 + 6 = 12 marks) (November, 1996)

Answer

(a) There are four different types of risks in portfolio planning.

1. *Interest rate risk*: It is due to changes in interest rates from time to time. Price of the securities move inversely with change in the rate of interest.
2. *Purchasing power risk*: As inflation affects purchasing power adversely. Inflation

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rates vary over time and the investors are caught unaware when the rate of inflation changes abruptly.

3. *Business risk*: It arises from sale and purchase of securities affected by business cycles and technological changes.
 4. *Financial risk*: This arises due to changes in the capital structure of the company. It is expressed in terms of debt-equity ratio. Although a leveraged company's earnings are more, too much dependence on debt financing may endanger solvency and to some extent the liquidity.
- (b) (i) Security A has a return of 8% for a risk of 4%, whereas securities B and F have a higher risk for the same rate of return. Hence security A dominates securities B and F. For the same degree of risk of 4% security D has only a return of 4%. Hence, this security is also dominated by A. Securities C and E have a higher return as well as a higher degree of risk.

Hence the securities which will be selected are A, C and E.

- (ii) When perfect positive correlation exist between two securities, their risk and return can be averaged with the proportion. Hence the average value of A and C together for a proportion of 3 : 1 for risk and return will be as follows:

$$\text{Risk } (3 \times 4 + 1 \times 12)/4 = 6\%$$

$$\text{Return } (3 \times 8 + 1 \times 12)/4 = 9\%$$

Comparing the above average risk and return with security E, it is better to invest in E as it has lesser risk (5%) for the same return of 9%.

Question 3

An investor is seeking the price to pay for a security, whose standard deviation is 3.00 per cent. The correlation coefficient for the security with the market is 0.8 and the market standard deviation is 2.2 per cent. The return from government securities is 5.2 per cent and from the market portfolio is 9.8 per cent. The investor knows that, by calculating the required return, he can then determine the price to pay for the security. What is the required return on the security? (6 marks) (May 1998)

Answer

$$\text{Beta coefficient} = \frac{\text{Correlation coefficient between the security and the market} \times \text{Std. deviation of the security return}}{\text{Std. deviation of the market return}}$$

$$= \frac{(.8) \times (.03)}{(.022)} = 1.091$$

Now, required return on the security: Rate of return on risk free security + beta coefficient (required return on market portfolio – rate of return on risk free security)

$$= 5.2 + 1.091 (9.8 - 5.2)$$

$$= 5.2 + 5.02 = 10.22\%$$

Question 4

Write short note on objectives of portfolio management.

(5 marks) (November, 1998)

Answer

Objectives of portfolio management: Portfolio management refers to the selection of securities and their continuous shifting in the portfolio for optimizing the return for investor. The following are the objectives of portfolio management:

- (i) *Security/safety of principal:* Security not only involves keeping the principal sum intact but also keeping intact its purchasing power.
- (ii) *Stability of income:* So as to facilitate planning more accurately and systematically the reinvestment or consumption of income.
- (iii) *Capital growth:* Which can be attained by reinvesting in growth securities or through purchase of growth securities.
- (iv) *Marketability:* The ease with which security can be bought or sold. This is essential to provide flexibility to investment portfolio.
- (v) *Liquidity:* It is desirable for an investor to take advantage of attractive opportunities in the market.
- (vi) *Diversification:* The basic objective of building a portfolio is to reduce the risk of loss of capital/income by investing in various types of securities and over a wide range of industries.
- (vii) *Favourable tax status:* The effective yield an investor gets from his investment depends on tax to which it is subjected. By minimizing tax burden, yield can be improved effectively.

Question 5

Write short note on Systematic and Unsystematic Risk in connection with Portfolio Investment.

(5 marks) (May 1999)

Answer

Systematic and Unsystematic Risk in connection with Portfolio Investment:

Systematic Risk: It is the risk which cannot be eliminated by diversification. This part of risk arises because every security has a built in tendency to move in with the fluctuations in the market. The investors are exposed to market risk even when they hold well diversified portfolio of securities. It is because all individual securities move together in the same manner and therefore no investors can avoid or eliminate this risk, whatsoever precautions or diversification may be resorted to.

The examples of systematic risk are:

The government changes the interest rate policy; the corporate tax rate is increased; the government resort to massive deficit financing; the inflation rate increases etc.

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Unsystematic Risk: It is the risk which can be eliminated by diversification. This risk represents the fluctuations in return of a security due to factors specific to particular firm only and not to the market as a whole. The investors can totally reduce this risk through diversification. It is because when a large number of securities enter a portfolio, many random fluctuations in returns from these securities will automatically set off each other.

The examples of unsystematic risks are:

Workers declared strike in a company; the Research and Development expert of the company leaves; a formidable competitor enters the market; the company loses a big contract in a bid etc.

Question 6

John inherited the following securities on his uncle's death:

Types of Security	Nos.	Annual Coupon %	Maturity Years	Yield %
Bond A (Rs. 1,000)	10	9	3	12
Bond B (Rs. 1,000)	10	10	5	12
Preference shares C (Rs. 100)	100	11	*	13*
Preference shares D (Rs. 100)	100	12	*	13*

**likelihood of being called at a premium over par.*

Compute the current value of his uncle's portfolio.

(8 marks) (May 2000)

Answer

Computation of current value of John's portfolio

(i) 10 Nos. Bond A, Rs. 1,000 par value, 9% Bonds maturity 3 years:

Rs.

Current value of interest on bond A

1-3 years: Rs. 900 × Cumulative P.V. @ 12% (1-3 years)

= Rs. 900 × 2.402

2,162

Add: Current value of amount received on maturity of Bond A

End of 3rd year: Rs. 1,000 × 10 × P.V. @ 12% (3rd year)

= Rs. 10,000 × 0.712

7,120

9,282

(ii) 10 Nos. Bond B, Rs. 1,000 par value, 10% Bonds maturity 5 years:

Current value of interest on bond B

1-5 years: Rs. 1,000 × Cumulative P.V. @ 12% (1-5 years)

= Rs. 1,000 × 3.605

3,605

Add: Current value of amount received on maturity of Bond B

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End of 5th year: Rs. 1,000 × 10 × P.V. @ 12% (5 th year)		
= Rs. 10,000 × 0.567	<u>5,670</u>	9,275
(iii) 100 Preference shares C, Rs. 100 par value, 11% coupon		
$\frac{11\% \times 100 \text{ Nos.} \times \text{Rs. } 100}{13\%} = \frac{1,100}{0.13}$	8,462	
(iv) 100 Preference shares D, Rs. 100 par value, 12% coupon		
$\frac{12\% \times 100 \text{ Nos.} \times \text{Rs. } 100}{13\%} = \frac{1,200}{0.13}$	<u>9,231</u>	17,693
Total current value of his portfolio [(i) + (ii) + (iii) + (iv)]		<u>36,250</u>

Question 7

Write short note on Factors affecting investment decisions in portfolio management.

(5 marks) (May 2000)

Answer

Factors affecting investment decisions in portfolio management:

- (i) **Objectives of investment portfolio:** There can be many objectives of making an investment. The manager of a provident fund portfolio has to look for security (low risk) and may be satisfied with none too higher return. An aggressive investment company may, however, be willing to take a high risk in order to have high capital appreciation.
- (ii) **Selection of investment:**
 - (a) What types of securities to buy or invest in? There is a wide variety of investments opportunities available i.e. debentures, convertible bonds, preference shares, equity shares, government securities and bonds, income units, capital units etc.
 - (b) What should be the proportion of investment in fixed interest/dividend securities and variable interest/dividend bearing securities?
 - (c) In case investments are to be made in the shares or debentures of companies, which particular industries shows potential of growth?
 - (d) Once industries with high growth potential have been identified, the next step is to select the particular companies, in whose shares or securities investments are to be made.
- (iii) **Timing of purchase:** At what price the share is acquired for the portfolio depends entirely on the timing decision. It is obvious if a person wishes to make any gains, he should "buy cheap and sell dear" i.e. buy when the shares are selling at a low price and sell when they are at a high price.

Question 8

A Ltd. has an expected return of 22% and Standard deviation of 40%. B Ltd. has an expected

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return of 24% and Standard deviation of 38%. A Ltd. has a beta of 0.86 and B Ltd. a beta of 1.24. The correlation coefficient between the return of A Ltd. and B Ltd. is 0.72. The Standard deviation of the market return is 20%. Suggest:

- (i) Is investing in B Ltd. better than investing in A Ltd.?
- (ii) If you invest 30% in B Ltd. and 70% in A Ltd., what is your expected rate of return and portfolio Standard deviation?
- (iii) What is the market portfolios expected rate of return and how much is the risk-free rate?
- (iv) What is the beta of Portfolio if A Ltd.'s weight is 70% and B Ltd.'s weight is 30%?

(10 marks) (May 2002)

Answer

- (i) A Ltd. has lower return and higher risk than B Ltd. investing in B Ltd. is better than in A Ltd. because the returns are higher and the risk, lower. However, investing in both will yield diversification advantage.

- (ii) $r_{AB} = .22 \times 0.7 + .24 \times 0.3 = 22.6\%$

$$\sigma_{AB}^2 = \sqrt{.40^2 \times 0.7^2 + .38^2 \times 0.3^2 + 2 \times 0.7 \times 0.3 \times 0.72 \times .40 \times .38} = .1374$$

$$\sigma_{AB} = \sqrt{\sigma_{AB}^2}$$

$$= \sqrt{.1374} = .37 = 37\% *$$

* Answer = 37.06% is also correct and variation may occur due to approximation.

- (iii) This risk-free rate will be the same for A and B Ltd. Their rates of return are given as follows:

$$r_A = 22 = r_f + (r_m - r_f) 0.86$$

$$r_B = 24 = r_f + (r_m - r_f) 1.24$$

$$r_A - r_B = -2 = (r_m - r_f) (-0.38)$$

$$r_m - r_f = -2 / -0.38 = 5.26\%$$

$$r_A = 22 = r_f + (5.26) 0.86$$

$$r_f = 17.5\% *$$

$$r_B = 24 = r_f + (5.26) 1.24$$

$$r_f = 17.5\% *$$

$$r_m - 17.5 = 5.26$$

$$r_m = 22.76\% **$$

*Answer = 17.47% might occur due to variation in approximation.

**Answer may show small variation due to approximation. Exact answer is 22.736%.

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(iv) $\beta_{AB} = \beta_A \times W_A + \beta_B \times W_B$
 $= 0.86 \times 0.7 + 1.24 \times 0.3 = 0.974$

Question 9

Following is the data regarding six securities:

	A	B	C	D	E	F
Return (%)	8	8	12	4	9	8
Risk (Standard deviation)	4	5	12	4	5	6

- (i) Assuming three will have to be selected, state which ones will be picked.
 (ii) Assuming perfect correlation, show whether it is preferable to invest 75% in A and 25% in C or to invest 100% in E. (10 marks)(November, 2002)

Answer

- (i) Security A has a return of 8% for a risk of 4, whereas B and F have a higher risk for the same return. Hence, among them A dominates.

For the same degree of risk 4, security D has only a return of 4%. Hence, D is also dominated by A.

Securities C and E remain in reckoning as they have a higher return though with higher degree of risk.

Hence, the ones to be selected are A, C & E.

- (ii) The average values for A and C for a proportion of 3 : 1 will be :

$$\text{Risk} = \frac{(3 \times 4) + (1 \times 12)}{4} = 6\%$$

$$\text{Return} = \frac{(3 \times 8) + (1 \times 12)}{4} = 9\%$$

Therefore:	75% A	E
	25% C	—
Risk	6	5
Return	9%	9%

For the same 9% return the risk is lower in E. Hence, E will be preferable.

Question 10

Briefly explain Capital Asset Pricing Model (CAPM).

(5 marks) (November, 1997) & (6 marks) (May 2003)

Answer

Capital Asset Pricing Model:

The mechanical complexity of the Markowitz's portfolio model kept both practitioners and academics away from adopting the concept for practical use. Its intuitive logic, however, spurred the creativity of a number of researchers who began examining the stock market implications that would arise if all investors used this model. As a result what is referred to as the Capital Asset Pricing Model (CAPM), was developed.

The Capital Assets Pricing Model was developed by Sharpe, Mossin and Lintner in 1960. The model explains the relationship between the expected return, non-diversifiable risk and the valuation of securities. It considers the required rate of return of a security on the basis of its contribution to the total risk. It is based on the premise that the diversifiable risk of a security is eliminated when more and more securities are added to the portfolio. However, the systematic risk cannot be diversified and is correlated with that of the market portfolio. All securities do not have same level of systematic risk. Therefore, the required rate of return goes with the level of systematic risk. The systematic risk can be measured by beta, β . Under CAPM, the expected return from a security can be expressed as:

Expected return on security = $R_f + \text{Beta} (R_m - R_f)$

The model shows that the expected return of a security consists of the risk-free rate of interest and the risk premium. The CAPM, when plotted on a graph paper is known as the Security Market Line (SML). A major implication of CAPM is that not only every security but all portfolios too must plot on SML. This implies that in an efficient market, all securities are expected to yield returns commensurate with their riskiness, measured by β .

The CAPM is based on following eight assumptions:

- (i) The Investor's objective is to maximise the utility of terminal wealth;
- (ii) Investors make choices on the basis of risk and return;
- (iii) Investors have homogenous expectations of risk and return;
- (iv) Investors have identical time horizon;
- (v) Information is freely and simultaneously available to investors;
- (vi) There is a risk-free asset, and investors can borrow and lend unlimited amounts at the risk-free rate;
- (vii) There are no taxes, transaction costs, restrictions on short rates, or other market imperfections;
- (viii) Total asset quantity is fixed, and all assets are marketable and divisible.

CAPM can be used to estimate the expected return of any portfolio with the following formula.

$$E(R_p) = R_f + B_p [E(R_m) - R_f]$$

$E(R_p)$ = Expected return of the portfolio

R_f = Risk free rate of return

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B_p = Portfolio beta i.e. market sensitivity index

$E(R_m)$ = Expected return on market portfolio.

$E(R_m) - R_f$ = Market risk premium.

CAPM provides a conceptual frame work for evaluating any investment decision where capital is committed with a goal of producing future returns.

Question 11

An investor is holding 1,000 shares of Fatlass Company. Presently the rate of dividend being paid by the company is Rs. 2 per share and the share is being sold at Rs. 25 per share in the market. However, several factors are likely to change during the course of the year as indicated below:

	Existing	Revised
Risk free rate	12%	10%
Market risk premium	6%	4%
Beta value	1.4	1.25
Expected growth rate	5%	9%

In view of the above factors whether the investor should buy, hold or sell the shares? And why ?
(8 marks)(May 2003)

Answer

On the basis of existing and revised factors, rate of return and price of share is to be calculated.

Existing rate of return

$$\begin{aligned} &= R_f + \text{Beta} (R_m - R_f) \\ &= 12\% + 1.4 (6\%) = 20.4\% \end{aligned}$$

Revised rate of return

$$= 10\% + 1.25 (4\%) = 15\%$$

Price of share (original)

$$P_o = \frac{D(1+g)}{K_e - g} = \frac{2(1.05)}{.204 - .05} = \frac{2.10}{.154} = \text{Rs. } 13.63$$

Price of share (Revised)

$$P_o = \frac{2(1.09)}{.15 - .09} = \frac{2.18}{.06} = \text{Rs. } 36.33$$

In case of existing market price of Rs. 25 per share, rate of return (20.4%) and possible equilibrium price of share at Rs. 13.63, this share needs to be sold because the share is overpriced (Rs. 25 – 13.63) by Rs. 11.37. However, under the changed scenario where

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growth of dividend has been revised at 9% and the return though decreased at 15% but the possible price of share is to be at Rs. 36.33 and therefore, in order to expect price appreciation to Rs. 36.33 the investor should hold the shares, if other things remain the same.

Question 12

Your client is holding the following securities:

Particulars of Securities	Cost Rs.	Dividends Rs.	Market Price Rs.	BETA
<i>Equity Shares:</i>				
Co. X	8,000	800	8,200	0.8
Co. Y	10,000	800	10,500	0.7
Co. Z	16,000	800	22,000	0.5
PSU Bonds	34,000	3,400	32,300	1.0

Assuming a Risk-free rate of 15%, calculate:

- Expected rate of return in each, using the Capital Asset Pricing Model (CAPM).
- Average return of the portfolio. (6 marks) (May 2003)

Answer

Calculation of expected return on market portfolio (R_m)

Investment	Cost (Rs.)	Dividends (Rs.)	Capital Gains (Rs.)
Shares X	8,000	800	200
Shares Y	10,000	800	500
Shares Z	16,000	800	6,000
PSU Bonds	<u>34,000</u>	<u>3,400</u>	<u>-1,700</u>
	<u>68,000</u>	<u>5,800</u>	<u>5,000</u>

$$R_m = \frac{5,800 + 5,000}{68,000} \times 100 = 15.88\%$$

Calculation of expected rate of return on individual security:

Security:

Shares X :	$15 + 0.8 (15.88 - 15.0)$	$= 15.70\%$
Shares Y :	$15 + 0.7 (15.88 - 15.0)$	$= 15.62\%$
Shares Z :	$15 + 0.5 (15.88 - 15.0)$	$= 15.44\%$
PSU Bonds :	$15 + 1.0 (15.88 - 15.0)$	$= 15.88\%$

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Calculation of the Average Return of the Portfolio:

$$= \frac{15.70 + 15.62 + 15.44 + 15.88}{4}$$

= 15.66%.

Question 13

The rates of return on the security of Company X and market portfolio for 10 periods are given below:

Period	Return of Security X (%)	Return on Market Portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

(i) What is the beta of Security X?

(ii) What is the characteristic line for Security X?

(10 marks)(November, 2003)

Answer

(i)

Period	R_X	R_M	$R_X - \bar{R}_X$	$R_M - \bar{R}_M$	$(R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$(R_M - \bar{R}_M)^2$
1	20	22	5	10	50	100
2	22	20	7	8	56	64
3	25	18	10	6	60	36
4	21	16	6	4	24	16
5	18	20	3	8	24	64
6	-5	8	-20	-4	80	16

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7	17	-6	2	-18	-36	324
8	19	5	4	-7	-28	49
9	-7	6	-22	-6	132	36
10	<u>20</u>	<u>11</u>	5	-1	<u>-5</u>	<u>1</u>
	150	120			357	706
	ΣR_X	ΣR_M			$\Sigma (R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$\Sigma (R_M - \bar{R}_M)^2$

$$\bar{R}_X = 15 \quad \bar{R}_M = 12$$

$$\sigma^2_M = \frac{\Sigma (R_M - \bar{R}_M)^2}{n - 1} = \frac{706}{9} = 78.44$$

$$\text{Cov}_{X,M} = \frac{\Sigma (R_X - \bar{R}_X)(R_M - \bar{R}_M)}{n - 1} = \frac{357}{9} = 39.66$$

$$\text{Beta}_X = \frac{\text{Cov}_{X,M}}{\sigma^2_M} = \frac{39.66}{78.44} = .505$$

(ii) $\bar{R}_X = 15 \quad \bar{R}_M = 12$

$$y = \alpha + \beta x$$

$$15 = \alpha + 0.505 \times 12$$

$$\begin{aligned} \text{Alpha } (\alpha) &= 15 - (0.505 \times 12) \\ &= 8.94\% \end{aligned}$$

$$\text{Characteristic line for security X} = \alpha + \beta \times R_M$$

where, R_M = Expected return on Market Index

$$\therefore \text{Characteristic line for security X} = 8.94 + 0.505 R_M$$

Question 14

- (a) What sort of investor normally views the variance (or Standard Deviation) of an individual security's return as the security's proper measure of risk?
- (b) What sort of investor rationally views the beta of a security as the security's proper measure of risk? In answering the question, explain the concept of beta.

(3 + 7=10 marks)(May 2004)

Answer

- (a) A rational risk-averse investor views the variance (or standard deviation) of her portfolio's return as the proper risk of her portfolio. If for some reason or another the investor can hold only one security, the variance of that security's return becomes the variance of the portfolio's return. Hence, the variance of the security's return is the security's proper measure of risk.

While risk is broken into diversifiable and non-diversifiable segments, the market generally does not reward for diversifiable risk since the investor himself is expected to diversify the risk himself. However, if the investor does not diversify he cannot be considered to be an efficient investor. The market, therefore, rewards an investor only for the non-diversifiable risk. Hence, the investor needs to know how much non-diversifiable risk he is taking. This is measured in terms of beta.

An investor therefore, views the beta of a security as a proper measure of risk, in evaluating how much the market reward him for the non-diversifiable risk that he is assuming in relation to a security. An investor who is evaluating the non-diversifiable element of risk, that is, extent of deviation of returns viz-a-viz the market therefore consider beta as a proper measure of risk.

- (b) If an individual holds a diversified portfolio, she still views the variance (or standard deviation) of her portfolios return as the proper measure of the risk of her portfolio. However, she is no longer interested in the variance of each individual security's return. Rather she is interested in the contribution of each individual security to the variance of the portfolio.

Under the assumption of homogeneous expectations, all individuals hold the market portfolio. Thus, we measure risk as the contribution of an individual security to the variance of the market portfolio. The contribution when standardized properly is the beta of the security. While a very few investors hold the market portfolio exactly, many hold reasonably diversified portfolio. These portfolios are close enough to the market portfolio so that the beta of a security is likely to be a reasonable measure of its risk.

In other words, beta of a stock measures the sensitivity of the stock with reference to a broad based market index like BSE sensex. For example, a beta of 1.3 for a stock would indicate that this stock is 30 per cent riskier than the sensex. Similarly, a beta of a 0.8 would indicate that the stock is 20 per cent (100 – 80) less risky than the sensex. However, a beta of one would indicate that the stock is as risky as the stock market index.

Question 15

Following is the data regarding six securities:

	U	V	W	X	Y	Z
Return (%)	10	10	15	5	11	10
Risk (%) (Standard deviation)	5	6	13	5	6	7

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- (i) Which of three securities will be selected?
- (ii) Assuming perfect correlation, analyse whether it is preferable to invest 80% in security U and 20% in security W or to invest 100% in Y. (8 marks)(May 2004)

Answer

- (i) When we make risk-return analysis of different securities from U to Z, we can observe that security U gives a return of 10% at risk level of 5%. Simultaneously securities V and Z give the same return of 10% as of security U, but their risk levels are 6% and 7% respectively. Security X is giving only 5% return for the risk rate of 5%. Hence, security U dominates securities V, X and Z.

Securities W and Y offer more return but it carries higher level of risk.

Hence securities U, W and Y can be selected based on individual preferences.

- (ii) In a situation where the perfect positive correlation exists between two securities, their risk and return can be averaged with the proportion.

Assuming the perfect correlation exists between the securities U and W, average risk and return of U and W together for proportion 4 : 1 is calculated as follows:

$$\text{Risk} = (4 \times .05 + 1 \times .13) \div 5 = 6.6\%$$

$$\text{Return} = (4 \times .10 + 1 \times .15) \div 5 = 11\%$$

When we compare risk of 6.6% and return of 11% with security Y with 6% risk and 11% return, security Y is preferable over the portfolio of securities U and W in proportion of 4 : 1

Question 16

Given below is information of market rates of Returns and Data from two Companies A and B:

	Year 2002	Year 2003	Year 2004
Market (%)	12.0	11.0	9.0
Company A (%)	13.0	11.5	9.8
Company B (%)	11.0	10.5	9.5

Required:

- (i) Determine the beta coefficients of the Shares of Company A and Company B.
- (ii) Distinguish between 'Systematic risk' and 'Unsystematic risk'.

(8 marks)(November, 2004)

Answer

(i) Company A:

Year	Return % (Ra)	Market return % (Rm)	Deviation R(a)	Deviation Rm	D Ra × DRm	Rm ²
1	13.0	12.0	1.57	1.33	2.09	1.77
2	11.5	11.0	0.07	0.33	0.02	0.11
3	<u>9.8</u>	<u>9.0</u>	-1.63	-1.67	<u>2.72</u>	<u>2.79</u>
	<u>34.3</u>	<u>32.0</u>			<u>4.83</u>	<u>4.67</u>

Average Ra = 11.43

Average Rm = 10.67

$$\text{Covariance} = \frac{4.83}{2} = 2.42$$

$$\beta = \frac{2.42}{2.34} = 1.03$$

Company B:

Year	Return % (Ra)	Market return % (Rm)	Deviation R(a)	Deviation Rm	D Ra × D Rm	Rm ²
1	11.0	12.0	0.67	1.33	0.89	1.77
2	10.5	11.0	0.17	0.33	0.06	0.11
3	<u>9.5</u>	<u>9.0</u>	-0.83	-1.67	<u>1.39</u>	<u>2.79</u>
	<u>31.0</u>	<u>32.0</u>			<u>2.34</u>	<u>4.67</u>

Average Ra = 10.33

Average Rm = 10.67

$$\text{Covariance} = \frac{2.34}{2} = 1.17$$

$$\beta = \frac{1.17}{2.34} = 0.50$$

- (ii) Systematic risk refers to the variability of return on stocks or portfolio associated with changes in return on the market as a whole. It arises due to risk factors that affect the overall market such as changes in the nations' economy, tax reform by the Government or a change in the world energy situation. These are risks that affect securities overall and, consequently, cannot be diversified away. This is the risk which is common to an entire class of assets or liabilities. The value of investments may decline over a given time period simply because of economic changes or other events that impact large

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portions of the market. Asset allocation and diversification can protect against systematic risk because different portions of the market tend to under perform at different times. This is also called market risk.

Unsystematic risk however, refers to risk unique to a particular company or industry. It is avoidable through diversification. This is the risk of price change due to the unique circumstances of a specific security as opposed to the over all market. This risk can be virtually eliminated from a portfolio through diversification.

Question 17

- (i) Who can be appointed as Asset Management Company (AMC)?
- (ii) Write the conditions to be fulfilled by an AMC.
- (iii) What are the obligations of AMC? (4 Marks) (May, 2005)

Answer

- (i) **Asset Management Company (AMC):** A company formed and registered under Companies Act 1956 and which has obtained the approval of SEBI to function as an asset management company may be appointed by the sponsorer of the mutual fund as AMC.
- (ii) The following conditions should be fulfilled by an AMC
 - (1) Any director of the asset management company shall not hold the place of a director in another asset management company unless such person is independent director referred to in clause (d) of sub-regulation (1) of regulation 21 of the Regulations and the approval of the Board of asset management company of which such person is a director, has been obtained.
 - (2) The asset management company shall forthwith inform SEBI of any material change in the information or particulars previously furnished which have a bearing on the approval granted by SEBI.
 - (a) No appointment of a director of an asset management company shall be made without the prior approval of the trustees.
 - (b) The asset management company undertakes to comply with SEBI (Mutual Funds) Regulations, 1996.
 - (c) No change in controlling interest of the asset management company shall be made unless prior approval of the trustees and SEBI is obtained.
 - (i) a written communication about the proposed change is sent to each unit holder and an advertisement is given in one English Daily newspaper having nation wide circulation and in a newspaper published in the language of the region where the head office of the mutual fund is situated.
 - (ii) The unit holders are given an option to exit at the prevailing Net Asset Value without any exit load.

Portfolio Management

- (iii) The asset management company shall furnish such information and documents to the trustees as and when required by the trustees.
- (iii) Obligations of the AMC:
- (1) The AMC shall manage the affairs of the mutual funds and operate the schemes of such fund.
 - (2) The AMC shall take all reasonable steps and exercise due diligence to ensure that the investment of the mutual funds pertaining to any scheme is not contrary to the provisions of SEBI Regulations and the trust deed of the mutual fund.

Question 18

The Investment portfolio of a bank is as follows:

Government Bond	Coupon Rate	Purchase rate (F.V. Rs. 100 per Bond)	Duration (Years)
G.O.I. 2006	11.68	106.50	3.50
G.O.I. 2010	7.55	105.00	6.50
G.O.I. 2015	7.38	105.00	7.50
G.O.I. 2022	8.35	110.00	8.75
G.O.I. 2032	7.95	101.00	13.00

Face value of total Investment is Rs. 5 crores in each Government Bond.

Calculate actual Investment in portfolio.

What is a suitable action to churn out investment portfolio in the following scenario?

1. *Interest rates are expected to lower by 25 basis points.*
2. *Interest rates are expected to raise by 75 basis points.*

Also calculate the revised duration of investment portfolio in each scenario.

(8 Marks) (November, 2005)

Answer

Calculation of Actual investment of Portfolio

Security	Purchase price	Investment (Rs. in lakhs)
GOI 2006	106.50	532.50*
GOI 2010	105.00	525.00
GOI 2015	105.00	525.00
GOI 2022	110.00	550.00
GOI 2032	101.00	505.00
Total		<u>2,637.50</u>

Management Accounting and Financial Analysis

$$* \frac{\text{Rs. 5 crores}}{\text{Rs. 100} \times 1,00,000} \times \text{Rs. 106.50}$$

$$\begin{aligned}\text{Average Duration} &= \frac{3.5 + 6.5 + 7.5 + 8.75 + 13.00}{5} \\ &= \frac{39.25}{5} = 7.85\end{aligned}$$

Suitable action to churn out investment portfolio in following scenario.

To reduce risk and to maximize profit or minimize losses.

- (1) Interest rates are expected to be lower by 25 basis points in such case increase the average duration by purchasing GOI 2032 and Disposing of GOI 2006.

$$\begin{aligned}\text{Revised average duration shall be} &= \frac{39.25 - 3.5 + 13}{5} \\ &= \frac{48.75}{5} = 9.75 \text{ years}\end{aligned}$$

- (2) Interest rates are expected to rise by 75 basis points in such case reduce the average duration by (*) Purchasing GOI 2010 and disposing of GOI 2032.

$$\begin{aligned}\text{Revised average duration shall be} &= \frac{39.25 - 13 + 6.5}{5} \\ &= \frac{32.75}{5} = 6.55 \text{ years}\end{aligned}$$

(*) Purchasing of GOI 2006 is not beneficial as maturity period is very short and 75 basis points is comparatively higher change.

Question 19

Your client is holding the following securities:

Particulars of Securities	Cost Rs.	Dividends/Interest Rs.	Market price Rs.	Beta
<i>Equity Shares:</i>				
Gold Ltd.	10,000	1,725	9,800	0.6
Silver Ltd.	15,000	1,000	16,200	0.8
Bronze Ltd.	14,000	700	20,000	0.6
GOI Bonds	36,000	3,600	34,500	1.0

Average return of the portfolio is 15.7%, calculate:

- (i) Expected rate of return in each, using the Capital Asset Pricing Model (CAPM).
(ii) Risk free rate of return. (8 Marks) (November, 2005)

Portfolio Management

Answer

<i>Particulars of Securities</i>	<i>Cost Rs.</i>	<i>Dividend</i>	<i>Capital gain</i>
Gold Ltd.	10,000	1,725	–200
Silver Ltd.	15,000	1,000	1,200
Bronz Ltd.	14,000	700	6,000
GOI Bonds	36,000	3,600	–1,500
Total	75,000	7,025	5,500

Expected rate of return on market portfolio

$$\frac{\text{Dividend Earned} + \text{Capital appreciation} * 100}{\text{Initial investment}}$$

$$= \frac{\text{Rs. 7,025} + \text{Rs. 5,500} * 100}{75,000}$$

$$= 16.7\%$$

Risk free return

$$\text{Average of Betas} = \frac{0.6 + 0.8 + 0.6 + 1.0}{4}$$

$$\text{Average of Betas} = 0.75$$

$$\text{Average return} = \text{Risk free return} + \text{Average Betas} (\text{Expected return} - \text{Risk free return})$$

$$15.7 = \text{Risk free return} + 0.75 (16.7 - \text{Risk free return})$$

$$\text{Risk free return} = 12.7\%$$

Expected Rate of Return for each security is

$$\text{Rate of Return} = R_f + B (R_m - R_f)$$

$$\text{Gold Ltd.} = 12.7 + .6 (16.7 - 12.7) = 15.10\%$$

$$\text{Silver Ltd.} = 12.7 + .8 (16.7 - 12.7) = 15.90\%$$

$$\text{Bronz Ltd.} = 12.7 + .6 (16.7 - 12.7) = 15.10\%$$

$$\text{GOI Bonds} = 12.7 + 1.0 (16.7 - 12.7) = 16.70\%$$

Management Accounting and Financial Analysis

Question 20

The distribution of return of security 'F' and the market portfolio 'P' is given below:

Probability	Return %	
	F	P
0.30	30	-10
0.40	20	20
0.30	0	30

You are required to calculate the expected return of security 'F' and the market portfolio 'P', the covariance between the market portfolio and security and beta for the security.

(8 Marks) (May, 2006)

Answer

Security F

Prob(P)	R _f	PxR _f	Deviations of F (R _f - ER _f)	(Deviation) ² of F	(Deviations) ² × p
0.3	30	9	13	169	50.7
0.4	20	8	3	9	3.6
0.3	0	0	-17	289	86.7
		ER _f =17			<u>Var_f=141</u>

$$\text{STDEV } \sigma_f = \sqrt{141} = 11.87$$

Market Portfolio, P

R _M %	P _M	Exp. Ret urn R _M × P _M	Deviation of P (R _M - ER _M)	(Deviation of P) ²	(Deviation) ² P _M	Deviation of F) × (Dev iatio n of P)	Deviation of F × Dev iatio n of P) × P
-10	0.3	-3	-24	576	172.8	-312	-93.6
20	0.4	8	6	36	14.4	18	7.2
30	0.3	9	16	256	76.8	-272	-81.6
		ER _M =14			Var _M =264 σ _M =16.25		=Co Var P _M =- 168

$$\text{Beta} = \frac{\text{Co Var } P_M}{\sigma_M^2} = \frac{-168}{264} = -.636$$

Question 21

Briefly explain the objectives of "Portfolio Management".

(6 Marks) (May, 2006)

Answer

Objectives of Portfolio Management:

Portfolio management is concerned with efficient management of portfolio investment in financial assets, including shares and debentures of companies. The management may be by professionals or others or by individuals themselves. A portfolio of an individual or a corporate unit is the holding of securities and investment in financial assets. These holdings are the result of individual preferences and decisions regarding risk and return.

The investors would like to have the following objectives of portfolio management:

- (a) Capital appreciation.
- (b) Safety or security of an investment.
- (c) Income by way of dividends and interest.
- (d) Marketability.
- (e) Liquidity.
- (f) Tax Planning - Capital Gains Tax, Income tax and Wealth Tax.
- (g) Risk avoidance or minimization of risk.
- (h) Diversification, i.e. combining securities in a way which will reduce risk.

It is necessary that all investment proposals should be assessed in terms of income, capital appreciation, liquidity, safety, tax implication, maturity and marketability i.e., saleability (i.e., saleability of securities in the market). The investment strategy should be based on the above objectives after a thorough study of goals of the investor, market situation, credit policy and economic environment affecting the financial market.

The portfolio management is a complex task. Investment matrix is one of the many approaches which may be used in this connection. The various considerations involved in investment decisions are liquidity, safety and yield of the investment. Image of the organization is also to be taken into account. These considerations may be taken into account and an overall view obtained through a matrix approach by allotting marks for each consideration and totaling them.

Management Accounting and Financial Analysis

Question 22

Write short notes on:

Assumptions of CAPM.

(6 Marks) (May, 2006)

Answer

Assumptions of Capital Assets Pricing Model (CAPM)

The Capital Assets Pricing Model is based on the following eight assumptions.

- (a) The Investor's objective is to maximize the utility of terminal wealth.
- (b) Investor's make choices on the basis of risk and return.
- (c) Investors have homogenous expectations of Risk and Return.
- (d) Investors have identical time horizon.
- (e) Information is freely and simultaneously available to investors.
- (f) There is a risk-free asset and investors can borrow and lend unlimited amount at the risk-free rate.
- (g) There are no taxes, transaction costs, restrictions on short term rates or other market imperfections.
- (h) Total asset quantity is fixed and all assets are marketable and divisible.

Question 23

X Co., Ltd., invested on 1.4.2005 in certain equity shares as below:

Name of Co.	No. of shares	Cost (Rs.)
M Ltd.	1,000 (Rs.100 each)	2,00,000
N Ltd.	500 (Rs.10 each)	1,50,000

In September, 2005, 10% dividend was paid out by M Ltd. and in October, 2005, 30% dividend paid out by N Ltd. On 31.3.2006 market quotations showed a value of Rs.220 and Rs.290 per share for M Ltd. and N Ltd. respectively.

On 1.4.2006, investment advisors indicate (a) that the dividends from M Ltd. and N Ltd. for the year ending 31.3.2007 are likely to be 20% and 35%, respectively and (b) that the probabilities of market quotations on 31.3.2007 are as below:

Probability factor	Price/share of M Ltd.	Price/share of N Ltd.
0.2	220	290
0.5	250	310
0.3	280	330

Portfolio Management

You are required to:

- (i) Calculate the average return from the portfolio for the year ended 31.3.2006;
 - (ii) Calculate the expected average return from the portfolio for the year 2006-07; and
 - (iii) Advise X Co. Ltd., of the comparative risk in the two investments by calculating the standard deviation in each case.
- (8 Marks) (November, 2006)

Answer

Calculation of return on portfolio for 2005-06	(Calculation Rs./share	in	
	M	N	
Dividend received during the year	10	3	
Capital gain/loss by 31.03.06			
Market value by 31.03.06	220	290	
Cost of investment	200	300	
Gain/loss	20	(-)10	
Yield	30	(-)7	
Cost	200	300	
% return	15%	(-)2.33%	
Weight in the portfolio	57	43	
Weighted average return			7.55%
Calculation of estimated return for 2006-07			
Expected dividend	20	3.5	
Capital gain by 31.03.07			
$(220 \times 0.2) + (250 \times 0.5) + (280 \times 0.3) - 220 = (253 - 220)$	33		
$(290 \times 0.2) + (310 \times 0.5) + (330 \times 0.3) - 290 = (312 - 290)$		22	
Yield	53	25.5	
*Market Value 01.04.06	220	290	
% return	24.09%	8.79%	
*Weight in portfolio $(1,000 \times 220) : (500 \times 290)$	60.3	39.7	
Weighted average (Expected) return			18.02%
(*The market value on 31.03.06 is used as the base for calculating yield for 06-07)			

Management Accounting and Financial Analysis

Calculation of Standard deviation.

M Ltd.

Expected market value	Expected gain	Expected dividend	Expected yield	Deviations	Square of deviations	Probability factor	Sq. of d x prob.
220	0	20	20	-33	1089	0.2	217.80
250	30	20	50	-3	9	0.5	4.50
280	60	20	80	27	729	0.3	218.70
							441.00
Standard deviation						21	

N Ltd.

Expected market value	Expected gain	Expected dividend	Expected yield	Deviations	Square of deviations	Probability factor	Sq. of d x prob.
290	0	3.5	3.5	-22	484	0.2	96.80
310	20	3.5	23.5	-2	4	0.5	2.00
330	40	3.5	43.5	18	324	0.3	97.20
							196.00
Standard deviation						14	

Share of company M Ltd. is more risky as the S.D. is more than company N Ltd.

Question 24

Discuss the various kinds of Systematic and Unsystematic risk? (6 Marks) (November, 2006)

Answer

There are two types of Risk - Systematic (or non-diversifiable) and unsystematic (or diversifiable) relevant for investment - also, called as general and specific risk.

Types of Systematic Risk

- (i) *Market risk:* Even if the earning power of the Corporate sector and the interest rate structure remain more or less unchanged prices of securities, equity shares in particular, tend to fluctuate. Major cause appears to be the changing psychology of the investors. The irrationality in the security markets may cause losses unrelated to the basic risks. These losses are the result of changes in the general tenor of the market and are called market risks.

- (ii) *Interest Rate Risk*: The change in the interest rate have a bearing on the welfare of the investors. As the interest rate goes up, the market price of existing fixed income securities falls and vice versa. This happens because the buyer of a fixed income security would not buy it at its par value or face value if its fixed interest rate is lower than the prevailing interest rate on a similar security.
- (iii) *Social or Regulatory Risk*: The social or regulatory risk arises, where an otherwise profitable investment is impaired as a result of adverse legislation, harsh regulatory climate, or in extreme instance nationalization by a socialistic government.
- (iv) *Purchasing Power Risk*: Inflation or rise in prices lead to rise in costs of production, lower margins, wage rises and profit squeezing etc. The return expected by investors will change due to change in real value of returns.

Classification of Unsystematic Risk

- (i) *Business Risk*: As a holder of corporate securities (equity shares or debentures) one is exposed to the risk of poor business performance. This may be caused by a variety of factors like heightened competition, emergence of new technologies, development of substitute products, shifts in consumer preferences, inadequate supply of essential inputs, changes in governmental policies and so on. Often of course the principal factor may be inept and incompetent management.
- (ii) *Financial Risk*: This relates to the method of financing, adopted by the company, high leverage leading to larger debt servicing problem or short term liquidity problems due to bad debts, delayed receivables and fall in current assets or rise in current liabilities.
- (iii) *Default Risk*: Default risk refers to the risk accruing from the fact that a borrower may not pay interest and/or principal on time. Except in the case of highly risky debt instrument, investors seem to be more concerned with the perceived risk of default rather than the actual occurrence of default. Even though the actual default may be highly unlikely, they believe that a change in the perceived default risk of a bond would have an immediate impact on its market price.

Question 25

Expected returns on two stocks for particular market returns are given in the following table:

Market Return	Aggressive	Defensive
7%	4%	9%
25%	40%	18%

You are required to calculate:

- (a) The Betas of the two stocks.
- (b) Expected return of each stock, if the market return is equally likely to be 7% or 25%.
- (c) The Security Market Line (SML), if the risk free rate is 7.5% and market return is equally likely to be 7% or 25%.
- (d) The Alphas of the two stocks.

(8 marks) (May, 2007)

Management Accounting and Financial Analysis

Answer

(a) The Betas of two stocks:

$$\text{Aggressive stock} - 40\% - 4\%/25\% - 7\% = 2$$

$$\text{Defensive stock} - 18\% - 9\%/25\% - 7\% = 0.50$$

(b) Expected returns of the two stocks:-

$$\text{Aggressive stock} - 0.5 \times 4\% + 0.5 \times 40\% = 22\%$$

$$\text{Defensive stock} - 0.5 \times 9\% + 0.5 \times 18\% = 13.5\%$$

(c) Expected return of market portfolio = $0.5 \times 7\% + 0.5 \times 25\% = 16\%$

$$\therefore \text{Market risk prem.} = 16\% - 7.5\% = 8.5\%$$

$$\therefore \text{SML is, required return} = 7.5\% + \beta_i 8.5\%$$

(d) Alpha for stock A = $0.22 - (0.075 + 2 \times 0.085) = -2.5\%$

$$\text{Alpha for stock B} = 0.135 - (0.075 + 0.5 \times 0.085) = 1.75\%$$

Question 26

The historical rates of return of two securities over the past ten years are given. Calculate the Covariance and the Correlation coefficient of the two securities:

Years:	1	2	3	4	5	6	7	8	9	10
Security 1: (Return per cent)	12	8	7	14	16	15	18	20	16	22
Security 2: (Return per cent)	20	22	24	18	15	20	24	25	22	20

(10 marks) (May, 2007)

Answer

Calculation of Covariance

Year	R_1	Deviation ($R_1 - \bar{R}_1$)	R_2 ($R_2 - \bar{R}_2$)	Deviation	Product of deviations
1	12	-2.8	20	-1	2.8
2	8	-6.8	22	1	-6.8
3	7	-7.8	24	3	-23.4
4	14	-0.8	18	-3	2.4
5	16	1.2	15	-6	-7.2
6	15	0.2	20	-1	-0.2
7	18	3.2	24	3	9.6
8	20	5.2	25	4	20.8

Portfolio Management

9	16	1.2	22	1	1.2
10	22	7.2	20	-1	-7.2
$R_1 = \frac{148}{10} = 14.8$		$R_2 = \frac{210}{10} = 21$		-8.00	

$$\text{Covariance} = \frac{\sum_{i=1}^N [R_1 - \bar{R}_1][R_2 - \bar{R}_2]}{N}$$

$$= -8/10 = -0.8$$

For calculation of correlation, the standard deviation of the two securities are also required.

Calculation of Standard Deviation

Year	R ₁	R ₁ ²	R ₂	R ₂ ²
1	12	144	20	400
2	8	64	22	484
3	7	49	24	576
4	14	196	18	324
5	16	256	15	225
6	15	225	20	400
7	18	324	24	576
8	20	400	25	625
9	16	256	22	484
10	22	484	20	400
148		2398	210	4494

Standard deviation of security 1:

$$\sigma_1 = \sqrt{\frac{N \sum R_1^2 - (\sum R_1)^2}{N^2}}$$

$$= \sqrt{\frac{(10 \times 2398) - (148)^2}{10 \times 10}} = \sqrt{\frac{23980 - 21904}{100}}$$

$$= \sqrt{20.76} = 4.56$$

Management Accounting and Financial Analysis

Standard deviation of security 2:

$$\begin{aligned}\sigma_2 &= \sqrt{\frac{N \sum R_2^2 - (\sum R_2)^2}{N^2}} \\ &= \sqrt{\frac{(10 \times 4494) - (210)^2}{10 \times 10}} = \sqrt{\frac{44940 - 44100}{100}} \\ &= \sqrt{\frac{840}{100}} = \sqrt{8.4} = 2.90\end{aligned}$$

Correlation Coefficient

$$\begin{aligned}r_{12} &= \frac{\text{Cov}}{\sigma_1 \sigma_2} \\ &= \frac{-0.8}{4.56 \times 2.90} = \frac{-0.8}{13.22} \\ &= -0.0605\end{aligned}$$

Question 27

XYZ Ltd. has substantial cash flow and until the surplus funds are utilised to meet the future capital expenditure, likely to happen after several months, are invested in a portfolio of short-term equity investments, details for which are given below:

Investment	No. of shares	Beta	Market price per share Rs.	Expected dividend yield
I	60,000	1.16	4.29	19.50%
II	80,000	2.28	2.92	24.00%
III	1,00,000	0.90	2.17	17.50%
IV	1,25,000	1.50	3.14	26.00%

The current market return is 19% and the risk free rate is 11%.

Required to:

- Calculate the risk of XYZ's short-term investment portfolio relative to that of the market;
- Whether XYZ should change the composition of its portfolio. (8 Marks)(Nov2007)

Answer

(i) Computation of Beta of Portfolio

Investment	No. of shares	Market Price	Market Value	Dividend Yield	Dividend	Composition	β	Weighted β
I.	60,000	4.29	2,57,400	19.50%	50,193	0.2339	1.16	0.27
II.	80,000	2.92	2,33,600	24.00%	56,064	0.2123	2.28	0.48
III.	1,00,000	2.17	2,17,000	17.50%	37,975	0.1972	0.90	0.18
IV.	1,25,000	3.14	3,92,500	26.00%	1,02,050	0.3566	1.50	0.53
			<u>11,00,500</u>		<u>2,46,282</u>	<u>1.0000</u>		<u>1.46</u>

$$\text{Return of the Port Folio} = \frac{2,46,282}{11,00,500} = 0.2238$$

$$\text{Beta of Port Folio} = 1.46$$

Market Risk implicit

$$0.2238 = 0.11 + \beta \times (0.19 - 0.11)$$

$$\text{Or, } 0.08 \beta + 0.11 = 0.2238$$

$$\beta = \frac{0.2238 - 0.11}{0.08} = 1.42$$

Market β implicit is 1.42 while the port folio β is 1.46. Thus the portfolio is marginally risky compared to the market.

- (ii) The decision regarding change of composition may be taken by comparing the dividend yield (given) and the expected return as per CAPM as follows:

Expected return R_s as per CAPM is:

$$R_s = I_{RF} + (R_M - I_{RF}) \beta$$

$$\text{For investment I, } R_s = I_{RF} + (R_M - I_{RF}) \beta$$

$$= .11 + (.19 - .11) 1.16$$

$$= 20.28\%$$

$$\text{For investment II, } R_s = .11 + (.19 - .11) 2.28 = 29.24\%$$

$$\text{For investment III, } R_s = .11 + (.19 - .11) .90$$

$$= 18.20\%$$

$$\text{For investment IV, } R_s = .11 + (.19 - .11) 1.50$$

$$= 23\%$$

Management Accounting and Financial Analysis

Comparison of dividend yield with the expected return R_s shows that the dividend yields of investment I, II and III are less than the corresponding R_s . So, these investment are over-priced and should be sold by the investor. However, in case of investment IV, the dividend yield is more than the corresponding R_s , so, XYZ Ltd. should increase its proportion..

Question 28

P Ltd. invested on 1.4.2006 in Equity shares as below:

Company	Number of Shares	Cost (Rs.)
M Ltd.	1,000 (Rs. 100 each)	2,00,000
N Ltd.	500 (Rs. 10 each)	1,50,000

In September, 2006, M Ltd. paid 10% dividend and in October, 2006, N Ltd. paid 30% dividend.

On 31.3.2007, market price of shares of M Ltd. and N Ltd. were Rs. 220 and Rs. 290 respectively.

P Ltd. have been informed by their investment advisers that:

- (i) *Dividends from M Ltd. and N Ltd. for the year ending 31.3.2008 are likely to be 20% and 35% respectively.*
- (ii) *Probabilities of market quotations on 31.3.2008 are:*

Probability Factor	Price of share of M Ltd.	Price of share of N Ltd.
0.2	220	290
0.5	250	310
0.3	280	330

You are required to:

- (i) *Calculate the average return from the portfolio for the year ended 31.3.2007.*
- (ii) *Calculate the expected average return from the portfolio for the year 2007 – 08.*
- (iii) *Advise P Ltd. of the comparative risk of two investments by calculating the Standard deviation in each case.*
(8 Marks)(May, 2008)

Answer

- (i) Calculation of average return from portfolio for the year ended 31.03.2007

	Rs./Share	
	M Ltd.	N Ltd.
Dividend received during the year	10	3
Capital Gain/Loss to 31.03.2007		
Market Value	220	290
Cost of Investment	200	300

Portfolio Management

Gain (Loss)	20	(10)
Yield	30	(7)
Cost	200	300
% Return	15	(2.33)
Weight in the portfolio	57	43
Weighted average return $(0.57 \times 0.15) + (0.43 \times -0.0233)$	7.55%	
= 0.0755		
Expected average Return for 2007- 08		
Expected Dividend	20	3.5
Capital Gain (Loss) to 31.03.2008		
$(220 \times 0.2) + (250 \times 0.5) + (280 \times 0.3)$ [253-220]	33	
$(290 \times 0.2) + (310 \times 0.5) + (330 \times 0.3)$ [312 – 290]		22
Yield	53	25.5
Market Value	220	290
% Return	24.09	8.79
Weighted Average (expected) Return $(0.57 \times 0.2409) + (0.43 \times 0.0879) =$	17.51%	

(iii) Calculation of Standard Deviation

	Expected Market Value	Expected Gain	Expected Dividend	Expected Yield	Devia- Tions (D)	Square of D	Probab factor (p)	D2 x p
M Ltd.	220	-	20	20	-33	1089	0.2	217.80
	250	30	20	50	-3	9	0.5	4.50
	280	60	20	80	27	729	0.3	218.70
				SD 21				441.00
N Ltd	290	-	3.5	3.5	-22	484	0.2	96.80
	310	20	3.5	23.5	-2	4	0.5	2.00
	330	40	3.5	43.5	18	324	0.3	97.20
				SD 14				196.00

Share of M Ltd. is more risky as the SD is more than that of N Ltd.

Question 29

A company has a choice of investments between several different equity oriented mutual funds. The company has an amount of Rs.1 crore to invest. The details of the mutual funds are as follows:

Mutual Fund	Beta
A	1.6
B	1.0

Management Accounting and Financial Analysis

C	0.9
D	2.0
E	0.6

Required:

- (i) If the company invests 20% of its investment in the first two mutual funds and an equal amount in the mutual funds C, D and E, what is the beta of the portfolio?
- (ii) If the company invests 15% of its investment in C, 15% in A, 10% in E and the balance in equal amount in the other two mutual funds, what is the beta of the portfolio?
- (iii) If the expected return of market portfolio is 12% at a beta factor of 1.0, what will be the portfolios expected return in both the situations given above? (10 Marks)(May 2008)

Answer

With 20% investment in each MF Portfolio Beta is the weighted average of the Betas of various securities calculated as below:

(i) Investment	BETA	Investment (Rs. Lacs)	Weighted Investment
A	1.6	20	32
B	1	20	20
C	0.9	20	18
D	2	20	40
E	0.6	20	12
		100	122

Weighted BETA = 1.22

Expected Return = $1.22 \times 12 = 14.64\%$

- (ii) With varied percentages of investments portfolio beta is calculated as follows:

	BETA	Investment (Rs. Lacs)	Weighted Investment
A	1.6	15	24
B	1	30	30
C	0.9	15	13.5
D	2	30	60
E	0.6	10	6
		100	133.5

Portfolio Management

Weighted BETA = 1.335

Expected Return – $1.335 \times 12 = 16.02\%$

- (iii) Expected return of the portfolio with pattern of investment as in case (i)
 $= 12\% \times 1.22$ i.e. 14.64%

Expected Return with pattern of investment as in case (ii) = $12\% \times 1.335$ i.e., 16.02%.

Question 30

A holds the following portfolio:

Share/Bond	Beta	Initial Price Rs`	Dividends Rs.	Market Price at end of year Rs.
Epsilon Ltd.	0.8	25	2	50
Sigma Ltd.	0.7	35	2	60
Omega Ltd.	0.5	45	2	135
GOI Bonds	0.99	1,000	140	1,005

Calculate:

- (i) The expected rate of return on his portfolio using Capital Asset Pricing Method (CAPM)
(ii) The average return of his portfolio.

Risk-free return is 14%.

(10 Marks) (May, 2008)

Answer

- (i) Expected rate of return

	Total Investments	Dividends	Capital Gains
Epsilon Ltd.	25	2	25
Sigma Ltd.	35	2	25
Omega Ltd.	45	2	90
GOI Bonds	<u>1,000</u>	<u>140</u>	<u>5</u>
	1,105	146	145
	=====	=====	=====

$$\text{Expected Return on market portfolio} = \frac{146 + 145}{1105} = 26.33\%$$

$$\text{CAPM } E(R_p) = R_F + B [E(R_M) - R_F]$$

					%age
Epsilon Ltd	$14 + 0.8$	$[26.33 - 14]$	$=$	$14 + 9.86$	$= 23.86$
Sigma Ltd.	$14 + 0.7$	$[26.33 - 14]$	$=$	$14 + 8.63$	$= 22.63$

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Omega Ltd.	14+0.5	[26.33-14]	=	14+6.17	=	20.17
GOI Bonds	14+0.99	[26.33-14]	=	14+12.21	=	26.21

(ii) Average Return of Portfolio

$$\frac{23.86 + 22.63 + 20.17 + 26.21}{4} = \frac{92.87}{4} = 23.22\%$$

OR

$$\frac{0.8 + 0.7 + 0.5 + 0.99}{4} = \frac{2.99}{4} = 0.7475$$

$$14 + 0.7475(26.33 - 14)$$

$$14 + 9.22 = 23.22\%$$

Question 31

Mr. A is interested to invest Rs.1,00,000 in the securities market. He selected two securities B and D for this purpose. The risk return profile of these securities are as follows :

Security	Risk (σ)	Expected Return (ER)
B	10%	12%
D	18%	20%

Co-efficient of correlation between B and D is 0.15.

You are required to calculate the portfolio return of the following portfolios of B and D to be considered by A for his investment.

- 100 percent investment in B only;
- 50 percent of the fund in B and the rest 25 percent in D;
- 75 percent of the fund in B and the rest 25 percent in D; and
- 100 percent investment in D only.

Also indicate that which portfolio is best for him from risk as well as return point of view?

(8 marks) (Nov, 2008)

Answer

We have $E_p = W_1E_1 + W_2E_2 + \dots + W_nE_n$

$$\text{and for standard deviation } \sigma_p = \left[\sum_{i=1}^n \sum_{j=1}^n \times i \times j \rho_{ij} \sigma_i \sigma_j \right]^{1/2}$$

Substituting the respective values we get,

(a) All funds invested in B

$$E_p = 12\%$$

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$$\bar{\sigma}_p = 10\%$$

- (b) 50% of funds in each of B & D

$$E_p = 16\%$$

$$\bar{\sigma}_p = 10.9\%$$

- (c) 75% in B and 25% in D

$$E_p = 14\%$$

$$\bar{\sigma}_p = 9.4\%$$

- (d) 25% in B and 75% in D

$$E_p = 18\%$$

$$\bar{\sigma}_p = 14.15\%$$

- (e) All funds in D

$$E_p = 20\%$$

$$\bar{\sigma}_p = 18.0\%$$

In the terms of return, we see that portfolio (e) is the best portfolio. In terms of risk we see that portfolio © is the best portfolio.

Question 32

Discuss the Capital Asset Pricing Model (CAPM) and its relevant assumptions.

(4 marks) (Nov 2008)

Answer

CAPITAL ASSET PRICING MODEL: The mechanical complexity of the Markowitz's portfolio model kept both practitioners and academics away from adopting the concept for practical use. Its intuitive logic, however, spurred the creativity of a number of researchers who began examining the stock market implications that would arise if all investors used this model. As a result what is referred to as the Capital Asset Pricing Model (CAPM), was developed.

The Capital Asset Pricing Model was developed by Sharpe, Mossin and Linter in 1960. The model explains the relationship between the expected return, non diversifiable risk and the valuation of securities. It considers the required rate of return of a security on the basis of its contribution to the total risk. It is based on the premises that the diversifiable risk of a security is eliminated when more and more securities are added to the portfolio. However, the systematic risk cannot be diversified and is related with that of the market portfolio. All securities do not have same level of systematic risk. The systematic risk can be measured by beta, β under CAPM, the expected return from a security can be expressed as:

$$\text{Expected return on security} = R_f + \beta (R_m - R_f)$$

The model shows that the expected return of a security consists of the risk-free rate of interest and the risk premium. The CAPM, when plotted on the graph paper is known as the Security Market

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Line (SML). A major implication of CAPM is that not only every security but all portfolio too must plot on SML. This implies that in an efficient market, all securities are expected returns commensurate with their riskiness, measured by β .

RELEVANT ASSUMPTIONS OF CAPM:

- (i) The investor's objective is to maximize the utility of terminal wealth;
- (ii) Investors make choices on the basis of risk and return;
- (iii) Investors have identical time horizon;
- (iv) Investors have homogeneous expectations of risk and return;
- (v) Information is freely and simultaneously available to investors;
- (vi) There is risk-free asset, and investor can borrow and lend unlimited amounts at the risk-free rate;
- (vii) There are no taxes, transaction costs, restrictions on short rates or other market imperfections;
- (viii) Total asset quantity is fixed, and all assets are marketable and divisible.

CAPM can be used to estimate the expected return of any portfolio with the following formula:

$$E(R_p) = R_f + B_p [E(R_m) - R_f]$$

$E(R_p)$ = Expected return of the portfolio

R_f = Risk free rate of return

B_p = Portfolio beta i.e. market sensitivity index.

$E(R_m)$ = Expected return on market portfolio

$E(R_m) - R_f$ = Market risk premium

CAPM provides a conceptual frame work for evaluating any investment decision where capital is committed with a goal of producing future returns.

Question 1

Briefly explain the meaning and importance of 'Credit-rating'. (4 marks) (May 2002)

Answer

Credit rating essentially reflects the probability of timely repayment of principal and interest by a borrower company. It indicates the risk involved in a debt instrument as well its qualities. Higher the credit rating, greater is the probability that the borrower will make timely payment of principal and interest and vice-versa.

It has assumed an important place in the modern and developed financial markets. It is a boon to the companies as well as investors. It facilitates the company in raising funds in the capital market and helps the investor to select their risk-return trade-off. By indicating credit-worthiness of a borrower, it helps the investor in arriving at a correct and rational decision about making investments.

Credit rating system plays a vital role in investor protection. Fair and good credit ratings motivate the public to invest their savings.

As a fee-based financial advisory service, credit rating is obviously extremely useful to the investors, the corporates (borrowers) and banks and financial institutions. To the investors, it is an indicator expressing the underlying credit quality of a (debt) issue programme. The investor is fully informed about the company as any effect of changes in business/economic conditions on the company is evaluated and published regularly by the rating agencies. The Corporate borrowers can raise funds at a cheaper rate with good rating. It minimizes the role of the 'name recognition' and less known companies can also approach the market on the basis of their rating. The fund ratings are useful to the banks and other financial institutions while deciding lending and investment strategies.

Question 2

Write short note on Credit rating in India. (4 marks)(November, 2003)

Answer

Credit Rating in India: It is a fee-based financial advisory service provided by accredited credit rating agencies to lend a reasonable reliability to the financial position of prospective corporate bodies intending to raise debt funds from public. Though not a final guarantee for a debt programme but it only serves as an indicator to the investors for deciding upon the choice

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of subscription. Presently some of the credit rating agencies working in India are namely CRISIL, CARE, ICRA, DCR and ONICRA. All credit rating agencies have their own methodology of rating the instruments in the market but they all, however, confine on basic criteria like business risk, financial risk and some business specific risk related to that project. On the basis of their rating they provide different grades but these gradings should not be treated as perfect substitute of investors' own assessments. In our country the capital market regulator, SEBI, has provided different guidelines for these credit rating agencies. Most of the debt instruments are mandatorily to be rated by the credit rating agencies. Some of the instruments rated by these agencies are commercial papers, debentures, public deposits, bonds etc. Different symbols are used for short-term and long-term instruments. In fact, the credit rating is not the assessment of credit worthiness of individuals but of the risk associated with entering into a transaction with an individual/corporate entity at a point of time.

10

CONSUMER FINANCE

Note : No questions were asked on this topic.

NOTE

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MUTUAL FUNDS : OPERATIONS AND REGULATIONS

Question 1

Write short note on methods of Venture Capital Financing.

(5 marks) (May 1999)

Answer

Methods of Venture Capital Financing: The venture capital financing refers to financing and funding of the small scale enterprises, high technology and risky ventures. Some common methods of venture capital financing are as follows:

- (i) *Equity financing:* The venture capital undertakings generally requires funds for a longer period but may not be able to provide returns to the investors during the initial stages. Therefore, the venture capital finance is generally provided by way of equity share capital. The equity contribution of venture capital firm does not exceed 49% of the total equity capital of venture capital undertakings so that the effective control and ownership remains with the entrepreneur.
- (ii) *Conditional Loan:* A conditional loan is repayable in the form of a royalty after the venture is able to generate sales. No interest is paid on such loans. In India Venture Capital Financers charge royalty ranging between 2 to 15 per cent; actual rate depends on other factors of the venture such as gestation period, cash flow patterns, riskiness and other factors of the enterprise. Some Venture Capital Financers give a choice to the enterprise of paying a high rate of interest (which could be well above 20 per cent) instead of royalty on sales once it becomes commercially sound.
- (iii) *Income Note:* It is a hybrid security which combines the features of both conventional loan and conditional loan. The entrepreneur has to pay both interest and royalty on sales but at substantially low rates. IDBI's Venture Capital Fund provides funding equal to 80-87.5% of the projects cost for commercial application of indigenous technology or adopting imported technology to domestic applications.
- (iv) *Participating Debenture:* Such security carries charges in three phases – in the start up phase, no interest is charged, next stage a low rate of interest is charged upto a particular level of operations, after that, a high rate of interest is required to be paid.

Question 2

Write short notes on the role of Mutual Funds in the Financial Market.

(6 marks)(May 2003)

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Answer

Role of Mutual Funds in the Financial Market:

Mutual funds have opened new vistas to investors and imparted much needed liquidity to the system. In this process, they have challenged the hitherto dominant role of the commercial banks in the financial market and national economy.

In 1997, the share of mutual funds in house-hold financial assets was over 5% in USA, 8% in Germany, 3% in Japan, 3% in Italy and about 5% in India. In India, there has been a steady increase in the share of mutual funds in house-hold savings since 1988-89, i.e. after the entry of public sector mutual funds. The most significant growth during 1980-81 to 1992-93 was in respect of UTI.

According to Centre for Monitoring Indian Economy, "Mutual Funds" cornered 12% of the total market capitalisation, the share of the UTI being 9.4% of the total market capitalisation of Indian stock markets.

Question 3

A mutual fund that had a net asset value of Rs. 20 at the beginning of month - made income and capital gain distribution of Re. 0.0375 and Re. 0.03 per share respectively during the month, and then ended the month with a net asset value of Rs. 20.06. Calculate monthly return
(4 marks) (May 2003)

Answer

Calculation of monthly return on the mutual funds:

$$r = \left[\frac{(\text{NAV}_t - \text{NAV}_{t-1}) + I_t + G_t}{\text{NAV}_{t-1}} \right]$$

Where,

r = Return on the mutual fund

NAV_t = Net assets value at time period t

NAV_{t-1} = Net assets value at time period $t - 1$

I_t = Income at time period t

G_t = Capital gain distribution at time period t

$$\begin{aligned} r &= \left[\frac{(\text{Rs. } 20.06 - \text{Rs. } 20.00) + (\text{Re. } 0.0375 + \text{Re. } 0.03)}{20} \right] \\ &= \frac{0.06 + 0.0675}{20} \end{aligned}$$

Mutual Funds : Operations and Regulations

$$= \frac{0.1275}{20} = 0.006375$$

or $r = 0.6375\%$ p.m.

or say $= 7.65\%$ p.a.

Question 4

- (a) *Explain, how to establish a Mutual Fund.*
- (b) *Mr. A can earn a return of 16 per cent by investing in equity shares on his own. Now he is considering a recently announced equity based mutual fund scheme in which initial expenses are 5.5 per cent and annual recurring expenses are 1.5 per cent. How much should the mutual fund earn to provide Mr. A a return of 16 per cent?*

(6 + 4 = 10 marks)(November, 2003)

Answer

- (a) **Establishment of a Mutual Fund:** A mutual fund is required to be registered with the Securities and Exchange Board of India (SEBI) before it can collect funds from the public. All mutual funds are governed by the same set of regulations and are subject to monitoring and inspections by the SEBI. The Mutual Fund has to be established through the medium of a sponsor. A sponsor means any body corporate who, acting alone or in combination with another body corporate, establishes a mutual fund after completing the formalities prescribed in the SEBI's Mutual Fund Regulations.

The sponsor should have a sound track record and general reputation of fairness and integrity in all his business transactions.

The Mutual Fund has to be established as either a trustee company or a Trust, under the Indian Trust Act and the instrument of trust shall be in the form of a deed. The deed shall be executed by the sponsor in favour of the trustees named in the instrument of trust. The trust deed shall be duly registered under the provisions of the Indian Registration Act, 1908. The trust deed shall contain clauses specified in the Third Schedule of the Regulations.

An Asset Management Company, who holds an approval from SEBI, is to be appointed to manage the affairs of the Mutual Fund and it should operate the schemes of such fund. The Asset Management Company is set up as a limited liability company, with a minimum net worth of Rs. 10 crores.

The sponsor should contribute at least 40% to the networth of the Asset Management Company. The Trustee should hold the property of the Mutual Fund in trust for the benefit of the unit holders.

SEBI regulations require that atleast two-thirds of the directors of the trustee company or

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board of trustees must be independent, that is, they should not be associated with the sponsors. Also, 50 per cent of the directors of AMC must be independent.

(b) Personal earnings of Mr. A = R_1

Mutual Fund earnings = R_2

$$\begin{aligned} R_2 &= \frac{1}{1 - \text{Initial expenses (\%)}} R_1 + \text{Recurring expenses (\%)} \\ &= \frac{1}{1 - 0.055} \times 16\% + 1.5\% \\ &= 18.43\% \end{aligned}$$

Mutual Fund earnings = 18.43%

Question 5

A has invested in three Mutual Fund Schemes as per details below:

	MF A	MF B	MF C
Date of investment	01.12.2003	01.01.2004	01.03.2004
Amount of investment	Rs. 50,000	Rs. 1,00,000	Rs. 50,000
Net Asset Value (NAV) at entry date	Rs. 10.50	Rs. 10	Rs. 10
Dividend received upto 31.03.2004	Rs. 950	Rs. 1,500	Nil
NAV as at 31.03.2004	Rs. 10.40	Rs. 10.10	Rs. 9.80

Required:

What is the effective yield on per annum basis in respect of each of the three schemes to Mr. A upto 31.03.2004?
(6 marks)(November, 2004)

Answer

Scheme	Investment Rs.	Unit Nos.	Unit NAV 31.3.2004 Rs.	Total NAV 31.3.2004 Rs.
MFA	50,000	4761.905	10.40	49,523.812
MFB	1,00,000	10,000	10.10	1,01,000
MFC	50,000	5,000	9.80	49,000

Mutual Funds : Operations and Regulations

Scheme	NAV (+) / (-) Rs.	Dividend Received Rs.	Total Yield Rs.	Number of days	Effective Yield (% P.A.)
MFA	(-)476.188	950	473.812	122	2.835%
MFB	(+)1,000	1,500	2,500	91	10.027%
MFC	(-)1,000	Nil	(-)1,000	31	(-)24%

Question 6

Explain briefly about net asset value (NAV) of a Mutual Fund Scheme.

(4 marks)(May, 2004) & (6 marks)(November, 2004)

Answer

Net Asset Value (NAV) is the total asset value (net of expenses) per unit of the fund calculated by the Asset Management Company (AMC) at the end of every business day. Net Asset Value on a particular date reflects the realizable value that the investor will get for each unit that he is holding if the scheme is liquidated on that date.

The performance of a particular scheme of a mutual fund is denoted by Net Asset Value (NAV). Net Asset Value may also be defined as the value at which new investors may apply to a mutual fund for joining a particular scheme.

It is the value of net assets of the fund. The investors' subscription is treated as the capital in the balance sheet of the fund, and the investments on their behalf are treated as assets. The NAV is calculated for every scheme of the MF individually. The value of portfolio is the aggregate value of different investments.

$$\text{The Net Asset Value (NAV)} = \frac{\text{Net Assets of the scheme}}{\text{Number of units outstanding}}$$

Net Assets of the scheme will normally be:

Market value of investments + Receivables + Accrued Income + Other Assets – Accrued Expenses – Payables – Other Liabilities

Since investments by a Mutual Fund are marked to market, the value of the investments for computing NAV will be at market value.

NAV of MF schemes are published on a daily basis in Newspapers and electronic media and play an important part in investors' decisions to enter or to exit. Analyst use the NAV to

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determine the yield on the schemes.

The Securities and Exchange Board of India (SEBI) has notified certain valuation norms calculating net asset value of Mutual fund schemes separately for traded and non-traded schemes.

Question 7

Sun Moon Mutual Fund (Approved Mutual Fund) sponsored open-ended equity oriented scheme "Chanakya Opportunity Fund". There were three plans viz. 'A' – Dividend Re-investment Plan, 'B' – Bonus Plan & 'C' – Growth Plan.

At the time of Initial Public Offer on 1.4.1995, Mr. Anand, Mr. Bacchan & Mrs. Charu, three investors invested Rs. 1,00,000 each & chosen 'B', 'C' & 'A' Plan respectively.

The History of the Fund is as follows:

	Dividend %	Bonus Ratio	Net Asset Value per Unit (F.V. Rs. 10)		
			Plan A	Plan B	Plan C
28.07.1999	20		30.70	31.40	33.42
31.03.2000	70	5 : 4	58.42	31.05	70.05
31.10.2003	40		42.18	25.02	56.15
15.03.2004	25		46.45	29.10	64.28
31.03.2004		1 : 3	42.18	20.05	60.12
24.03.2005	40	1 : 4	48.10	19.95	72.40
31.07.2005			53.75	22.98	82.07

On 31st July all three investors redeemed all the balance units.

Calculate annual rate of return to each of the investors.

Consider:

- 1. Long-term Capital Gain is exempt from Income tax.*
- 2. Short-term Capital Gain is subject to 10% Income tax.*
- 3. Security Transaction Tax 0.2 per cent only on sale/redemption of units.*
- 4. Ignore Education Cess* *.(12 Marks) (November, 2005)*

Answer

(a) Mrs. Charu		Plan A Dividend Reinvestment		
		(Amount in Rs.)		
Date	Investment	Rate	Units	Balance
01.04.1995	1,00,000.00	10.00	10,000.00	10,000.00
28.07.1999	20,000.00	30.70	651.47	10,651.47

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31.03.2000	74,560.29	58.42	1,276.28	11,927.75
30.10.2003	47,711.00	42.18	1,131.13	13,058.88
15.03.2004	32,647.20	46.45	702.85	13,761.73
31.03.2004	N.A.	N.A.	N.A.	13,761.73
24.03.2005	55,046.92	48.10	1,144.43	14,906.16

Redemption value $14,906.16 \times 53.75$		8,01,206.10
Less: Security Transaction Tax (S.T.T) is .2%		<u>1,602.41</u>
Net amount received		7,99,603.69
Less: Short term capital gain tax @ 10%		
1,144.43 (53.64 – 48.10)	6,340	
i.e. 53.75 – S.T.T. .2%		<u>634</u>
Net of tax		7,98,969.69
Less: Investment		<u>1,00,000.00</u>
		<u>6,98,969.69</u>

Annual average return (%) $\frac{6,98,969}{1,00,000} \times \frac{12}{124} \times 100 = 67.64$

Mr. Anand

Plan B – Bonus

(Amount in Rs.)

Date	Units	Balance	NAV per unit
01.04.1995	10,000	10,000	10
31.03.2000	12,500	22,500	31.05
31.03.2004	7,500	30,000	20.05
24.03.2005	7,500	37,500	19.95

Redemption value $37,500 \times 22.98$		8,61,750.00
Less: Security Transaction Tax (S.T.T) is .2%		<u>1,723.50</u>
Net amount received		8,60,026.50
Less: Short term capital gain tax @ 10%		
7,500 $\times$ (22.93 – 19.95)	22,350	
i.e. 22.98 – S.T.T. .2%		<u>2,235.00</u>
Net of tax		8,57,791.50

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Less: Investment	<u>1,00,000.00</u>
Net gain	<u>7,57,791.50</u>

$$\text{Annual average return (\%)} = \frac{7,57,791}{1,00,000} \times \frac{12}{124} \times 100 = 73.33$$

Mr. Bacchan

Plan C – Growth

(Amount in Rs.)

Redemption value $10,000 \times 82.07$	8,20,700.00
Less: Security Transaction Tax (S.T.T) is .2%	<u>1,641.40</u>
Net amount received	8,19,058.60
Less: Short term capital gain tax @ 10%	<u>0.00</u>
Net of tax	8,19,058.60
Less: Investment	<u>1,00,000.00</u>
Net gain	<u>7,19,058.60</u>

$$\text{Annual average return (\%)} = \frac{7,19,058}{1,00,000} \times \frac{12}{124} \times 100 = 69.59$$

Question 8

What are the investors' rights & obligations under the Mutual Fund Regulations? Explain different methods for evaluating the performance of Mutual Fund (8 Marks) (November, 2005)

Answer

(a) Investors' rights and obligations under the Mutual Fund Regulations:

Important aspect of the mutual fund regulations and operations is the investors' protection and disclosure norms. It serves the very purpose of mutual fund guidelines. Due to these norms it is very necessary for the investor to remain vigilant. Investor should continuously evaluate the performance of mutual fund.

Following are the steps taken for improvement and compliance of standards of mutual fund:

1. All mutual funds should disclose full portfolio of their schemes in the annual report within one month of the close of each financial year. Mutual fund should either send it to each unit holder or publish it by way of an advertisement in one English daily and one in regional language.
2. The Asset Management Company must prepare a compliance manual and design internal audit systems including audit systems before the launch of any schemes. The trustees are also required to constitute an audit committee of the trustees which

Mutual Funds : Operations and Regulations

will review the internal audit systems and the recommendation of the internal and statutory audit reports and ensure their rectification.

3. The AMC shall constitute an in-house valuation committee consisting of senior executives including personnel from accounts, fund management and compliance departments. The committee would on a regular basis review the system practice of valuation of securities.
4. The trustees shall review all transactions of the mutual fund with the associates on a regular basis.

Investors' Rights:

1. Unit holder have proportionate right in the beneficial ownership of the schemes assets as well as any dividend or income declared under the scheme.
2. Receive dividend warrant within 42 days.
3. AMC can be terminated by 75% of the unit holders.
4. Right to inspect major documents i.e. material contracts, Memorandum of Association and Articles of Association (M.A. & A.A) of the AMC, Offer document etc.
5. 75% of the unit holders have the right to approve any changes in the close ended scheme.
6. Every unit holder have right to receive copy of the annual statement.

Legal limitations to investors' rights:

1. Unit holders cannot sue the trust but they can initiate proceedings against the trustees, if they feel that they are being cheated.
2. Except in certain circumstances AMC cannot assure a specified level of return to the investors. AMC cannot be sued to make good any shortfall in such schemes.

Investors' Obligations:

1. An investor should carefully study the risk factors and other information provided in the offer document. Failure to study will not entitle him for any rights thereafter.
2. It is the responsibility of the investor to monitor his schemes by studying the reports and other financial statements of the funds.

The criteria for evaluating the performance is as follows:

1. Sharpe Ratio

The excess return earned over the risk free return on portfolio to the portfolio's total risk measured by the standard deviation. This formula uses the volatility of portfolio return.

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$$S = \frac{\text{Return of portfolio} - \text{Return of risk free investment}}{\text{Standard Deviation of Portfolio}}$$

2. Treynor Ratio

This ratio is similar to the Sharpe Ratio except it uses Beta of portfolio instead of standard deviation.

$$T = \frac{\text{Return of portfolio} - \text{Return of risk free investment}}{\text{Beta of Portfolio}}$$

3. Jensen's Alpha

The comparison of actual return of the fund with benchmark portfolio with the same risk. Normally, for the comparison of portfolios of mutual funds this ratio is applied and compared with market return. It shows the comparative risk and reward from the said portfolio. Alpha is the excess of actual return compared with expected return.

Question 9

A Mutual Fund having 300 units has shown its NAV of Rs.8.75 and Rs.9.45 at the beginning and at the end of the year respectively. The Mutual Fund has given two options:

- (i) Pay Rs.0.75 per unit as dividend and Rs.0.60 per unit as a capital gain, or*
- (ii) These distributions are to be reinvested at an average NAV of Rs.8.65 per unit.*

What difference it would make in terms of return available and which option is preferable?

(6 Marks) (May, 2006)

Answer

- (i) Returns for the year:

(All changes on a Per -Unit Basis)

Change in Price: Rs.9.45 – Rs.8.75 = Re.0.70

Dividends received: Re. 0.75

Capital gains distribution Re. 0.60

Total reward Rs. 2.05

Holding period reward : $\frac{\text{Rs.2.05}}{\text{Rs.8.75}} = 23.43\%$

- (ii) When all dividends and capital gains distributions are re-invested into additional units of the fund @ (Rs. 8.65/unit)

Dividend + Capital Gains per unit

= Re.0.75 + Re 0.60 = Rs. 1.35

Total received from 300 units = Rs.1.35 x 300 = Rs.405/-.

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Additional Units Acquired

$$= \text{Rs.}405/\text{Rs.}8.65 = 46.82 \text{ Units.}$$

$$\begin{aligned}\text{Total No. of Units} &= 300 \text{ units} + 46.82 \text{ units} \\ &= 346.82 \text{ units.}\end{aligned}$$

Value of 346.82 units held at the end of the year

$$= 346.82 \text{ units} \times \text{Rs.}9.45 = \text{Rs.}3277.45$$

Price Paid for 300 Units at the beginning of the year

$$= 300 \text{ units} \times \text{Rs.}8.75 = \text{Rs.}2,625.00$$

Holding Period Reward

$$\text{Rs.}(3277.45 - 2625.00) = \text{Rs.}652.45$$

%age of Holding Period Reward

$$\frac{\text{Rs.}652.45}{\text{Rs.}2625.00} = 24.85\%$$

Conclusion: Since the holding period reward is more in terms of percentage in option-two i.e., reinvestment of distributions at an average NAV of Rs.8.65 per unit, this option is preferable.

Question 10

Mr. X on 1.7.2000, during the initial offer of some Mutual Fund invested in 10,000 units having face value of Rs.10 for each unit. On 31.3.2001 the dividend operated by the M.F. was 10% and Mr. X found that his annualized yield was 153.33%. On 31.12.2002, 20% dividend was given. On 31.3.2003 Mr. X redeemed all his balance of 11,296.11 units when his annualized yield was 73.52%. What are the NAVs as on 31.3.2001, 31.12.2002 and 31.3.2003?

(6 Marks) (November, 2006)

Answer

$$\text{Yield for 9 months} = (153.33 \times 9/12) = 115\%$$

$$\begin{aligned}\text{Amount receivable as on 31.03.2001} &= 1,00,000/- + (1,00,000 \times 115\%) \\ &= \text{Rs.}2,15,000/-\end{aligned}$$

$$\text{Therefore, NAV as on 31.03.2001} = (2,15,000 - 10,000)/10,000 = \text{Rs.}20.50$$

$$\text{Therefore, units as on 31.03.2001} = 10487.80 \text{ i.e., } (2,15,000/20.50)$$

$$\text{Dividend as on 31.03.2002} = 10,487.80 \times 10 \times 0.2 = \text{Rs.}20,975.60$$

$$\begin{aligned}\text{Therefore, NAV as on 31.03.2002} &= 20,975.6/(11,296.11 - 10,487.80) \\ &= \text{Rs.}25.95\end{aligned}$$

Management Accounting and Financial Analysis

$$\begin{aligned}\text{NAV as on 31.03.2003} &= 1,00,000 (1+0.7352 \times 33/12)/11296.11 \\ &= \text{Rs.26.75}\end{aligned}$$

Question No 11

Answer

The advantages of investing in a Mutual Fund are:

1. **Professional Management:** Investors avail the services of experienced and skilled professionals who are backed by a dedicated investment research team which analyses the performance and prospects of companies and selects suitable investments to achieve the objectives of the scheme.
2. **Diversification:** Mutual Funds invest in a number of companies across a broad cross-section of industries and sectors. Investors achieve this diversification through a Mutual Fund with far less money and risk than one can do on his own.
3. **Convenient Administration:** Investing in a Mutual Fund reduces paper work and helps investors to avoid many problems such as bad deliveries, delayed payments and unnecessary follow up with brokers and companies.
4. **Return Potential:** Over a medium to long term, Mutual Fund has the potential to provide a higher return as they invest in a diversified basket of selected securities.
5. **Low Costs:** Mutual Funds are a relatively less expensive way to invest compared to directly investing in the capital markets because the benefits of scale in brokerage, custodial and other fees translate into lower costs for investors.
6. **Liquidity:** In open ended schemes investors can get their money back promptly at net asset value related prices from the Mutual Fund itself. With close-ended schemes, investors can sell their units on a stock exchange at the prevailing market price or avail of the facility of direct repurchase at NAV related prices which some close ended and interval schemes offer periodically.
7. **Transparency:** Investors get regular information on the value of their investment in addition to disclosure on the specific investments made by scheme, the proportion invested in each class of assets and the fund manager's investment strategy and outlook.

Note : No questions were asked on this topic.

NOTE

[illegible]

MERGERS AND ACQUISITION

Question 1

(a) Company X is contemplating the purchase of Company Y. Company X has 3,00,000 shares having a market price of Rs. 30 per share, while Company Y has 2,00,000 shares selling at Rs. 20 per share. The EPS are Rs. 4.00 and Rs. 2.25 for Company X and Y respectively. Managements of both companies are discussing two alternative proposals for exchange of shares as indicated below:

- (i) in proportion to the relative earnings per share of two companies.
- (ii) 0.5 share of Company X for one share of Company Y (.5 : 1).

You are required:

- (i) to calculate the Earnings Per Share (EPS) after merger under two alternatives; and
- (ii) to show the impact on EPS for the shareholders of two companies under both the alternatives. (10 marks)

(b) Explain the following:

- (i) Take over by Reserve bid.
- (ii) Demerger.

(5 × 2 = 10 marks)(November, 2002)

Answer

(a) (i) **Mergers effect on EPS**

(Exchange ratio in proportion to relative EPS)

(in Rs.)			
Company	Existing No. Of shares	EPS	Total earnings
X	3,00,000	4.00	12,00,000
Y	2,00,000	2.25	<u>4,50,000</u>
		Total earnings	<u>16,50,000</u>

Management Accounting and Financial Analysis

No. of shares after merger $3,00,000 + 1,12,500 = 4,12,500$

Note: 1,12,500 may be calculated as $= \left(2,00,000 \times \frac{2.25}{4.00} \right)$

$$\begin{aligned}\text{EPS for Co X after merger} &= \frac{16,50,000}{4,12,500} \\ &= \text{Rs. 4.00}\end{aligned}$$

Equivalent EPS of Co. Y

Before merger Rs. 2.25

After merger (EPS before merger $\div$ Share exchange ratio on EPS basis)

$$2.25 \div .5625 = \text{Rs. 4.00}$$

Merger effect on EPS with share exchange ratio of 0.5 : 1

Total earnings after merger	Rs. 16,50,000
No. of shares post merger	
$(3,00,000 + 1,00,000 (.5 \times 2,00,000))$	4,00,000
EPS $16,50,000 \div 4,00,000$	4.125

(ii) Impact on EPS

Co. X' shareholders	Rs.
EPS before merger	4.00
EPS after merger i.e. $(16,50,000 \div 4,00,000)$	4.125
Increase in EPS	0.125

Co. Y' Shareholders	
Equivalent EPS before merger $2.25 \div 0.5$	4.5
EPS after the merger	4.125
Decrease in EPS	0.375

(b) (i) Take over by Reverse Bid

Under normal circumstances, a 'take over' would mean that a larger company acquires a smaller company. However, there could be exceptional circumstances wherein a smaller company gains control of a larger one. Such a situation is referred to as 'take over by reverse bid'.

Mergers and Acquisition

Take over by reverse bid could happen where already a significant per cent of the shareholding is held by the transfer company, to exploit economies of scale, to enjoy better trading advantages and other similar reasons.

The concept of take over by reverse bid has been successfully employed in schemes formulated for revival and rehabilitation of sick industrial companies.

- (ii) **Demerger:** The word 'demerger' is defined under the Income-tax Act, 1961. It refers to a situation where pursuant to a scheme for reconstruction/restructuring, an 'undertaking' is transferred or sold to another purchasing company or entity. The important point is that even after demerger, the transferring company would continue to exist and may do business.

Demerger is used as a suitable scheme in the following cases:

- ◆ Restructuring of an existing business
- ◆ Division of family-managed business
- ◆ Management 'buy-out'.

While under the Income tax Act there is recognition of demerger only for restructuring as provided for under sections 391 – 394 of the Companies Act, in a larger context, demerger can happen in other situations also.

Question 2

XYZ Ltd., is considering merger with ABC Ltd. XYZ Ltd.'s shares are currently traded at Rs. 20. It has 2,50,000 shares outstanding and its earnings after taxes (EAT) amount to Rs. 5,00,000. ABC Ltd., has 1,25,000 shares outstanding; its current market price is Rs. 10 and its EAT are Rs. 1,25,000. The merger will be effected by means of a stock swap (exchange). ABC Ltd., has agreed to a plan under which XYZ Ltd., will offer the current market value of ABC Ltd.'s shares:

- (i) What is the pre-merger earnings per share (EPS) and P/E ratios of both the companies?
- (ii) If ABC Ltd.'s P/E ratio is 6.4, what is its current market price? What is the exchange ratio? What will XYZ Ltd.'s post-merger EPS be?
- (iii) What should be the exchange ratio, if XYZ Ltd.'s pre-merger and post-merger EPS are to be the same? (10 marks)(May 2003)

Answer

- (i) Pre-merger EPS and P/E ratios of XYZ Ltd. and ABC Ltd.

Particulars	XYZ Ltd.	ABC Ltd.
Earning after taxes	5,00,000	1,25,000
Number of shares outstanding	2,50,000	1,25,000
EPS	2	1
Market Price per share	20	10
P/E Ratio (times)	10	10

Management Accounting and Financial Analysis

(ii) Current Market Price of ABC Ltd. if P/E ratio is 6.4 = Rs. 1 × 6.4 = Rs. 6.40

$$\text{Exchange ratio} = \frac{\text{Rs. 20}}{6.40} = 3.125$$

Post merger EPS of XYZ Ltd.

$$\begin{aligned} &= \frac{\text{Rs. 5,00,000} + \text{Rs. 1,25,000}}{\text{Rs. 2,50,000} + (\text{Rs. 1,25,000}/3.125)} \\ &= \frac{\text{Rs. 6,25,000}}{\text{Rs. 2,90,000}} = 2.16 \end{aligned}$$

(iii) Desired exchange ratio

Total number of shares in post-merged company

$$= \frac{\text{Post-merger earnings}}{\text{Pre-merger EPS of XYZ Ltd}} = \frac{\text{Rs. 6,25,000}}{2} = 3,12,500$$

Number of shares required to be issued

$$= 3,12,500 - 2,50,000 = 62,500$$

Therefore, the exchange ratio is

$$\begin{aligned} &\frac{62,500}{1,25,000} \\ &= \frac{62,500}{1,25,000} = 0.50 \end{aligned}$$

Question 3

Explain the term 'Buy-Outs'.

(8 marks) (November, 2003)

Answer

A very important phenomenon witnessed in the Mergers and Acquisitions scene, in recent times is one of buy - outs. A buy-out happens when a person or group of persons gain control of a company by buying all or a majority of its shares. A buyout involves two entities, the acquirer and the target company. The acquirer seeks to gain controlling interest in the company being acquired normally through purchase of shares. There are two common types of buy-outs: Leveraged Buyouts (LBO) and Management Buy-outs (MBO). LBO is the purchase of assets or the equity of a company where the buyer uses a significant amount of debt and very little equity capital of his own for payment of the consideration for acquisition. MBO is the purchase of a business by its management, who when threatened with the sale of its business to third parties or frustrated by the slow growth of the company, step-in and acquire the business from the owners, and run the business for themselves. The majority of buy-outs are management buy-outs and involve the acquisition by incumbent management of the business where they are employed. Typically, the purchase price is met by a small amount of their own funds and the rest from a mix of venture capital and bank debt.

Mergers and Acquisition

Internationally, the two most common sources of buy-out operations are divestment of parts of larger groups and family companies facing succession problems. Corporate groups may seek to sell subsidiaries as part of a planned strategic disposal programme or more forced reorganisation in the face of parental financing problems. Public companies have, however, increasingly sought to dispose off subsidiaries through an auction process partly to satisfy shareholder pressure for value maximisation.

In recessionary periods, buy-outs play a big part in the restructuring of a failed or failing businesses and in an environment of generally weakened corporate performance often represent the only viable purchasers when parents wish to dispose off subsidiaries.

Buy-outs are one of the most common forms of privatisation, offering opportunities for enhancing the performances of parts of the public sector, widening employee ownership and giving managers and employees incentives to make best use of their expertise in particular sectors.

Question 4

M Co. Ltd., is studying the possible acquisition of N Co. Ltd., by way of merger. The following data are available in respect of the companies:

Particulars	M Co. Ltd.	N Co. Ltd.
Earnings after tax (Rs.)	80,00,000	24,00,000
No. of equity shares	16,00,000	4,00,000
Market value per share (Rs.)	200	160

- If the merger goes through by exchange of equity and the exchange ratio is based on the current market price, what is the new earning per share for M Co. Ltd.?*
- N Co. Ltd. wants to be sure that the earnings available to its shareholders will not be diminished by the merger. What should be the exchange ratio in that case?*

(8 marks)(November, 2003)

Answer

(i) Calculation of new EPS of M Co. Ltd.

No. of equity shares to be issued by M Co. Ltd. to N Co. Ltd.

$$= 4,00,000 \text{ shares} \times \text{Rs. } 1.6/\text{Rs. } 2.0 = 3,20,000 \text{ shares}$$

Total no. of shares in M Co. Ltd. after acquisition of N Co. Ltd.

$$= 16,00,000 + 3,20,000 = 19,20,000$$

Total earnings after tax [after acquisition]

$$= 80,00,000 + 24,00,000 = 1,04,00,000$$

Management Accounting and Financial Analysis

$$\text{EPS} = \frac{\text{Rs. 1,04,00,000}}{19,20,000 \text{ equity shares}} = \text{Rs. 5.42}$$

- (ii) **Calculation of exchange ratio which would not diminish the EPS of N Co. Ltd. after its merger with M Co. Ltd.**

Current EPS:

$$\text{M Co. Ltd.} = \frac{\text{Rs. 80,00,000}}{16,00,000 \text{ equity shares}} = \text{Rs. 5}$$

$$\text{N Co. Ltd.} = \frac{\text{Rs. 24,00,000}}{4,00,000 \text{ equity shares}} = \text{Rs. 6}$$

$$\text{Exchange ratio} = 6/5 = 1.20$$

No. of new shares to be issued by M Co. Ltd. to N Co. Ltd.

$$= 4,00,000 \times 1.20 = 4,80,000 \text{ shares}$$

Total number of shares of M Co. Ltd. after acquisition

$$= 16,00,000 + 4,80,000 = 20,80,000 \text{ shares}$$

$$\text{EPS [after merger]} = \frac{\text{Rs. 1,04,00,000}}{20,80,000 \text{ shares}} = \text{Rs. 5}$$

Total earnings in M Co. Ltd. available to new shareholders of N Co. Ltd.

$$= 4,80,000 \times \text{Rs. 5} = \text{Rs. 24,00,000}$$

Recommendation: The exchange ratio (6 for 5) based on market shares is beneficial to shareholders of 'N' Co. Ltd.

Question 5

ABC Ltd. is intending to acquire XYZ Ltd. by merger and the following information is available in respect of the companies:

	ABC Ltd.	XYZ Ltd.
Number of equity shares	10,00,000	6,00,000
Earnings after tax (Rs.)	50,00,000	18,00,000
Market value per share (Rs.)	42	28

Required:

- What is the present EPS of both the companies?*
- If the proposed merger takes place, what would be the new earning per share for ABC Ltd.? Assume that the merger takes place by exchange of equity shares and the exchange ratio is based on the current market price.*

Mergers and Acquisition

- (iii) What should be exchange ratio, if XYZ Ltd. wants to ensure the earnings to members are as before the merger takes place? (8 marks)(May 2004)

Answer

- (i) Earnings per share = Earnings after tax /No. of equity shares
ABC Ltd. = Rs. 50,00,000/10,00,000 = Rs. 5
XYZ Ltd. = Rs. 18,00,000 / 6,00,000 = Rs. 3
- (ii) Number of Shares XYZ limited's shareholders will get in ABC Ltd. based on market value per share = Rs. 28/ 42 × 6,00,000 = 4,00,000 shares
Total number of equity shares of ABC Ltd. after merger = 10,00,000 + 4,00,000 = 14,00,000 shares
Earnings per share after merger = Rs. 50,00,000 + 18,00,000 / 14,00,000 = Rs. 4.86
- (iii) Calculation of exchange ratio to ensure shareholders of XYZ Ltd. to earn the same as was before merger:
Shares to be exchanged based on EPS = (Rs. 3/Rs. 5) × 6,00,000 = 3,60,000 shares
EPS after merger = (Rs. 50,00,000 + 18,00,000)/13,60,000 = Rs. 5
Total earnings in ABC Ltd. available to shareholders of XYZ Ltd. = 3,60,000 × Rs. 5 = Rs. 18,00,000.
Exchange ratio based on market price is beneficial to shareholders of XYZ Ltd. because of higher Earnings available to them i.e. (4,00,000 shares × Rs. 4.86 = Rs. 19,44,000).

Question 6

The following information is provided related to the acquiring Firm Mark Limited and the target Firm Mask Limited:

	Firm Mark Limited	Firm Mask Limited
Earning after tax (Rs.)	2,000 lakhs	400 lakhs
Number of shares outstanding	200 lakhs	100 lakhs
P/E ratio (times)	10	5

Required:

- (i) What is the Swap Ratio based on current market prices?
- (ii) What is the EPS of Mark Limited after acquisition?
- (iii) What is the expected market price per share of Mark Limited after acquisition, assuming P/E ratio of Mark Limited remains unchanged?
- (iv) Determine the market value of the merged firm.

Management Accounting and Financial Analysis

- (v) Calculate gain/loss for shareholders of the two independent companies after acquisition.
(8 marks) (November, 2004)

Answer

Particulars	Mark Ltd.	Mask Ltd.
EPS	Rs. 2,000 Lakhs / 200 lakhs = Rs. 10	Rs. 400 lakhs / 100 lakhs Rs. 4
Market Price	Rs. 10 × 10 = Rs. 100	Rs. 4 × 5 = Rs. 20

- (i) The Swap ratio based on current market price is
 $\text{Rs. 20} / \text{Rs. 100} = 0.2$ or 1 share of Mark Ltd. for 5 shares of Mask Ltd.
No. of shares to be issued = $\text{Rs. 100 lakh} \times 0.2 = \text{Rs. 20 lakhs}$.

- (ii) EPS after merger
$$= \frac{\text{Rs. 2,000 lakhs} + \text{Rs. 400 lakhs}}{200 \text{ lakhs} + 20 \text{ lakhs}}$$
$$= \text{Rs. 10.91}$$

- (iii) Expected market price after merger assuming P / E 10 times.
 $= \text{Rs. 10.91} \times 10 = \text{Rs. 109.10}$

- (iv) Market value of merged firm
 $= \text{Rs. 109.10 market price} \times 220 \text{ lakhs shares} = 240.02 \text{ crores}$

- (v) Gain from the merger
Post merger market value of the merged firm Rs. 240.02 crores
Less: Pre-merger market value

Mark Ltd. 200 Lakhs × Rs. 100 = 200 crores

Mask Ltd. 100 Lakhs × Rs. 20 = 20 crores Rs. 220.00 crores

Gain from merger Rs. 20.02 crores

Appropriation of gains from the merger among shareholders:

	Mark Ltd.	Mask Ltd.
Post merger value	218.20 crores	21.82 crores
Less: Pre-merger market value	200.00 crores	20.00 crores
Gain to Shareholders	18.20 crores	1.82 crores

Question 7

The following information is provided relating to the acquiring company Efficient Ltd. and the target Company Healthy Ltd.

Mergers and Acquisition

	Efficient Ltd.	Healthy Ltd.
No. of shares (F.V. Rs. 10 each)	10.00 lakhs	7.5 lakhs
Market capitalization	500.00 lakhs	750.00 lakhs
P/E ratio (times)	10.00	5.00
Reserves and Surplus	300.00 lakhs	165.00 lakhs
Promoter's Holding (No. of shares)	4.75 lakhs	5.00 lakhs

Board of Directors of both the Companies have decided to give a fair deal to the shareholders and accordingly for swap ratio the weights are decided as 40%, 25% and 35% respectively for Earning, Book Value and Market Price of share of each company:

- (i) Calculate the swap ratio and also calculate Promoter's holding % after acquisition.
- (ii) What is the EPS of Efficient Ltd. after acquisition of Healthy Ltd.?
- (iii) What is the expected market price per share and market capitalization of Efficient Ltd. after acquisition, assuming P/E ratio of Firm Efficient Ltd. remains unchanged.
- (iv) Calculate free float market capitalization of the merged firm. (12 Marks) (May, 2005)

Answer

Swap Ratio	Efficient Ltd.	Healthy Ltd.
Market capitalisation	500 lakhs	750 lakhs
No. of shares	10 lakhs	7.5 lakhs
Market Price per share	Rs. 50	Rs. 100
P/E ratio	10	5
EPS	Rs. 5	Rs. 20
Profit	Rs. 50 lakh	Rs. 150 lakh
Share capital	Rs. 100 lakh	Rs. 75 lakh
Reserves and surplus	Rs. 300 lakh	Rs. 165 lakh
Total	Rs. 400 lakh	Rs. 240 lakh
Book Value per share	Rs. 40	Rs. 32

(i) Calculation of Swap Ratio

EPS	1 : 4 i.e.	$4.0 \times 40\%$	1.6
Book value	1 : 0.8 i.e.	$0.8 \times 25\%$	0.2
Market price	1 : 2 i.e.	$2.0 \times 35\%$	0.7
		Total	2.5

Swap ratio is for every one share of Healthy Ltd., to issue 2.5 shares of Efficient Ltd. Hence, total no. of shares to be issued $7.5 \text{ lakh} \times 2.5 = 18.75 \text{ lakh shares}$

Promoter's holding = $4.75 \text{ lakh shares} + (5 \times 2.5 = 12.5 \text{ lakh shares}) = 17.25 \text{ lakh}$
i.e. Promoter's holding % is $(17.25 \text{ lakh} / 28.75 \text{ lakh}) \times 100 = 60\%$.

Management Accounting and Financial Analysis

Calculation of EPS, Market price, Market capitalization and free float market capitalisation

(ii)	Total No. of shares	10 lakh + 18.75 lakh = 28.75 lakh
	Total capital	100 lakh + 187.5 lakh = Rs. 287.5 lakh
	EPS	$\frac{\text{Total profit}}{\text{No. of shares}} = \frac{50 \text{ lakh} + 150 \text{ lakh}}{28.75 \text{ lakh}} = \frac{200}{28.75}$ = Rs. 6.956
(iii)	Expected market price	EPS 6.956 × P/E 10 = Rs. 69.56
	Market capitalization	= Rs. 69.56 per share × 28.75 lakh shares = Rs. 1,999.85 lakh
(iv)	Free float of market capitalization	= Rs. 69.56 per share × (28.75 lakh × 40%) = Rs. 799.94 lakh

Question 8

The following information is relating to Fortune India Ltd. having two division, viz. Pharma Division and Fast Moving Consumer Goods Division (FMCG Division). Paid up share capital of Fortune India Ltd. is consisting of 3,000 Lakhs equity shares of Re. 1 each. Fortune India Ltd. decided to de-merge Pharma Division as Fortune Pharma Ltd. w.e.f. 1.4.2005. Details of Fortune India Ltd. as on 31.3.2005 and of Fortune Pharma Ltd. as on 1.4.2005 are given below:

Particulars	Fortune Pharma Ltd. Rs.	Fortune India Ltd. Rs.
Outside Liabilities		
Secured Loans	400 lakh	3,000 lakh
Unsecured Loans	2,400 lakh	800 lakh
Current Liabilities & Provisions	1,300 lakh	21,200 lakh
Assets		
Fixed Assets	7,740 lakh	20,400 lakh
Investments	7,600 lakh	12,300 lakh
Current Assets	8,800 lakh	30,200 lakh
Loans & Advances	900 lakh	7,300 lakh
Deferred tax/Misc. Expenses	60 lakh	(200) lakh

Board of Directors of the Company have decided to issue necessary equity shares of Fortune Pharma Ltd. of Re. 1 each, without any consideration to the shareholders of Fortune India Ltd. For that purpose following points are to be considered:

1. Transfer of Liabilities & Assets at Book value.
2. Estimated Profit for the year 2005-06 is Rs. 11,400 Lakh for Fortune India Ltd. & Rs. 1,470 lakhs for Fortune Pharma Ltd.

Mergers and Acquisition

3. Estimated Market Price of Fortune Pharma Ltd. is Rs. 24.50 per share.
4. Average P/E Ratio of FMCG sector is 42 & Pharma sector is 25, which is to be expected for both the companies.

Calculate:

1. The Ratio in which shares of Fortune Pharma are to be issued to the shareholders of Fortune India Ltd.
2. Expected Market price of Fortune India Ltd.
3. Book Value per share of both the Companies immediately after Demerger.

(8 Marks) (November, 2005)

Answer

Share holders' funds

Particulars	Fortune India Ltd.	Fortune Pharma Ltd.	Fortune India (FMCG) Ltd.
Assets	70,000	25,100	44,900
Outside liabilities	<u>25,000</u>	<u>4,100</u>	<u>20,900</u>
Net worth	<u>45,000</u>	<u>21,000</u>	<u>24,000</u>

1. Calculation of Shares of Fortune Pharma Ltd. are to be issued to shareholders of Fortune India Ltd.

	Fortune Pharma Ltd.
Estimated Profit (Rs. in lakhs)	1,470
Estimated market price (Rs.)	24.5
Estimated P/E	25
Estimated EPS (Rs.)	0.98
No. of shares lakhs	1,500

Hence, Ratio is 1 share of Fortune Pharma Ltd. for 2 shares of Fortune India Ltd.

2. Expected market price of Fortune India Ltd.

	Fortune India (FMCG) Ltd.
Estimated Profit (Rs. in lakhs)	11,400
No. of equity shares (Rs. in lakhs)	3,000
Estimated EPS (Rs.)	3.8
Estimated P/E	42
Estimated market price (Rs.)	159.6

Management Accounting and Financial Analysis

3. Book value per share

	<i>Fortune Pharma Ltd.</i>	<i>Fortune India (FMCG) Ltd.</i>
Net worth (Rs.in lakhs)	21,000	24,000
No. of shares (Rs. in lakhs)	1,500	3,000
Book value of shares	Rs. 14	Rs. 8

Question 9

What is take over by reverse bid?

(3 Marks) (May, 2006)

Answer

Take Over by Reverse Bid : When the smaller company gains control of a larger one. Then it is called "Take-over by reverse bid". This concept has been successfully followed for revival of sick industries. The concept of take-over by reverse bid, or of reverse merger, is thus not the usual case of amalgamation of a sick unit which is non-viable with a healthy or prosperous unit but is a case whereby the entire undertaking of the healthy and prosperous company is to be merged and vested in the sick company which is non-viable. Under the Sick Industrial Companies (Special Provision) Act, 1985, a company becomes a sick industrial company when there is erosion of its net worth. This alternative is also known as taking over by reverse bid.

The three tests in a takeover by reverse bid that are required to be satisfied are, namely, (i) the assets of the transferor company are greater than the transferee company; (ii) equity capital to be issued by the transferee company pursuant to the acquisition exceeds its original issued capital, and (iii) the change of control in the transferee company will be through the introduction of minority holder or group of holders.

In reverse takeover control goes to the shareholders (and usually management) of the company that is formally the target of the bid.

The term reverse takeover is also be applied to the purchase of a listed company by an unlisted company with control passing to the shareholders and management of the unlisted company. This is sometimes known as a 'back door listing'.

A reverse takeover will almost always take place by way of a pure equity acquisition, also called a share swap.

A reverse takeover for the purpose of obtaining a back door listing is accomplished by the shareholders of the unlisted company selling all of their shares to the listed company in exchange for shares of the listed company.

This is a cost effective method of obtaining a public listing because it avoids the expenses associated with a floatation. Sometimes, the unlisted company usually takesover a listed company, a company i.e., listed but not actively traded on the stock exchange.

Mergers and Acquisition

Question 10

Reliable Industries Ltd. (RIL) is considering a takeover of Sunflower Industries Ltd. (SIL). The particulars of 2 companies are given below:

Particulars	Reliable Industries Ltd	Sunflower Industries Ltd.
Earnings After Tax (EAT)	Rs.20,00,000	Rs.10,00,000
Equity shares O/s	10,00,000	10,00,000
Earnings per share (EPS)	2	1
PE Ratio (Times)	10	5

Required:

- (i) What is the market value of each Company before merger?
- (ii) Assume that the management of RIL estimates that the shareholders of SIL will accept an offer of one share of RIL for four shares of SIL. If there are no synergic effects, what is the market value of the Post-merger RIL? What is the new price per share? Are the shareholders of RIL better or worse off than they were before the merger?
- (iii) Due to synergic effects, the management of RIL estimates that the earnings will increase by 20%. What is the new post-merger EPS and Price per share? Will the shareholders be better off or worse off than before the merger? (8 Marks) (May, 2006)

Answer

(i) Market value of Companies before Merger

Particulars	RIL	SIL
EPS	Rs.2	Re.1
P/E Ratio	10	5
Market Price Per Share	Rs.20	Rs.5
Equity Shares	10,00,000	10,00,000
Total Market Value	2,00,00,000	50,00,000

(ii) Post Merger Effects on RIL

	Rs.
Post merger earnings	30,00,000
Exchange Ratio (1:4)	
No. of equity shares o/s (10,00,000 + 2,50,000)	12,50,000
EPS: 30,00,000/12,50,000	2.4
Market Price per share	10.00
Market Value 10 x 2.4	24

Management Accounting and Financial Analysis

Total Value (12,50,000 x 24)	3,00,00,000
Gains From Merger:	Rs.
Post-Merger Market Value of the Firm	3,00,00,000
Less: Pre-Merger Market Value	
RIL 2,00,00,000	
SIL <u>50,00,000</u>	<u>2,50,00,000</u>
Total gains from Merger	<u>50,00,000</u>

Apportionment of Gains between the Shareholders:

Particulars	RIL	SIL
Post Merger Market Value:	Rs.	Rs.
10,00,000 x 24	2,40,00,000	--
2,50,000 x 24	-	60,00,000
Less: Pre-Merger Market Value	2,00,00,000	50,00,000
Gains from Merger:	40,00,000	10,00,000

Thus, the shareholders of both the companies (RIL + SIL) are better off than before

(iii) Post-Merger Earnings:

Increase in Earnings by 20%

New Earnings: Rs.30,00,000 x 20% = Rs.36,00,000

No. of equity shares outstanding: 12,50,000

EPS: Rs. 36,00,000/12,50,000 = Rs.2.88

PE Ratio = 10

Market Price Per Share:

= Rs.2.88 x 10 = Rs.28.80

∴ Shareholders will be better-off than before the merger situation.

Question 11

AB Ltd., is planning to acquire and absorb the running business of XY Ltd. The valuation is to be based on the recommendation of merchant bankers and the consideration is to be discharged in the form of equity shares to be issued by AB Ltd. As on 31.3.2006, the paid up capital of AB Ltd. consists of 80 lakhs shares of Rs.10 each. The highest and the lowest market quotation during the last 6 months were Rs.570 and Rs.430. For the purpose of the exchange, the price per share is to be reckoned as the average of the highest and lowest market price during the last 6 months ended on 31.3.06.

XY Ltd.'s Balance Sheet as at 31.3.2006 is summarised below:

Mergers and Acquisition

	Rs. lakhs
<i>Sources</i>	
<i>Share Capital</i>	
20 lakhs equity shares of Rs.10 each fully paid	200
10 lakhs equity shares of Rs.10 each, Rs.5 paid	50
<i>Loans</i>	100
<i>Total</i>	350
<i>Uses</i>	
Fixed Assets (Net)	150
Net Current Assets	200
	350

An independent firm of merchant bankers engaged for the negotiation, have produced the following estimates of cash flows from the business of XY Ltd.:

Year ended	By way of	Rs. lakhs
31.3.07	after tax earnings for equity	105
31.3.08	do	120
31.3.09	Do	125
31.3.10	Do	120
31.3.11	Do	100
	terminal value estimate	200

It is the recommendation of the merchant banker that the business of XY Ltd. may be valued on the basis of the average of (i) Aggregate of discounted cash flows at 8% and (ii) Net assets value. Present value factors at 8% for years

1-5:	0.93	0.86	0.79	0.74	0.68
------	------	------	------	------	------

You are required to:

- (i) Calculate the total value of the business of XY Ltd.*
- (ii) The number of shares to be issued by AB Ltd.; and*
- (iii) The basis of allocation of the shares among the shareholders of XY Ltd.*

(12 Marks) (November, 2006)

Answer

Price/share of AB Ltd. for determination of number of shares to be issued:

$$\frac{(\text{Rs.}570 + \text{Rs.}430)}{2} \quad \text{Rs.} \quad 500$$

Value of XY Ltd based on future cash flow capitalization

Management Accounting and Financial Analysis

$(105 \times 0.93) + (120 \times 0.86) + (125 \times 0.79) + (120 \times 0.74) \times (300 \times 0.68)$	Rs. lakhs	592.40
Value of XY Ltd based on net assets	Rs. lakhs	250.00
Average value $(592.4 + 250) / 2$		421.20
No. of shares in AB Ltd to be issued $42120000 / 500$	Nos.	84240
Basis of allocation of shares		
Fully paid equivalent shares in XY Ltd. $(20 + 5)$ lakhs		2500000
Distribution to fully paid shareholders $84240 \times 20 / 25$		67392
Distribution to partly paid shareholders $84240 - 67392$		16848
		Total

Question 12

AFC Ltd. wishes to acquire BCD Ltd. The shares issued by the two companies are 10,00,000 and 5,00,000 respectively:

- (i) Calculate the increase in the total value of BCD Ltd. resulting from the acquisition on the basis of the following conditions:

Current expected growth rate of BCD Ltd. 7%

Expected growth rate under control of AFC Ltd., (without any additional capital investment and without any change in risk of operations) 8%

Current Market price per share of AFC Ltd. Rs. 100

Current Market price per share of BCD Ltd. Rs. 20

Current Dividend per share of BCD Ltd. Re. 0.60

- (ii) On the basis of aforesaid conditions calculate the gain or loss to shareholders of both the companies, if AFC Ltd. were to offer one of its share for every four shares of BCD Ltd.
- (iii) Calculate the gain to the shareholders of both the Companies, if AFC Ltd. pays Rs.22 for each share of BCD Ltd., assuming the P/E Ratio of AFC Ltd. does not change after the merger. EPS of AFC Ltd. is Rs.8 and that of BCD is Rs.2.50. It is assumed that AFC Ltd. invests its cash to earn 10%. (8 marks, May 2007)

Answer

- (i) For BCD Ltd., before acquisition

The cost of capital of BCD Ltd. may be calculated by using the following formula:

$$\frac{\text{Dividend}}{\text{Price}} + \text{Growth \%}$$

$$\text{Cost of Capital i.e., } K_e = (0.60/20) + 0.07 = 0.10$$

After acquisition g (i.e. growth) becomes 0.08

$$\text{Therefore, price per share after acquisition} = 0.60 / (0.10 - 0.08) = \text{Rs.30}$$

Mergers and Acquisition

The increase in value therefore is = $\text{Rs.}(30-20) \times 5,00,000 = \text{Rs.}50,00,000/-$

- (ii) To share holders of BCD Ltd. the immediate gain is $\text{Rs.}100 - \text{Rs.}20 \times 4 = \text{Rs.}20$ per share
The gain can be higher if price of shares of AFC Ltd. rise following merger which they should undertake.

To AFC Ltd. shareholders	(Rs. (In lakhs))
Value of Company now	1,000
Value of BCD Ltd.	<u>150</u>
	1,150
No. of shares	11.25

$\therefore$ Value per share $1150/11.25 = \text{Rs.}102.22$

Gain to shareholders of BCD Ltd. = $\text{Rs.}102.22 - \text{Rs.}(4 \times 20) = \text{Rs.}22.22$

Gain to shareholders of AFC Ltd. = $\text{Rs.}102.22 - \text{Rs.}100.00 = \text{Rs.}2.22$

- (iii) Gain to shareholders of AFC Ltd:-

Earnings of BCD Ltd. $(5,00,000 \times 2.50) =$	Rs.12,50,000/-
Less: Loss of earning in cash	<u>Rs.11,00,000/-</u>
$(5,00,000/- \times 22 \times 0.10)$	
Net Earning	Rs.1,50,000/-
Number of shares	10,00,000
Net increase in earning per share	0.15

P/E ratio of AFC Ltd. = $100/8 = 12.50$

Therefore, Gain per share of shareholders of AFC Ltd.
= $0.15 \times 12.50 = \text{Rs.}1.88$

Gain to the shareholders of BCD Ltd. $\text{Rs.} (22-20) = \text{Rs.}2/-$ per share

Question 13

A Ltd. wants to acquire T Ltd. and has offered a swap ratio of 1:2 (0.5 shares for every one share of T Ltd.). Following information is provided:

	A Ltd.	T. Ltd.
Profit after tax	Rs.18,00,000	Rs.3,60,000
Equity shares outstanding (Nos.)	6,00,000	1,80,000
EPS	Rs.3	Rs.2
PE Ratio	10 times	7 times
Market price per share	Rs.30	Rs.14

Required:

- (i) *The number of equity shares to be issued by A Ltd. for acquisition of T Ltd.*

Management Accounting and Financial Analysis

- (ii) *What is the EPS of A Ltd. after the acquisition?*
- (iii) *Determine the equivalent earnings per share of T Ltd.*
- (iv) *What is the expected market price per share of A Ltd. after the acquisition, assuming its PE multiple remains unchanged?*
- (v) *Determine the market value of the merged firm.* (10 Marks)(Nov 2007)

Answer

- (a) (i) **The number of shares to be issued by A Ltd.:**

The Exchange ratio is 0.5

So, new Shares = 1,80,000 x .5 =
90,000 shares.

- (ii) **EPS of A Ltd. After a cquisition:**

Total Earnings	(18,00,000+3,60,000)	Rs.21,60,000
No. of Shares	(6,00,000 + 90,000)	6,90,000
EPS	(21,60,000)/6,90,000)	Rs.3.13

- (iii) **Equivalent EPS of T Ltd.:**

No. of new Shares	0.5
EPS	Rs.3.13
Equivalent EPS (3.13 x .5)	Rs.1.57

- (iv) **New Market Price of A Ltd. (P/E remaining unchanged):**

Present P/E Ratio of A Ltd.	10 times
Expected EPS after merger	Rs.3.13
Expected Market Price (3.13 x 10)	Rs.31.30

- (v) **Market Value of merged firm:**

Total number of Shares	6,90,000
Expected Market Price	Rs.31.30
Total value (6,90,000 x 31.30)	Rs.2,15,97,000

Mergers and Acquisition

Question 14

BA Ltd. and DA Ltd. both the companies operate in the same industry. The Financial statements of both the companies for the current financial year are as follows :

Balance Sheet

Particulars	BA Ltd. (Rs.)	DA Ltd. (Rs.)
Current Assets	14,00,000	10,00,000
Fixed Assets (Net)	10,00,000	5,00,000
Total (Rs.)	<u>24,00,000</u>	<u>15,00,000</u>
Equity capital (Rs.10 each)	10,00,000	8,00,000
Retained earnings	2,00,000	--
14% long-term debt	5,00,000	3,00,00
Current liabilities	7,00,000	4,00,000
Total (Rs.)	<u>24,00,000</u>	<u>15,00,000</u>

Income Statement

	BA Ltd. (Rs.)	DA Ltd. (Rs.)
Net Sales	34,50,000	17,00,000
Cost of Goods sold	<u>27,60,000</u>	<u>13,60,000</u>
Gross profit	6,90,000	3,40,000
Operating expenses	2,00,000	1,00,000
Interest	70,000	42,000
Earning before taxes	4,20,000	1,98,00
Taxes @ 50%	<u>2,10,000</u>	<u>99,000</u>
Earning after taxes (EAT)	<u>2,10,000</u>	<u>99,000</u>
Additional Information :		
No. of Equity shares	1,00,000	80,000
Dividend payment ratio (D/P)	40%	60%
Market price per share	Rs.40	Rs.15

Assume that both companies are in the process of negotiating a merger through an exchange of equity shares. You have been asked to assist in establishing equitable exchange terms and are required to :

- (i) Decompose the share price of both the companies into EPS and P/E components; and also segregate their EPS figures into Return on Equity (ROE) and book value/intrinsic value per share components.
- (ii) Estimate future EPS growth rates for each company.
- (iii) Based on expected operating synergies BA Ltd. estimates that the intrinsic value of DA's equity share would be Rs.20 per share on its acquisition. You are required to develop a range of justifiable equity share exchange ratios that can be offered by BA Ltd. to the shareholders of DA Ltd. Based on your analysis in part (i) and (ii), would you expect the negotiated terms to be closer to the upper, or the lower exchange ratio limits and why?

Management Accounting and Financial Analysis

- (iv) Calculate the post-merger EPS based on an exchange ratio of 0.4 : 1 being offered by BA Ltd. Indicate the immediate EPS accretion or dilution, if any, that will occur for each group of shareholders.
- (v) Based on a 0.4 : 1 exchange ratio and assuming that BA Ltd.'s pre-merger P/E ratio will continue after the merger, estimate the post-merger market price. Also show the resulting accretion or dilution in pre-merger market prices. (20 marks) (Nov 2008)

Answer

Market price per share (MPS) = EPS SP/E ratio or P/E ratio = MPS/EPS

(i) Determination of EPS, P/E ratio, ROE and BVPS of BA Ltd. and DA Ltd.

		BA Ltd.	DA Ltd.
Earnings After Tax	(EAT)	210000	99000
No. of Shares	(N)	100000	80000
EPS	(EAT/N)	2.1	1.2375
Market price per share	(MPS)	40	15
P/E Ratio	(MPS/EPS)	19.05	12.12
Equity Funds	(EF)	1200000	800000
BVPS	(EF/N)	12	10
ROE	(EAT/EF) × 100	17.50%	12.37%

(ii) Estimation of growth rates in EPS for BA Ltd. and DA Ltd.

Retention Ratio	(1-D/P ratio)	0.6	0.4
Growth Rate	(ROE × Retention Ratio)	10.50%	4.95%

(iii) Justifiable equity shares exchange ratio

(a) Intrinsic value based		= Rs.20 / Rs.40	= 0.5:1 (upper limit)
(b) Market price based	= MPS _b /MPS _a	= Rs.15 / Rs.40	= 0.375:1 (lower limit)

Since, BA Ltd. has a higher EPS, ROE, P/E ratio and even higher EPS growth expectations, the negotiable terms would be expected to be closer to the lower limit, based on the existing share prices.

(iv) Calculation of post merger EPS and its effects

Particulars			BA Ltd.	DA Ltd.	Combined
EAT	(Rs.)	(i)	210000	99000	309000
Share outstanding		(ii)	100000	80000	132000*
EPS	(Rs.)	(i) / (ii)	2.1	1.2375	2.341
EPS Accretion (Dilution)	(Re.)		0.241	(0.301***)	

Mergers and Acquisition

(v) Estimation of Post merger Market price and other effects

Particulars			BA Ltd.	DA Ltd.	Combined
EPS	(Rs.)	(i)	2.1	1.2375	2.341
P/E Ratio		(ii)	19.05	12.12	19.05
MPS	(Rs.)	(i) / (ii)	40	15	44.6
MPS Accretion	(Rs.)		4.6	2.84***	

* Shares outstanding (combined) = 100000 shares + (.40 × 80000) = 132000 shares

** EPS claim per old share = Rs.2.34 × .04 = Re.0.936

EPS dilution = Rs.1.2375 – Re.0.936 = Re.0.3015

***S claim per old share (Rs.44.60 × 0.4) 17.84

Less: MPS and per old share 15.00

2.84

Management Accounting and Financial Analysis

NOTE

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FOREIGN COLLABORATION AND JOINT VENTURES

Question 1

Write a note on the important financial issues to be taken into consideration while negotiating for foreign technical collaborations.
(10 marks)(November, 2002)

Answer

Foreign Technical Collaboration: Besides the necessity to take into account legal and regulatory requirements, the following issues are to be considered from a financial angle, while negotiating for foreign technical collaborations.

Tax aspects: This has assumed great importance as the liability to tax in the hands of the Indian party and the foreign party, needs to be clearly understood at both ends.

If there is an outright purchase of know-how, the expenditure is capital in nature as far as the Indian party is concerned. There are other intricate issues to be understood such as when the know-how will attach to plant and therefore be a subject for depreciation allowance, etc.

Cash flow aspects: The fee to be agreed upon could be a lump sum either up front or payable in instalments. The timings of payment has present value implications. The cash flows should be appropriately taken into account while evaluating liability.

Risk aspects: The risk implication could differ as between a lump sum purchase and a purchase to be paid in future royalties.

If a lump sum purchase, risks of product failure, obsolescence, etc., are to be clearly reckoned. The investments in know-how up front could stand jeopardised. A royalty on the other hand could be a better bet to ward off the effects of such failures.

Exchange Risk: Since payment for the know-how invariably is to be in foreign currency, it brings with it the necessity for considering forex risk. A lump-sum payment or agreed instalment plan could minimise the exchange risk whereas a royalty stream could have a greater exposure.

Question 2

Write a brief note on the tax issues relating to Foreign Collaboration Agreements.

(6 marks)(November, 2004)

Management Accounting and Financial Analysis

Answer

Tax issues relating to foreign collaborations:

Foreign collaborations can be either technical or financial or sometimes both.

In the case of technical collaborations, the important tax-related considerations that would arise are:

- (i) Treatment of technical fees – when to be capitalized and subjected to depreciation and when to be charged to Profit and Loss Account.

While the tax treatment has to be determined in every individual case as applicable, generally:

- ◆ Fees relating to advice on procurement of machinery/assets, can be capitalized to the value of such asset
- ◆ Fees relating to process are revenue in nature and are to be amortised over a period.
- ◆ Fees relating to use of brand name are to be treated as revenue expenditure.

The issue of tax deduction at source from such fees as payable is also to be studied carefully and compliance taken care of.

- (ii) Treatment of Dividend/distribution of profit

Normally there could be a withholding tax in the case of dividend to non-resident shareholders. As of now, in India in view of corporate dividend tax, there is no tax on dividend in the hands of recipients.

- (iii) Since in a foreign collaboration agreement at least two countries are involved, the applicability of respective Double Taxation Relief Agreement is also to be studied and the relevant provisions taken into account.

Question 3

An Indian company is desirous of obtaining foreign technology. Write a brief note explaining the important financial considerations it should take into account in this context.

(4 Marks) (November, 2006)

Answer

FINANCIAL CONSIDERATIONS WHILE BUYING FOREIGN TECHNOLOGY

- ◆ *Lump sum vs. royalty:* Whether to pay for the technology in a lump sum front-end or as royalty over a period of years, is an important issue. Advantages of lump sum payment are (a) the amount will become certain (b) the amount can be discounted forward and therefore be less; (c) the forex exposure risk is avoided; (d) it provides an opportunity to reduce the per unit cost of technology by maximizing sales. The main advantage of royalty payment is (a) it ensures that the sales benefit is realized before technology payment accrues; (b) it provides easy instalments for funding;

Foreign Collaboration and Joint Ventures

The advantages of lump sum model becomes the disadvantages of the royalty model and vice versa. It is for the organization to choose what is best under its circumstances.

- ◆ Tax issues: Deduction of tax at source is mandatory. This should be important from the recipient's point of view and should be made clear to them. If it is a lump sum upfront payment, tax also could be certain; whereas, in protracted royalty payment, there is a chance of tax uncertainty.

As to allowability in the hands of the payer, there have been various case laws and it would be advisable for the payer to obtain beforehand expert opinion as to how to plan its tax shield in the best manner possible.

- ◆ *Government clearance:* Automatic permission will be given for foreign technology agreements upto certain limits – currently, USD 2 million or royalty at 5% for domestic sales and 8% for export sales. In other cases approval will have to be obtained.

Management Accounting and Financial Analysis

NOTE

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INTRODUCTION TO INTERNATIONAL FINANCIAL MANAGEMENT – INCLUDING RAISING OF CAPITAL ABROAD (ADRs, GDRs, ECBs)

Question 1

Write short note on Global Depository Receipts or Euro Convertible Bonds.

(5 marks) (May 1996) & (4 marks) (May 2003)

Answer

Global Depository Receipts (GDRs): It is a negotiable certificate denominated in US dollars which represents a Non-US company's publically traded local currency equity shares. GDRs are created when the local currency shares of an Indian company are delivered to Depository's local custodian Bank against which the Depository bank issues depository receipts in US dollars. The GDRs may be traded freely in the overseas market like any other dollar – expressed security either on a foreign stock exchange or in the over-the-counter market or among qualified institutional buyers.

By issue of GDRs Indian companies are able to tap global equity market to raise foreign currency funds by way of equity. It has distinct advantage over debt as there is no repayment of the principal and service costs are lower. (Students may refer to MAFA study Material for detailed discussion)

OR

Euro Convertible Bonds: They are bonds issued by Indian companies in foreign market with the option to convert them into pre-determined number of equity shares of the company. Usually price of equity shares at the time of conversion will fetch premium. The Bonds carry fixed rate of interest.

The issue of bonds may carry two options:

Call option: Under this the issuer can call the bonds for redemption before the date of maturity. Where the issuer's share price has appreciated substantially, i.e., far in excess of the redemption value of bonds, the issuer company can exercise the option. This call option forces the investors to convert the bonds into equity. Usually, such a case arises when the share prices reach a stage near 130% to 150% of the conversion price.

Management Accounting and Financial Analysis

Put option: It enables the buyer of the bond a right to sell his bonds to the issuer company at a pre-determined price and date. The payment of interest and the redemption of the bonds will be made by the issuer-company in US dollars.

Question 2

Write short note on American Depositary Receipts (ADRS).

(5 marks) (November, 1996) & (6 marks) (November, 2002)

Answer

American Depositary Receipts (ADRs): A depository receipt is basically a negotiable certificate denominated in US dollars that represents a non- US company's publicly traded local currency (INR) equity shares/securities. While the term refer to them is global depository receipts however, when such receipts are issued outside the US, but issued for trading in the US they are called ADRs

An ADR is generally created by depositing the securities of an Indian company with a custodian bank. In arrangement with the custodian bank, a depository in the US issues the ADRs. The ADR subscriber/holder in the US is entitled to trade the ADR and generally enjoy rights as owner of the underlying Indian security. ADRs with special/unique features have been developed over a period of time and the practice of issuing ADRs by Indian Companies is catching up.

Only such Indian companies that can stake a claim for international recognition can avail the opportunity to issue ADRs. The listing requirements in US and the US GAAP requirements are fairly severe and will have to be adhered. However if such conditions are met ADR becomes an excellent sources of capital bringing in foreign exchange.

These are depository receipts issued by a company in USA and are governed by the provisions of Securities and Exchange Commission of USA. As the regulations are severe, Indian companies tap the American market through private debt placement of GDRS listed in London and Luxemburg stock exchanges.

Apart from legal impediments, ADRS are costlier than Global Depositary Receipts (GDRS). Legal fees are considerably high for US listing. Registration fee in USA is also substantial. Hence, ADRS are less popular than GDRS.

Question 3

Write short note on Euro convertible bonds.

(5 marks) (May 1998)

Answer

Euro Convertible bonds: Euro Convertible bonds are quasi-debt securities (unsecured) which can be converted into depository receipts or local shares. ECBs offer the investor an option to convert the bond into equity at a fixed price after the minimum lock in period. The price of equity shares at the time of conversion will have a premium element. The bonds carry a fixed rate of interest. These are bearer securities and generally the issue of such bonds may carry two options viz., call option and put option. A call option allows the company to

**Introduction to International Financial Management – including Raising of Capital abroad
(ADRs, GDRs, ECBs)**

force conversion if the market price of the shares exceed a particular percentage of the conversion price. A put option allows the investors to get his money back before maturity. In the case of ECBs, the payment of interest and the redemption of the bonds will be made by the issuer company in US dollars. ECBs issues are listed at London or Luxemburg stock exchanges.

Indian companies which have opted ECBs issue are Jindal Strips, Reliance, Essar Gujarat, Sterlite etc. Indian companies are increasingly looking at Euro-Convertible bond in place of Global Depository Receipts because GDRs are falling into disfavour among international fund managers.

An issuing company desirous of raising the ECBs is required to obtain prior permission of the Department of Economic Affairs, Ministry of Finance, Government of India, Companies having 3 years of good track record will only be permitted to raise funds. This condition is not applicable in the case of projects in infrastructure sector. The proceeds of ECBs would be permitted only for following purposes:

- (i) Import of capital goods.
- (ii) Retiring foreign currency debts.
- (iii) Capitalising Indian joint venture abroad.
- (iv) 25% of total proceedings can be used for working capital and general corporate restructuring.

The impact of such issues has been to procure for the issuing companies finances at very competitive rates of interest. For the country a higher debt means a forex outgo in terms of interest.

Question 4

Write short note on Forfaiting.

(1 mark)(November, 2002)

Answer

Forfaiting: During recent years the forfaiting has acquired immense importance as a source of financing. It means 'surrendering' or relinquishing rights to something. This is very commonly used in international practice among the exporters and importers. In the field of exports, it implies surrenders by an exporter of the claim to receive payment for goods or services rendered to an importer in return for cash payment for those goods and services from the forfaiter (generally a bank), who takes over the importer's promissory notes or the exporters' bills of exchange. The forfaiter, thus assumes responsibility for the collection of such documents from the importer. This arrangement is to help exporter, however, there is always a fixed cost of finance by way of discounting of the debt instruments by the forfaiter. Forfaiting assumes the nature of a purchase transaction without recourse to any previous holder in respect of the instrument of debts at the time of maturity in future.

The exporter generally takes bill or promissory notes to the forfaiter which buys the instrument at a discount from the face value. The importer party's bank has already guaranteed payment

Management Accounting and Financial Analysis

unconditionally and irrevocably, and the exporter party's bank now takes complete responsibility for collection without recourse to exporter. Thus a forfaiting arrangement eliminates all credit risks. It also protects against the possibility that interest rate may fluctuate before the bills or notes are paid off. Any adverse movement in exchange rate, any political uncertainties or business conditions may change to the disadvantage of the parties concerned. The forfaiting business is very common in Europe and has come as an important source of export financing in leading currencies.

Question 5

Write short note on Global Depository Receipts.

(6 marks)(May 2004)

Answer

Global Depository Receipt: It is an instrument in the form of a depository receipt or certificate created by the Overseas Depository Bank outside India denominated in dollar and issued to non-resident investors against the issue of ordinary shares or FCCBs of the issuing company. It is traded in stock exchange in Europe or USA or both. A GDR usually represents one or more shares or convertible bonds of the issuing company.

A holder of a GDR is given an option to convert it into number of shares/bonds that it represents after 45 days from the date of allotment. The shares or bonds which a holder of GDR is entitled to get are traded in Indian Stock Exchanges. Till conversion, the GDR does not carry any voting right. There is no lock-in-period for GDR.

Impact of GDR's on Indian Capital Market

Since the inception of GDR's a remarkable change in Indian capital market has been observed as follows:

- (i) Indian stock market to some extent is shifting from Bombay to Luxemburg.
- (ii) There is arbitrage possibility in GDR issues.
- (iii) Indian stock market is no longer independent from the rest of the world. This puts additional strain on the investors as they now need to keep updated with-world wide economic events.
- (iv) Indian retail investors are completely sidelined. GDR's/Foreign Institutional Investors' placements + free pricing implies that retail investors can no longer expect to make easy money on heavily discounted rights/public issues.

As a result of introduction of GDR's a considerable foreign investment has flown into India. This has also helped in the creation of specific markets like

- (i) GDR's are sold primarily to institutional investors.
- (ii) Demand is likely to be dominated by emerging market funds.
- (iii) Switching by foreign institutional investors from ordinary shares into GDR's is likely.

**Introduction to International Financial Management – including Raising of Capital abroad
(ADRs, GDRs, ECBs)**

- (iv) Major demand is also in UK, USA (Qualified Institutional Buyers), South East Asia (Hong Kong, Singapore), and to some extent continental Europe (principally France and Switzerland).

The following parameters have been observed in regard to GDR investors.

- (i) Dedicated convertible investors.
- (ii) Equity investors who wish to add holdings on reduced risk or who require income enhancement.
- (iii) Fixed income investors who wish to enhance returns.
- (iv) Retail investors: Retail investment money normally managed by continental European banks which on an aggregate basis provide a significant base for Euro-convertible issues.

Question 6

Explain the term 'Exposure Netting', with an example. (5 marks)(November, 2004)

Answer

Exposure Netting refers to offsetting exposures in one currency with Exposures in the same or another currency, where exchange rates are expected to move in such a way that losses or gains on the first exposed position should be offset by gains or losses on the second currency exposure.

The objective of the exercise is to offset the likely loss in one exposure by likely gain in another. This is a manner of hedging forex exposures though different from forward and option contracts. This method is similar to portfolio approach in handling systematic risk.

For example, let us assume that a company has an export receivables of US\$ 10,000 due 3 months hence, if not covered by forward contract, here is a currency exposure to US\$.

Further, the same company imports US\$ 10,000 worth of goods/commodities and therefore also builds up a reverse exposure. The company may strategically decide to leave both exposures open and not covered by forward, it would be doing an exercise in exposure netting.

Despite the difficulties in managing currency risk, corporates can now take some concrete steps towards implementing risk mitigating measures, which will reduce both actual and future exposures. For years now, banking transactions have been based on the principle of netting. Where only the difference of the summed transactions between the parties is actually transferred. This is called settlement netting. Strictly speaking in banking terms this is known as settlement risk. Exposure netting occurs where outstanding positions are netted against one another in the event of counter party default.

Question 7

Distinguish between Forfeiting and Factoring. (4 marks)(November, 2004)

Management Accounting and Financial Analysis

Answer

Forfeiting was developed to finance medium to long term contracts for financing capital goods. It is now being more widely used in the short-term also especially where the contracts involve large values. There are specialized finance houses that deal in this business and many are linked to some of main banks.

This is a form of fixed rate finance which involves the purchase by the forfeiture of trade receivables normally in the form of trade bills of exchange or promissory notes, accepted by the buyer with the endorsement or guarantee of a bank in the buyer's country.

The benefits are that the exporter can obtain full value of his export contract on or near shipment without recourse. The importer on the other hand has extended payment terms at fixed rate finance.

The forfeiture takes over the buyer and country risks. Forfeiting provides a real alternative to the government backed export finance schemes.

Factoring can however, broadly be defined as an agreement in which receivables arising out of sale of goods/services are sold by a "firm" (client) to the "factor" (a financial intermediary) as a result of which the title to the goods/services represented by the said receivables passes on to the factor. Henceforth, the factor becomes responsible for all credit control, sales accounting and debt collection from the buyer(s). In a full service factoring concept (without recourse facility) if any of the debtors fails to pay the dues as a result of his financial instability/insolvency/bankruptcy, the factor has to absorb the losses.

Some of the points of distinction between forfeiting and factoring have been outlined in the following table.

Factoring	Forfeiting
This may be with recourse or without recourse to the supplier.	This is without recourse to the exporter. The risks are borne by the forfeiter.
It usually involves trade receivables of short maturities.	It usually deals in trade receivables of medium and long term maturities.
It does not involve dealing in negotiable instruments.	It involves dealing in negotiable instrument like bill of exchange and promissory note.
The seller (client) bears the cost of factoring.	The overseas buyer bears the cost of forfeiting.
Usually it involves purchase of all book debts or all classes of book debts.	Forfeiting is generally transaction or project based. Its structuring and costing is case to case basis.
Factoring tends to be a 'case of' sell of debt obligation to the factor, with no secondary market.	There exists a secondary market in forfeiting. This adds depth and liquidity to forfeiting.

**Introduction to International Financial Management – including Raising of Capital abroad
(ADRs, GDRs, ECBs)**

Question 8

Write a brief note on external Commercial borrowings.

(5 Marks)(November, 2005)

Answer

ECB include bank loans, supplier credit, securitised instruments, credit from export credit agencies and borrowings from multilateral financial institutions. These securitised instruments may be FRNs, FRBs etc. Indian corporate sector is permitted to raise finance through ECBs within the framework of the policies and procedures prescribed by the Central Government. Multilateral financial institutions like IFC, ADB, AFIC, CDC are providing such facilities while the ECB policy provides flexibility in borrowing consistent with maintenance of prudential limits for total external borrowings, its guiding principles are to keep borrowing maturities long, costs low and encourage infrastructure/core and export sector financing which are crucial for overall growth of the economy. The government of India, from time to time changes the guidelines and limits for which the ECB alternative as a source of finance is pursued by the corporate sector. During past decade the government has streamlined the ECB policy and procedure to enable the Indian companies to have their better access to the international financial markets.

The government permits the ECB route for variety of purposes namely expansion of existing capacity as well as for fresh investment. But ECB can be raised through internationally recognized sources. There are caps and ceilings on ECBs so that macro economy goals are better achieved. Units in SEZ are permitted to use ECBs under a special window.

NOTE

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT, FOREIGN EXCHANGE MARKETS AND DEALINGS THEREIN

Question 1

- (i) Explain the term "Foreign Exchange Rate Risk".
- (ii) Mention any four of the tools available to cover Exchange Rate Risk.
- (iii) Alert Ltd. is planning to import a multi-purpose machine from Japan at a cost of 3,400 lakhs yen. The company can avail loans at 18% interest per annum with quarterly rests with which it can import the machine. However, there is an offer from Tokyo branch of an India based bank extending credit of 180 days at 2% per annum against opening of an irrevocable letter of credit.

Other Information:

Present exchange rate Rs. 100 = 340 yen.

180 days' forward rate Rs. 100 = 345 yen.

Commission charges for letter of credit at 2% per 12 months.

Advise whether the offer from the foreign branch should be accepted?

(4 + 4 + 12 = 20 marks) (November, 1996)

Answer

- (i) **Foreign Exchange Rate Risk:** This risk relates to the uncertainty attached to the exchange rates between two currencies. For example, the amount borrowed in foreign currency is to be repaid in the same currency or in some other acceptable currency.

Thus if the foreign currency becomes stronger than (say) Indian rupees, the Indian borrower has to repay the loan in terms of more rupees than the rupees he obtained by way of loan. The extra rupees he pays is not due to an increase in interest rate but because of unfavourable exchange rate. Conversely he will gain if the rupee is stronger. The fluctuation in the exchange rate causes uncertainty and this uncertainty gives rise to exchange rate risk.

Management Accounting and Financial Analysis

(ii) The following tools are available to cover exchange rate risk:

- (a) Spot contracts.
- (b) Rupee forward contract.
- (c) Rupee roll over contract.
- (d) Cross-currency forward contract.
- (e) Cross currency roll over contract.
- (f) Cross currency options.
- (g) Currency futures.
- (h) Currency and interest rate swaps.
- (i) Arbitrage.

(iii) **Option I (To finance the purchase by availing loan at 18% per annum):**

Cost of machine		<i>Rs. in lakhs</i>
3,400 lakh yen as Rs. 100 = 340 yen	=	1,000.00
Add: Interest at 4.5% I Quarter	=	45.00
Add: Interest at 4.5% II Quarter	=	<u>47.03</u>
(on Rs. 1045 lakhs)		
Total outflow in rupees	=	<u>1,092.03</u>

Alternatively, interest may also be calculated on compounded basis, i.e.,

$$\text{Rs. } 1,000 \times [1.045]^2 = \text{Rs. } 1,092.03 \text{ lakhs.}$$

Option II (To accept the offer from foreign branch):

Cost of letter of credit		<i>Rs. in lakhs</i>
at 1% on 3,400 lakhs yen as Rs. 100 = 340 yen	=	10.00
Add: Interest I Quarter	=	0.45
Add: Interest II Quarter	=	<u>0.47</u>
(A)	=	<u>10.92</u>

Payment at the end of 180 days:

Cost	3,400.00 lakhs yen
Interest at 2% p.a. $[3,400 \times 2/100 \times 180/365]$	<u>33.53 lakhs yen</u>
	<u>3,433.53 lakhs yen</u>

Conversion at Rs. 100 = 345 yen $[3,433.53/345 \times 100]$ (B) = Rs. 995.23

Total Cost : A + B = 1,006.15 lakhs

Advice: Option No. 2 is cheaper. Hence, the offer can be accepted.

**Foreign Exchange Exposure & Risk Managements, Foreign Exchange
Markets and Dealing Therein**

Question 2

Write short notes on:

- (a) *Cross Currency Roll Over Contracts.*
- (b) *Financial Swaps.*

(5 + 5 = 10 marks) (May 1997)

Answer

- (a) **Cross Currency Roll Over Contracts:** Cross Currency Roll Over contracts are contracts to cover overseas leg of long-term foreign exchange liabilities or assets. The cover is initially obtained for six months and later extended for further period of six months and so on.

Roll over charge or benefit depends on forward premium or discount, which in turn, is a function of interest rate differentials between US dollar and the other currency. There is no risk of currency appreciation or depreciation in the overseas leg:

Roll over for a maturity period exceeding six months is not possible because in the inter-bank market, quotations beyond six months are not available.

Under the Roll Over Contract the basic rate of exchange is fixed but loss or gain arises at the time of each Roll over depending upon the market conditions.

- (b) **Financial Swaps:** Financial swaps are a funding technique which permit a borrower to access one market and then exchange the liability for another type of liability. Investors can exchange one type of asset for another with a preferred income stream. Swaps by themselves are not a funding instrument, they are a device to obtain the desired form of financing indirectly which otherwise might be inaccessible or too expensive.

All swaps involve exchange of a series of periodic payments between two parties, usually through an intermediary which is a large international financial institution. The two payment streams are estimated to have identical present values at the outset when discounted at the respective cost of funds in the relevant primary financial markets.

The two major types of financial swaps are interest rate swaps and currency swaps. The two are combined to give a cross-currency interest rate swap. A number of variations are possible within each major type. In the following para the concept of interest rate and currency swaps has been described.

Interest rate swaps: With an interest rate swap, interest-payment obligations are exchanged between two parties, but they are denominated in the same currency. The swap can be longer term in nature than either the forward or the future contracts. Term may extend upto 15 years or more, whereas the range for forward or futures contracts is upto five years. The market for swaps is unregulated and began in the early 1980's. The most common interest rate swap is the floating-fixed rate exchange. For example, a corporate that has borrowed on a fixed rate term basis may swap with a counter party to make floating rate interest payments.

Management Accounting and Financial Analysis

Currency swaps: Yet another device for shifting risk is the currency swap. In a currency swap, two parties exchange debt obligations denominated in different currencies. Each party agrees to pay the other's interest obligation. At maturity, principal amounts are exchanged, usually at a rate of exchange agreed upon in advance. The currency swap market traces its roots to the 1960's, when parallel loans were arranged between two borrowers of different nationalities.

In currency swaps both the principal and interest in one currency are swapped for principal and interest in another currency. On maturity the principal amounts are swapped back.

Usually in practice swap is intermediated by a bank which takes away a part of the savings, leaving the balance to be shared by the parties. Swap gains or losses arises because of spread compression which varies in different financial markets.

Question 3

Write short on Forward as hedge instrument.

(5 marks) (November, 1997)

Answer

Forward as hedge instrument: International transactions both trade and financial give rise to currency exposures. A currency exposure if left unmanaged leaves a corporate open to profits or losses arising on account of fluctuations in currency ratio. One way in which corporate can protect itself from effects of fluctuations in currency rates is through buying or selling in forward markets.

A forward transaction is a transaction requiring delivery at future date of a specified amount of one currency for a specific amount of another currency. The exchange rate is determined at the time of entering into the contract but the payment and delivery takes place on maturity. Corporates use forwards to hedge themselves against fluctuations in currency price that would have a significant impact on their financial position. Banks use forward to offset the forward contracts entered into with non-bank customers.

Question 4

A company operating in a country having the dollar as its unit of currency has today invoiced sales to an Indian company, the payment being due three months from the date of invoice. The invoice amount is \$ 13,750 and at today's spot rate of \$ 0.0275 per Re. 1, is equivalent to Rs. 5,00,000.

It is anticipated that the exchange rate will decline by 5% over the three months period and in order to protect the dollar proceeds, the importer proposes to take appropriate action through foreign exchange market.

The three month forward rate is quoted as \$ 0.0273 per Re. 1.

You are required to calculate the expected loss and to show, how it can be hedged by forward contract.

(6 marks) (May 1998)

**Foreign Exchange Exposure & Risk Managements, Foreign Exchange
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Answer

Calculation of the expected loss due to foreign exchange rate fluctuation

Present cost

\$ 13,750 @ today spot rate of \$ 0.0275 per Re. 1 = Rs. 5,00,000

Cost after 3 months

\$ 13,750 @ expected spot rate of \$ 0.026125 per Re. 1 = Rs. 5,26,316

(Refer to working note)

Expected loss Rs. 26,316

Forward cover is available today at 1 Re. = \$ 0.0273 for 3 months

If we take forward cover now for payment after 3 months net amount to be paid is (\$ 13,750/\$ 0.0273) = Rs. 5,03,663

Hence, by forward contract the company can cover Rs. 22,653 (Rs. 26,316 – Rs. 3,663) i.e. about 86% of the expected loss.

Working Note:

Expected spot rate after 3 months

It is anticipated by the company that the exchange rate will decline by 5% over the three months period. The expected rate will be

Present rate – 5% of the present rate

= \$ 0.0275 – 5% of \$ 0.0275

= \$ 0.026125

Alternatively, the expected rate may also be calculated as follows:

$$\$ 0.0275 \times \frac{95}{100} = \$ 0.026125$$

Alternative Solution:

Calculation of expected loss due to foreign exchange rate fluctuations

Present cost

\$ 13,750 @ Rs. 36.36 = Rs. 4,99,950.00

(Refer to working note)

Cost after 3 months

\$ 13,750 @ expected spot rate of Rs. 38.18 = Rs. 5,24,975.00

(Refer to working note 2)

Expected loss Rs. 25,025.00

Management Accounting and Financial Analysis

Forward cover is available today at 1 Rs. 36.36 for 1 US \$ (*Refer to working note 3*)

If we take forward cover now for payment after 3 months net amount to be paid is Rs. 5,03,663 (\$13,750 @ Rs. 36.63 per \$).

Hence, by forward contract the company can cover Rs. 21,362 (Rs. 25,025 – Rs. 3,663) i.e. about 85.3% of the expected loss.

Working Note:

1. *Today spot rate*

\$ 0.0275 per Re. 1

$$\text{or } 1 \$ = \frac{1}{0.0275} \text{ or Rs. } 36.36$$

2. *Expected spot rate after 3 months*

It is anticipated by the Company that the exchange rate will decline by 5% over the three months period. The expected rate will be

Present rate + 5% of Rs. 36.36

= Rs. 38.18

3. *Today forward rate*

$$\$ 0.0273 \text{ per Re. } 1 \text{ or } 1 \$ = \frac{1}{0.0273} = \text{Rs. } 36.63$$

Question 5

X Ltd. an Indian company has an export exposure of 10 million (100 lakhs) yen, value September end. Yen is not directly quoted against Rupee. The current spot rates are USD/INR = 41.79 and USD/JPY = 129.75.

It is estimated that Yen will depreciate to 144 level and Rupee to depreciate against dollar to 43.

Forward rate for September 1998 USD/Yen = 137.35 and USD/INR = 42.89.

You are required to:

- (i) to calculate the expected loss if hedging is not done. How the position will change with company taking forward cover?*
- (ii) If the spot rate on 30th September, 1998 was eventually USD/Yen = 137.85 and USD/INR = 42.78, is the decision to take forward cover justified?*

(8 marks) (November, 1998)

**Foreign Exchange Exposure & Risk Managements, Foreign Exchange
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Answer

(i) Calculation of the expected loss if hedging is not done.

	Rs.
Exposure of (100 lakhs) yen at current spot rate of Rs. 32.21 per 100 yen (Refer to Working Note 1)	32,21,000
Exposure of (100 lakhs) yen at estimated rate of Rs. 29.86 per 100 yen (Refer to Working Note 2)	29,86,000
Expected loss without forward cover	<u>2,35,000</u>

Calculation of exposure if the Company takes forward cover

Exposure of (100 lakhs) yen at forward rate of Rs. 31.23 per 100 yen (Refer to Working Note 3)	31,23,000
If the Company takes forward cover the company loss is (Rs. 31,23,000 – Rs. 32,21,000)	98,000

(ii) Calculation of exposure at the spot rate of 30th September, 1998

	Rs.
Exposure of (100 lakhs) yen at the spot rate of Rs. 31.03 per 100 yen (Refer to Working Note 4)	31,03,000

Hence, without forward cover the loss was Rs. 1,18,000 (Rs. 31,03,000 – Rs. 32,21,000).
Hence, decision of the company to take forward cover is justified.

Working Notes:

- Spot (current) USD/INR = 41.79 and spot USD/JPY = 129.75
Therefore, Spot (current) JPY/INR = $41.79/129.75$
= Rs. 0.3221 per yen
or Rs. 32.21 per 100 yen.
- Expected USD/INR = 43 and USD/JPY = 144
Therefore, Expected JPY/INR = $43/144$
= Rs. 0.2986
or Rs. 29.86 per 100 yen.
- Forward USD/JPY = 137.35 and USD/INR = 42.89
Therefore, Forward JPY/INR = $42.89/137.35$
= Rs. 0.3123

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4. Spot (30th September, 1998) USD/INR = 42.78 and USD/JPY = 137.85
Therefore, spot (30th September, 1998) = $42.78/137.85$
= Rs. 0.3103 per yen
or Rs. 31.03 per 100 yen.

Question 6

X Co. Ltd. an Indian Company has to make payment of 3 million (30 lakhs) US Dollars after 6 months against import of plant and machinery. What are the different alternatives to hedge against this foreign currency exposure. Give explanations. (7 marks) (May 1999)

Answer

X Co. Ltd., an Indian Company which has to make payment of 3 million (30 lakhs) US Dollar after 6 months against import of plant and machinery has the following alternatives to hedge against this foreign currency exposure:

- (i) *Forward cover:* X Co. Ltd. can take a full forward cover against its foreign exchange exposure and entirely hedge its risk. It can contract with a bank to buy US\$ forward at an agreed exchange rate. Suppose the 6 months forward rate is Rs. 42.40/US \$ 1. This means that X Co. Ltd. has definite cost of Rs. 42.40×3 million rupees i.e. Rs. 1,272 lakhs, irrespective of the actual exchange rate at the end of six months.
- (ii) *Foreign currency option:* The foreign currency option is the right (not an obligation) to buy or sell a currency at an agreed exchange rate (exercise price) on or before an agreed maturity period. The right to buy is called a call option and right to sell is put option. A foreign currency option holder will exercise his right only if it is advantageous to do so. X Co. Ltd. can buy a 6 months put option in rupees at Rs. 42.40 (say) plus 5% (say) premium for purchasing the option i.e. maximum final (cost) Rs. 42.40×30 lakhs $\times 1.05$ i.e. Rs. 1,335.6 lakhs (including the cost of the premium Rs. 63.6 lakhs). Suppose at the end of 6 months, the exchange rate becomes Rs. 44, the company should exercise its put option since it will sell (pay) INR 42.40. On the other hand, if the rupee appreciates and the exchange rate at the end of six months is INR 42/US \$, the Co. will not exercise its option. In the open market, it need to pay only INR 42 (instead of INR 42.40 exercise price) to buy one US \$. However, it has already paid the option premium. If it does not exercise the option, its total cost will be Rs. 30 lakhs $\times$ Rs. 42 + Rs. 63.6 = Rs. 1,323.6 lakhs. Except for the cost of option premium, the foreign currency option provides a unique hedging alternative, one can avoid the loss by exercising appropriate option and gain from the favourable change in the exchange rate by not exercising the option.
- (iii) *Money market operations:* Another hedging technique is the money market operations. X Co. can borrow 3 million US \$. Now convert into rupees at the current exchange rate and invest in the money market in India for 6 months. If interest rate parity holds, the difference in the forward rate and the spot rate is the reflection of the differences in the interest rates in two countries. Thus, X Co. will be able to hedge against the change in

Foreign Exchange Exposure & Risk Managements, Foreign Exchange Markets and Dealing Therein

the exchange rate. The problem with the money market alternative is that all markets are not open and all currencies are not fully convertible.

Question 7

Outland Steel has a small but profitable export business. Contracts involve substantial delays in payment, but since the company has had a policy of always invoicing in dollars, it is fully protected against changes in exchange rates. More recently the sales force has become unhappy with this, since the company is losing valuable orders to Japanese and German firms that are quoting in customers' own currency. How will you, as Finance Manager, deal with the situation?
(8 marks) (May 2000)

Answer

As a Finance Manager to deal with the situation two problems emerge – (i) the problem of negotiating individual contracts and (ii) managing the company's foreign exchange exposure.

The sales force can be allowed to quote in customer's own currency and hedge for currency risk by obtaining the forward contracts etc.

The finance manager can decide whether the company ought to insure. There are two ways of protecting against exchange loss. First, by selling the foreign currency forward. Secondly, to borrow foreign currency against its receivables, sell the foreign currency spot and invest the proceeds in the foreign currency say dollars. Interest rate parity theory tells us that in free market the difference between selling forward and selling spot should be exactly equal to difference between the interest on the money one has to pay overseas and the interest one earns from dollars.

Question 8

Write short note on Debt route for foreign exchange funds. (5 marks) (May 2000)

Answer

Debt route for foreign exchange funds: The following are some of the instruments used for borrowing of funds from the international market:

- (i) *Syndicated bank loans:* The borrower should obtain a good credit rating from the rating agencies. Large loans can be obtained in a reasonably short period with few formalities. Duration of the loan is generally 5 to 10 years. Interest rate is based on LIBOR plus spread depending upon the rating. Some covenants are laid down by the lending institutions like maintenance of key financial ratios.
- (ii) *Euro bonds:* These are basically debt instruments denominated in a currency issued outside the country of the currency. For example, Yen bond floated in France. Primary attraction of these bonds is the shelter from tax and regulations which provide Scope for arbitraging yields. These are usually bearer bonds and can take the form of (i) traditional fixed rate bonds (ii) floating rate notes (FRN's) (iii) Convertible bonds.

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- (iii) *Foreign bonds*: Foreign bonds, are foreign currency bonds and sold at the country of that currency and are subject to the restrictions as placed by that country on the foreigners' funds.
- (iv) *Euro Commercial Papers*: These are short term money market securities usually issued at a discount, for maturity in less than one year.
- (v) *External Commercial Borrowings (ECB's)*: These include commercial bank loans, buyer's credit and supplier's credit, securitised instruments such as floating rate notes and fixed rate bonds, credit from official export credit agencies and commercial borrowings from multi-lateral financial institutions like IFCI, ADB etc. External Commercial borrowings have been a popular source of financing for most of capital goods imports. They are gaining importance due to liberalization of restrictions. ECB's are subject to overall ceilings with sub-ceilings fixed by the government from time to time.
- (vi) All other loans are approved by the government.

Question 9

The following table shows interest rates for the United States dollar and French francs. The spot exchange rate is 7.05 francs per dollars. Complete the missing entries:

	3 Months	6 Months	1 Year
<i>Dollar interest rate</i>			
(annually compounded)	11½%	12¼%	?
<i>Franc interest rate</i>			
(annually compounded)	19½	?	20%
<i>Forward franc per dollar</i>	?	?	7.5200
<i>Forward discount per franc</i>			
per cent per year	?	–6.3%	

(8 marks) (November, 2000)

Answer

Computation of missing entries in the table

For computing the missing entries in the table we will use interest rates parity theorem (IRP). This theorem states that the exchange rate of two countries will be affected by their interest rate differential. In other words, the currency of one country with a lower interest rate should be at a forward premium in terms of currency of country with higher interest rates and vice versa. This implies that the exchange rate (forward and spot) differential will be equal to the interest rate differential between the two countries i.e.

Interest rate differential = Exchange rate differential

$$\text{or } \frac{(1+r_f)}{(1+r_d)} = \frac{S_{f/d}}{F_{f/d}}$$

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Where r_f is the rate of interest of country F (say the foreign country), r_d is rate of interest of country D (say domestic country), $S_{f/d}$ is the spot rate between the two countries F and D and $F_{f/d}$ is the forward rate between the two countries F and D.

3 months

Dollar interest rate = $11\frac{1}{2}\%$

(annually compounded)

Franc interest rate = $19\frac{1}{2}\%$

(annually compounded)

Now, Differential in interest rate = Differential between forward and spot rate

i.e. $\frac{1+.115}{1+.195}$ = Differential between forward and spot rate

Or Differential between forward and spot rate = 93.3%

Therefore, Forward discount on franc per cent per year = $100\% - 93.3\%$
= -6.7%

Forward discount on franc per cent for 3 months = $-6.7/4$ or -1.675%

Forward franc = Today's spot rate (Difference between forward and Spot rate)
= 0.141844 dollar ($100\% - 1.675\%$)

Forward franc = 0.1394681 dollar

Forward franc per dollar = $1/0.1394681$
= 7.17

6 months

Dollar interest rate = $12\frac{1}{4}\%$

(annually compounded)

Forward discount on franc % per year = -6.3% or -3.15% for 6 months

Hence 6 months Forward rate = 0.141844 dollar (Spot rate) ($100\% - 3.15$)
= 0.13737 dollars

Forward francs per dollar = $1/0.13737$

or Forward francs per dollar = 7.28 francs

Again, Differential in interest rate = Differential between forward

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between the two countries and spot rate

Now, $\frac{1 + \text{Dollar interest rate}}{1 + \text{Franc interest rate}} = \text{Differential between forward and spot rate}$

$$\text{Or } \frac{1 + .1225}{1 + \text{Franc interest rate}} = (100\% - 6.3\%)$$

$$\text{Or } \frac{1 + .1225}{1 + \text{Franc interest rate}} = 93.7\%$$

$$\text{Or } 1 + \text{Franc interest rate} = \frac{1.1225}{93.7\%}$$

$$\text{Or Franc interest rate} = 1.19797 - 1$$

$$\text{Or } = .19797$$

$$\text{Or } = 19.8\%$$

1 Year

Franc interest rate = 20%

(annually compounded)

Forward franc per dollar = 7.5200

Today's spot rate is 7.05 (given) francs per dollar i.e. 1 Franc = 0.141844 dollar

Forward francs is 7.52 francs per dollar i.e. franc = 0.132978 dollar

Difference 0.008866 dollar

$$\begin{aligned} \text{Forward discount on Francs per cent per year} &= \frac{0.008866}{0.141844} \times 100 \\ &= -6.25\% \text{ or } -6.3\% \text{ (rounded off)} \end{aligned}$$

Again, Differential in interest rates = Differential between forward

Between the two countries rate and spot rate

$$\text{i.e. } \frac{1 + \text{Dollar interest rate}}{1 + 0.20} = \frac{7.05}{7.52}$$

$$\text{Or Dollar interest rate} = 1.20 \times 0.9374 - 1$$

$$= 1.125 - 1$$

$$= 0.125 \text{ or } 12.5\%$$

Question 10

Shoe Company sells to a wholesaler in Germany. The purchase price of a shipment is 50,000 deutsche marks with term of 90 days. Upon payment, Shoe Company will convert the DM to dollars. The present spot rate for DM per dollar is 1.71, whereas the 90-day forward rate is

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1.70.

You are required to calculate and explain:

(i) If Shoe Company were to hedge its foreign-exchange risk, what would it do? What transactions are necessary?

(ii) Is the deutsche mark at a forward premium or at a forward discount?

(iii) What is the implied differential in interest rates between the two countries?

(Use interest-rate parity assumption).

(10 marks) (May 2001)

Answer

(i) If Shoe Company were to hedge its foreign exchange risk, it would enter into forward contract of selling deutsche marks 90 days forward. It would sell 50,000 deutsche marks 90 days forward. Upon delivery of 50,000 DM 90 days hence, it would receive US \$ 29,412 i.e. 50,000 DM/1.70. If it were to receive US \$ payment today it would receive US \$ 29,240 i.e. 50,000 DM/1.71. Hence, Shoe Company will be better off by \$ 172 if it hedges its foreign exchange risk.

(ii) The deutsche mark is at a forward premium. This is because the 90 days forward rate of deutsche marks per dollar is less than the current spot rate of deutsche marks per dollar. This implies that deutsche mark is expected to be strengthen i.e. Fewer deutsche mark will be required to buy dollars.

(iii) The interest rate parity assumption is that high interest rates on a currency is offset by forward discount and low interest rate on a currency is offset by forward premiums.

Further, the spot and forward exchange rates moves in tandem, with the link between them based on interest differential. The movement between two currencies to take advantage of interest rates differential is a major determinant of the spread between forward and spot rates. The forward discount or premium is approximately equal to interest differential between the currencies i.e.

$$\frac{F_{(DM/US\$)} - S_{(DM/US\$)}}{S_{(DM/US\$)}} \times \frac{365}{90} = r_{DM} - r_{US\$}$$

$$\text{or } \frac{1.70 - 1.71}{1.71} \times \frac{365}{90} = r_{DM} - r_{US\$}$$

$$\text{Or } -0.0237 = r_{DM} - r_{US\$}$$

Therefore, the differential in interest rate is -2.37%, which means if interest rate parity holds, interest rate in the US should be 2.37% higher than in Germany.

Question 11

Airlines Company entered into an agreement with Airbus for buying latest plans for a total value of F.F. (French Francs) 1,000 Million payable after 6 months. The current spot exchange rate is INR (Indian Rupees) 6.60/FF. The Airlines Company can not predict the

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exchange rate in the future. Can the Airlines Company hedge its Foreign Exchange risk? Explain by examples. (November, 2001)

Answer

Airlines company can hedge its foreign exchange risk by the following:

- (i) **Hedging through forward contract:** The company can take full forward cover against foreign exchange exposure and entirely hedge its risk. It can contract with a bank to buy French franc forward at an agreed exchange rate e.g. suppose the 6 months forward rate is INR 6.77/FF. The liability is fixed and the airlines can concentrate on operation. Cost of forward contract

$$= \frac{6.60 - 6.77}{6.60} \times \frac{360}{\text{days}}$$

- (ii) **Foreign currency option:** Foreign currency option is the right (not an obligation) to buy or sell a currency at an agreed exchange rate (exercise price) on or before an agreed maturity period. The right to buy is called a call option and right to sell is put option. Suppose, the airlines wants to purchase a 6 months put option. The put option exercise rate (say) is INR 6.70. The Airlines will be required to pay a premium for purchasing the option say 5% of the value of put option $\text{INR } 6700 \times 0.05 = \text{INR } 335$

Maximum final cost = $6700 + 335 = \text{INR } 7035$

Suppose at the end of 6 months the exchange rate stay at INR 6.8/FF

Airlines will exercise its put option hence it will sell (pay) INR 6.7

(The exercise price) to obtain one French Franc. In this market it will be required to pay INR 6.80.

Suppose exchange rate at the end of 6 months is INR 6.35, Airlines should not exercise its option. In the open market it need to pay only INR 6.35 (instead of INR 6.70) to buy one FF. However, it has already paid the option premium.

- (iii) **Money market operations:** Airlines can borrow FF 1000 million now, convert them into rupee at the current exchange rate and involve (invest) in money market in India for 6 months. If interest rate parity holds, the difference in the forward rate and the spot rate is the reflection of the difference in the interest rates in two countries. Thus Airlines will be able to hedge against the changes in the exchange rate. The problem with money market is that all markets are not open and all countries are not fully convertible.

Question 12

(a) Distinguish between:

- (i) Forwards and Futures.
- (ii) Caps and Collars.

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- (b) A customer with whom the Bank had entered into 3 months' forward purchase contract for Swiss Francs 10,000 at the rate of Rs. 27.25 comes to the bank after 2 months and requests cancellation of the contract. On this date, the rates, prevailing, are:

Spot	CHF 1 = Rs. 27.30	27.35
One month forward	Rs. 27.45	27.52

What is the loss/gain to the customer on cancellation? (4 + 6 = 10 marks) (May 2002)

Answer

- (a) (i) **Forwards and Futures:** Forward contracts are private bilateral contracts and have well established commercial usage, whereas future contracts are standardized tradable contracts fixed in terms of size, contract and other features and traded on an exchange.

In forward contracts, price is not publicly disclosed whereas in future contracts price is transparent.

Forward contract is exposed to the problem of liquidity whereas in futures there is no liquidity problem.

Forward contracts are usually settled on one specified delivery date. In the case of futures there is a range of delivery dates.

Forwards are settled at the end of contract whereas futures are settled daily.

In forwards delivery or final cash settlement usually takes place, whereas in futures contract is usually closed out prior to maturity.

- (ii) **Caps and Collars:** These are derivatives which a finance manager can use to manage his cash-flows effectively and also to reduce the risk involved in case of a major devaluation of currency.

Caps-if a company decides on a particular rate of a currency vis-à-vis the rupee over which it is not ready to take a risk, it can buy a cap at that rate. The cost of caps is very prohibitive and can be offset by selling a 'floor' which is just the opposite of cap. Collar – a combination of caps and floors is called collar.

- (b) The contract would be cancelled at the one month forward sale rate of Rs. 27.52.

	Rs.
Francs bought from customer under original forward contract at:	27.25
It is sold to him on cancellation at:	<u>27.52</u>
Net amount payable by customer per Franc	<u>0.27</u>

At Rs. 0.27 per Franc, exchange difference for CHF 10,000 is Rs. 2,700.

Loss to the Customer:

Exchange difference (Loss) Rs. 2,700

Note: The exchange commission and other service charges are ignored.

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Question 13

- (a) *Distinguish between Forward Contracts and Futures Contracts?*
- (b) *On 1st April, 3 months interest rate in the US and Germany are 6.5 per cent and 4.5 per cent per annum respectively. The \$/DM spot rate is 0.6560. What would be the forward rate for DM for delivery on 30th June ?*
- (c) *In International Monetary Market an international forward bid for December, 15 on pound sterling is \$ 1.2816 at the same time that the price of IMM sterling future for delivery on December, 15 is \$ 1.2806. The contract size of pound sterling is £ 62,500. How could the dealer use arbitrage in profit from this situation and how much profit is earned?*

(6+4+4 = 14 marks) (November, 2002)

Answer

(a) Distinction between forward and futures contracts

1. Trading: Forward contracts are traded on personal basis or on telephone or otherwise.
Futures contracts are traded in a competitive arena.
2. Size of contract: Forward contracts are individually tailored and have no standardised size.
Futures contracts are standardised in terms of quantity or amount as the case may be.
3. Organised exchanges: Forward contracts are traded in an over the counter market.
Futures contracts are traded on organised exchanges with a designated physical location.
4. Settlement: Forward contracts settlement takes place on the date agreed upon between the parties.
Futures contracts settlements are made daily via exchange's clearing house.
5. Delivery date: Forward contracts may be delivered on the dates agreed upon and in terms of actual delivery.
Futures contracts delivery dates are fixed on cyclical basis and hardly takes place. However, it does not mean that there is no actual delivery.
6. Transaction costs: Cost of forward contracts is based on bid – ask spread.
Futures contracts entail brokerage fees for buy and sell orders.
7. Marking to market: Forward contracts are not subject to marking to market. Futures contracts are subject to marking to market in which the loss profit is debited or credited in the margin account on daily basis due to change in price.
8. Margins: Margins are not required in forward contract.

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In futures contracts every participant is subject to maintain margin as decided by the exchange authorities.

9. Credit Risk: In forward contracts credit risk is borne by each party and, therefore, every party has to bother for the creditworthiness of the counter – party.

In futures contracts the transaction is a two way transaction, hence the parties need not to bother for the creditworthiness of each party.

10. Liability extent: In forward contracts the liability happens to be unlimited because market fluctuation may be wide.

In Futures Contract the extent of loss/profit is known every next day and depending on the risk taking capacity of the party, exposure may be limited.

(b)	USD	DM
Spot	0.6560	1.000
Interest rate p.a.	6.5%	4.5%
Interest for 91 days	0.0106	0.0112
Amount after 91 days	0.6666	1.0112
Hence forward rate	<u>0.6666</u> 1.0112	0.6592

OR

$$\text{Forward rate} = \frac{0.6560 \times \left\{ 1 + \left(0.065 \times \frac{91}{365} \right) \right\}}{\left\{ 1 + \left(0.045 \times \frac{91}{365} \right) \right\}}$$

$$= 0.6592$$

(c)	Buy £ 62500 × 1.2806	= \$ 80037.50
	Sell £ 62500 × 1.2816	= <u>\$ 80100.00</u>
	Profit	<u>\$ 62.50</u>

Alternatively if the market comes back together before December 15, the dealer could unwind his position (by simultaneously buying £ 62,500 forward and selling a futures contract. Both for delivery on December 15) and earn the same profit of \$ 62.5.

Question 14

Write short note on Options.

(1 mark) (November, 2002)

Answer

Options: An option is a claim without any liability. It is a claim contingent upon the occurrence of certain conditions and, therefore, option is a contingent claim. More specifically, an option is contract that gives the holder a right, without any obligation, to buy or

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sell an asset at an agreed price on or before a specified period of time. The option to buy an asset is known as a call option and the option to sell an asset is called put option. The price at which option can be exercised is called as exercise price or strike price. Based on exercising the option it can be classified into two categories:

- (i) **European Option:** When an option is allowed to be exercised only on the maturity date.
- (ii) **American Option:** When an option is exercised any time before its maturity date.

When an option holder exercises his right to buy or sell it may have three possibilities.

- (a) An option is said to be in the money when it is advantageous to exercise it.
- (b) When exercise is not advantageous it is called out of the money.
- (c) When option holder does not gain or lose it is called at the money.

The holder of an option has to pay a price for obtaining call/put option. This price is known as option premium. This price has to be paid whether the option is exercised or not.

Question 15

What is a "derivative"? Briefly explain the recommendations of the L.C. Gupta Committee on derivatives. (6 marks)(May 2003)

Answer

The derivatives are most modern financial instruments in hedging risk. The individuals and firms who wish to avoid or reduce risk can deal with the others who are willing to accept the risk for a price. A common place where such transactions take place is called the 'derivative market'.

Derivatives are those assets whose value is determined from the value of some underlying assets. The underlying asset may be equity, commodity or currency.

Based on the report of Dr. L.C. Gupta Committee the following recommendations are accepted by SEBI on Derivatives:

- Phased introduction of derivative products, with the stock index futures as starting point for equity derivative in India.
- Expanded definition of securities under the Securities Contracts (Regulation) Act (SCRA) by declaring derivative contracts based on index of prices of securities and other derivatives contracts as securities.
- Permission to existing stock exchange to trade derivatives provided they meet the eligibility conditions including adequate infrastructural facilities, on-line trading and surveillance system and minimum of 50 members opting for derivative trading etc.
- Initial margin requirements related to the risk of loss on the position and capital adequacy norms shall be prescribed.

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- Annual inspection of all the members operating in the derivative segment by the Stock Exchange.
- Dissemination of information by the exchange about the trades, quantities and quotes in real time over at least two information vending networks.
- The clearing corporation/house to settle derivatives trades. This should meet certain specified eligibility conditions and the clearing corporation/house must interpose itself between both legs of every trade, becoming the legal counter party to both or alternatively provide an unconditional guarantee for settlement of all trades.
- Two tier membership: The trading member and clearing member, and the entry norms for the clearing member would be more stringent.
- The clearing member should have a minimum networth of Rs. 3 crores and shall make a deposit of Rs. 50 lakhs with the exchange/clearing corporation in the form of liquid assets.
- Prescription of a model Risk Disclosure Document, and monitoring broker-dealer/client relationship by the Stock Exchange and the requirement that the sales personnel working in the broker-dealer office, should pass a certification programme.
- Corporate clients/financial institutions/mutual funds should be allowed to trade derivatives only if and to the extent authorised by their Board of Directors/Trustees.

Mutual Funds would be required to make necessary disclosures in their offer documents if they opt to trade derivatives. For the existing schemes, they would require the approval of their unit holders. The minimum contract value would be Rs. 1 lakh, which would also apply in the case of individuals.

Question 16

In March, 2003, the Multinational Industries makes the following assessment of dollar rates per British pound to prevail as on 1.9.2003:

<i>\$/Pound</i>	<i>Probability</i>
1.60	0.15
1.70	0.20
1.80	0.25
1.90	0.20
2.00	0.20

- (i) *What is the expected spot rate for 1.9.2003?*
- (ii) *If, as of March, 2003, the 6-month forward rate is \$ 1.80, should the firm sell forward its pound receivables due in September, 2003?* (6 marks) (May 2003)

Answer

- (i) Calculation of expected spot rate for September, 2003:

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\$ for £	Probability	Expected \$/£
(1)	(2)	(1) × (2) = (3)
1.60	0.15	0.24
1.70	0.20	0.34
1.80	0.25	0.45
1.90	0.20	0.38
2.00	<u>0.20</u>	<u>0.40</u>
	<u>1.00</u>	EV = <u>1.81</u>

Therefore, the expected spot value of \$ for £ for September, 2003 would be \$ 1.81.

- (ii) If the six-months forward rate is \$ 1.80, the expected profits of the firm can be maximised by retaining its pounds receivable.

Question 17

Write short note on *Marking to market*.

(4 marks) (November, 2003)

Answer

Marking to market: It implies the process of recording the investments in traded securities (shares, debt-instruments, etc.) at a value, which reflects the market value of securities on the reporting date. In the context of derivatives trading, the futures contracts are marked to market on periodic (or daily) basis. Marking to market essentially means that at the end of a trading session, all outstanding contracts are repriced at the settlement price of that session. Unlike the forward contracts, the future contracts are repriced every day. Any loss or profit resulting from repricing would be debited or credited to the margin account of the broker. It, therefore, provides an opportunity to calculate the extent of liability on the basis of repricing. Thus, the futures contracts provide better risk management measure as compared to forward contracts.

Suppose on 1st day we take a long position, say at a price of Rs. 100 to be matured on 7th day. Now on 2nd day if the price goes up to Rs. 105, the contract will be repriced at Rs. 105 at the end of the trading session and profit of Rs. 5 will be credited to the account of the buyer. This profit of Rs. 5 may be drawn and thus cash flow also increases. This marking to market will result in three things – one, you will get a cash profit of Rs. 5; second, the existing contract at a price of Rs. 100 would stand cancelled; and third you will receive a new futures contract at Rs. 105. In essence, the marking to market feature implies that the value of the futures contract is set to zero at the end of each trading day.

Question 18

- (a) ABC Co. have taken a 6 month loan from their foreign collaborators for US Dollars 2 millions. Interest payable on maturity is at LIBOR plus 1.0%. Current 6-month LIBOR is 2%.

Enquiries regarding exchange rates with their bank elicit the following information:

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Spot USD 1 Rs. 48.5275

6 months forward Rs. 48.4575

- (i) What would be their total commitment in Rupees, if they enter into a forward contract?
- (ii) Will you advise them to do so? Explain giving reasons.
- (b) A company operating in Japan has today effected sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is 108 lakhs yen. At today's spot rate, it is equivalent to Rs. 30 lakhs. It is anticipated that the exchange rate will decline by 10% over the 3 months period and in order to protect the yen payments, the importer proposes to take appropriate action in the foreign exchange market. The 3 months forward rate is presently quoted as 3.3 yen per rupee. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

(10 + 6 = 16 marks)(November, 2003)

Answer

- (a) Firstly, the interest is calculated at 3% p.a. for 6 months. That is:

$$\text{USD } 20,00,000 \times 3/100 \times 6/12 = \text{USD } 30,000$$

From the forward points quoted, it is seen that the second figure is less than the first, this means that the currency is quoted at a discount.

- (i) The value of the total commitment in Indian rupees is calculated as below:

Principal Amount of loan	USD 20,00,000
Add: Interest	USD 30,000
Amount due	USD 20,30,000
Spot rate	Rs. 48.5275
Forward Points (6 months)	(-) 0.0700
Forward Rate	Rs. 48.4575
Value of Commitment	Rs. 9,83,68,725

- (ii) It is seen from the forward rates that the market expectation is that the dollar will depreciate. If the firm's own expectation is that the dollar will depreciate more than what the bank has quoted, it may be worthwhile not to cover forward and keep the exposure open.

If the firm has no specific view regarding future dollar price movements, it would be better to cover the exposure. This would freeze the total commitment and insulate the firm from undue market fluctuations. In other words, it will be advisable to cut the losses at this point of time.

Given the interest rate differentials and inflation rates between India and USA, it would be unwise to expect continuous depreciation of the dollar. The US Dollar is a

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stronger currency than the Indian Rupee based on past trends and it would be advisable to cover the exposure.

(b) Spot rate of Re. 1 against yen = 108 lakhs yen/Rs. 30 lakhs = 3.6 yen

3 months forward rate of Re. 1 against yen = 3.3 yen

Anticipated decline in Exchange rate = 10%.

Expected spot rate after 3 months

= 3.6 yen – 10% of 3.6

= 3.6 – 0.36 = 3.24 yen per rupee

	Rs. (in lakhs)
Present cost of 108 lakhs yen	30
Cost after 3 months: 108 lakhs yen/ 3.24 yen	<u>33.33</u>
Expected exchange loss	<u>3.33</u>
If the expected exchange rate risk is hedged by a Forward contract:	
Present cost	30
Cost after 3 months if forward contract is taken 108 lakhs yen/ 3.3 yen	<u>32.73</u>
Expected loss	<u>2.73</u>

Suggestion: If the exchange rate risk is not covered with forward contract, the expected exchange loss is Rs. 3.33 lakhs. This could be reduced to Rs. 2.73 lakhs if it is covered with Forward contract. Hence, taking forward contract is suggested.

Question 19

The following data relates to ABC Ltd.'s share prices:

Current price per share Rs. 180

Price per share in the futures market-6 months Rs. 195

It is possible to borrow money in the market for securities transactions at the rate of 12% per annum.

Required:

(i) Calculate the theoretical minimum price of a 6 month-forward contract.

(ii) Explain if any arbitraging opportunities exist. (6 marks)(May 2004)

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Answer

- (i) **ABC Ltd.**

Calculation of theoretical minimum price of a 6 months forward contract

Theoretical Minimum price = $180 + (180 \times .12 \times 6/12) = \text{Rs. } 190.80$

- (ii) Arbitrage opportunity exists.

The arbitrageur can borrow money @ 12% for 6 months and buy the share at Rs. 180. At the same time he can sell the shares in the futures market at Rs. 195. On the expiry date, 6 months later, he could deliver the share and collect Rs. 195, pay off Rs. 190.80 and record a profit of Rs. 4.20.

Question 20

The United States Dollar is selling in India at Rs. 45.50. If the interest rate for a 6-months borrowing in India is 8% per annum and the corresponding rate in USA is 2%.

- (i) *do you expect United States Dollar to be at a premium or at discount in the Indian forward market;*
(ii) *what is the expected 6-months forward rate for United States Dollar in India; and*
(iii) *what is the rate of forward premium or discount?* (9 marks)(May 2004)

Answer

- (i) Under the given circumstances, the USD is expected to quote at a premium in India as the interest rate is higher in India.
(ii) Calculation of the forward rate:

$$\frac{1+R_h}{1+R_f} = \frac{F_1}{E_0}$$

Where: R_h is home currency interest rate, R_f is foreign currency interest rate, F_1 is end of the period forward rate, and E_0 is the spot rate.

$$\text{Therefore } \frac{1+(0.08/2)}{1+(0.02/2)} = \frac{F_1}{45.50}$$

$$\frac{1+0.04}{1+0.01} = \frac{F_1}{45.50}$$

$$\text{or } \frac{(1.04)}{1.01} \times 45.50 = F_1$$

$$\text{or } \frac{47.32}{1.01} = F_1$$

$$\text{or } F_1 = 46.85$$

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(iii) Rate of premium:

$$\frac{46.85 - 45.50}{45.50} \times \frac{12}{6} \times 100 = 5.93\%$$

Question 21

Which position on the index future gives a speculator, a complete hedge against the following transactions:

- (i) The share of Right Limited is going to rise. He has a long position on the cash market of Rs. 50 lakhs on the Right Limited. The beta of the Right Limited is 1.25.
- (ii) The share of Wrong Limited is going to depreciate. He has a short position on the cash market of Rs. 25 lakhs on the Wrong Limited. The beta of the Wrong Limited is 0.90.
- (iii) The share of Fair Limited is going to stagnant. He has a short position on the cash market of Rs. 20 lakhs of the Fair Limited. The beta of the Fair Limited is 0.75.

(6 marks) (November, 2004)

Answer

Sl. No.	Company Name	Trend	Amount (Rs.)	Beta	Index Value (Rs.)	Position
(i)	Right Ltd.	Rise	50 lakh	1.25	62,50,000	Short
(ii)	Wrong Ltd.	Depreciate	25 lakh	0.90	22,50,000	Long
(iii)	Fair Ltd.	Stagnant	20 lakh	0.75	<u>15,00,000</u>	Long
					<u>25,00,000</u>	Short

Question 22

Excel Exporters are holding an Export bill in United States Dollar (USD) 1,00,000 due 60 days hence. They are worried about the falling USD value which is currently at Rs. 45.60 per USD. The concerned Export Consignment has been priced on an Exchange rate of Rs. 45.50 per USD. The Firm's Bankers have quoted a 60-day forward rate of Rs. 45.20.

Calculate:

- (i) Rate of discount quoted by the Bank
- (ii) The probable loss of operating profit if the forward sale is agreed to.

(4 marks)(November, 2004)

Answer

- (i) Rate of discount quoted by the bank

$$= \frac{(45.20 - 45.60) \times 365 \times 100}{45.20 \times 60} = 5.38\%$$

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(ii) Probable loss of operating profit:

$$(45.20 - 45.50) \times 1,00,000 = \text{Rs. } 30,000$$

Question 23

Explain the terms 'Intrinsic value of an option' and the 'Time value of an option'.

(4 marks)(November, 2004)

Answer

Intrinsic value of an Option: Intrinsic value of an option and the time value of an option are primary determinants of an option's price. By being familiar with these terms and knowing how to use them, any one will find himself in a much better position to choose the option contract that best suits his particular investment requirements.

Intrinsic Value is the value that any given option would have if it were exercised today. It is defined as the difference between the option's strike price (X) and the stock's actual current price (CP). In the case of a call option, you can calculate this intrinsic value by taking $CP - X$. If the result is greater than zero (in other words, if the stock's current price is greater than the option's strike price), then the amount left over after subtracting $CP - X$ is the option's intrinsic value. If the strike price is greater than the current stock price, then the intrinsic value of the option is zero – it would not be worth anything if it were to be exercised today (please note that an option's intrinsic value can never be below zero. To determine the intrinsic value of a put option, simply reverse the calculation to $X - CP$).

To illustrate, let us assume Wipro stock is priced at Rs. 105. In this case, a Wipro 100 *call* option would have an intrinsic value of (Rs. 105 – Rs. 100 = Rs 5). However, a Wipro 100 *put* option would have an intrinsic value of zero (Rs. 100 – Rs. 105 = Rs. –5). Since this figure is less than zero, the intrinsic value is zero. Again, intrinsic value can never be negative). On the other hand, if we were to look at a Wipro *put* option with a strike price of 120, then this particular option would have an intrinsic value of Rs. 15 (Rs. 120 – Rs. 105 = Rs. 15).

Time Value: This is the second component of an option's price. It is defined as any value of an option other than its intrinsic value. Looking at the example above, if Wipro is trading at Rs. 105 and the Wipro 100 *call* option is trading at Rs. 7, then we would say that this option has Rs. 2 of time value (Rs. 7 option price – Rs. 5 intrinsic value = Rs. 2 time value). Options that have zero intrinsic value are comprised entirely of time value. Time value is basically the risk premium that the seller requires to provide the option buyer with the right to buy/sell the stock up to the expiration date. This component may be regarded as the "insurance premium" of the option. This is also known as extrinsic value. Time value decays over time. In other words, the time value of an option is directly related to how much time an option has until expiration. The more time an option has until expiration, the greater the chances of option ending up in the money.

Question 24

A customer with whom the Bank had entered into 3 months forward purchase contract for Swiss Franks 1,00,000 at the rate of Rs. 36.25 comes to the bank after two months and

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requests cancellation of the contract. On this date, the rates are:

Spot	CHF 1 = Rs. 36.30	36.35
One month forward	36.45	36.52

Determine the amount of Profit or Loss to the customer due to cancellation of the contract.

(4 marks)(November, 2004)

Answer

Original contract for Swiss Francs 1,00,000 @ 36.25 – amount receivable by the customer. To cancel the purchase contract 1 month before the due date – The contract will be cancelled at 1 month forward sale rate i.e. Swiss Francs 1 = 36.52 payable by the customer.

Hence, Swap profit / loss to the customer:

Rs. 36.52	payable by the customer
Rs. 36.25	receivable by the customer
Rs. 0.27	Net payable by the customer i.e. loss

Therefore, total loss to the customer is

Swiss Francs 1,00,000 × Rs. 0.27 = Rs. 27,000

Question 25

On January 28, 2005 an importer customer requested a bank to remit Singapore Dollar (SGD) 25,00,000 under an irrevocable LC. However, due to bank strikes, the bank could effect the remittance only on February 4, 2005. The interbank market rates were as follows:

	January, 28	February 4
Bombay US\$1	= Rs. 45.85/45.90	45.91/45.97
London Pound 1	= US\$ 1.7840/1.7850	1.7765/1.7775
Pound 1	= SGD 3.1575/3.1590	3.1380/3.1390

The bank wishes to retain an exchange margin of 0.125%. How much does the customer stand to gain or lose due to the delay?

(Calculate rate in multiples of .0001)

(8 Marks) (May, 2005)

Answer

On January 28, 2005 the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US \$	=	Rs. 45.90
Pound 1	=	US\$ 1.7850
Pound 1	=	SGD 3.1575

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$$\text{Therefore, SGD 1} = \frac{\text{Rs. } 45.90 * 1.7850}{\text{SGD } 3.1575}$$

SGD 1 =	Rs. 25.9482
Add: Exchange margin (0.125%)	<u>Rs. 0.0324</u>
	<u>Rs. 25.9806</u>

On February 4, 2005 the rates are

US \$	=	Rs. 45.97
Pound 1	=	US\$ 1.7775
Pound 1	=	SGD 3.1380

$$\text{Therefore, SGD 1} = \frac{\text{Rs. } 45.97 * 1.7775}{\text{SGD } 3.1380}$$

SGD 1 =	Rs. 26.0394
Add: Exchange margin (0.125%)	<u>Rs. 0.0325</u>
	<u>Rs. 26.0719</u>

Hence, loss to the importer

= SGD 25,00,000 (Rs.26.0719 – Rs.25.9806)

= Rs. 2,28,250

Question 26

You as a dealer in foreign exchange have the following position in Swiss Francs on 31st October, 2004:

	Swiss Francs
<i>Balance in the Nostro A/c Credit</i>	1,00,000
<i>Opening Position Overbought</i>	50,000
<i>Purchased a bill on Zurich</i>	80,000
<i>Sold forward TT</i>	60,000
<i>Forward purchase contract cancelled</i>	30,000
<i>Remitted by TT</i>	75,000
<i>Draft on Zurich cancelled</i>	30,000

What steps would you take, if you are required to maintain a credit Balance of Swiss Francs 30,000 in the Nostro A/c and keep as overbought position on Swiss Francs 10,000?

(7 Marks) (November, 2005)

Management Accounting and Financial Analysis

Answer

Exchange Position/Currency Position:

<i>Particulars</i>	<i>Purchase Sw. Fcs.</i>	<i>Sale Sw. Fcs.</i>
Opening Balance Overbought	50,000	
Bill on Zurich	80,000	
Forward Sales – TT		60,000
Cancellation of Forward Contract		30,000
TT Sales		75,000
Draft on Zurich cancelled	<u>30,000</u>	
	1,60,000	1,65,000
Closing Balance Oversold	<u>5,000</u>	
	<u>1,65,000</u>	<u>1,65,000</u>

Cash Position (Nostro A/c)

	Credit	Debit
Opening balance credit	1,00,000	
TT sales		<u>75,000</u>
	1,00,000	75,000
Closing balance (credit)		<u>25,000</u>
	<u>1,00,000</u>	<u>1,00,000</u>

The Bank has to buy spot TT Sw. Fcs. 5,000 to increase the balance in Nostro account to Sw. Fcs. 30,000.

This would bring down the oversold position on Sw. Fcs. As Nil.

Since the bank requires an overbought position of Sw. Fcs. 10,000, it has to buy forward Sw. Fcs. 10,000.

Question 27

You sold Hong Kong Dollar 1,00,00,000 value spot to your customer at Rs. 5.70 & covered yourself in London market on the same day, when the exchange rates were

US\$ 1 = H.K.\$ 7.5880 7.5920

Local inter bank market rates for US\$ were

Spot US\$ 1 = Rs. 42.70 42.85

Calculate cover rate & ascertain the profit or loss in the transaction ignore brokerage.

(4 Marks) (November, 2005)

Answer

The bank (Dealer) covers itself by buying from the market at market selling rate.

Rupee – Dollar selling rate = Rs. 42.85

Dollar – Hong Kong Dollar = HK \$ 7.5880

Rupee – Hong Kong cross rate = Rs. 42.85 / 7.5880
= Rs. 5.6471

Amount received from customer (1 crore $\times$ 5.70)	Rs. 5,70,00,000
Amount paid on cover deal (1 crore $\times$ 5.6471)	<u>Rs. 5,64,71,000</u>
Profit to Bank	Rs. 5,29,000

(8 Marks) (May, 2006)

(v) Refund the debt taken in Can\$ with the interest due on it, i.e.,

Management Accounting and Financial Analysis

	Can\$
Principal	1000.00
Add: Interest @9% for 3 months	<u>22.50</u>
Total	1022.50

Net arbitrage gain = 1025.1 – 1022.5 = **Can\$ 2.6**

Question 29

XYZ Ltd. is an export oriented business house based in Mumbai. The Company invoices in customers' currency. Its receipt of US \$ 1,00,000 is due on September 1, 2005.

Market information as at June 1, 2005.

Exchange Rates		Currency Futures	
US \$/Rs.		US \$/Rs.	Contract size Rs.4,72,000
Spot	0.02140	June	0.02126
1 Month Forward	0.02136	September	0.02118
3 Months Forward	0.02127		

	Initial Margin	Interest Rates in India
June	Rs.10,000	7.50%
September	Rs.15,000	8.00%

On September 1, 2005 the spot rate US \$/Rs. is 0.02133 and currency future rate is 0.2134. Comment which of the following methods would be most advantageous for XYZ Ltd.

- (a) Using forward contract
- (b) Using currency futures
- (c) Not hedging currency risks.

It may be assumed that variation in margin would be settled on the maturity of the futures contract. (10 Marks)(November, 2006)

Answer

Receipts using a forward contract = 1,00,000/0.02127 = Rs.47,01,457

Receipts using currency futures

The number of contracts needed is (1,00,000/0.02118)/4,72,000 = 10

Initial margin payable is 10 x Rs.15,000 = Rs.1,50,000

On September 1 Close at 0.02133

Receipts = US\$1,00,000/0.02133 = 46,88,233

Variation Margin = [(0.02134 – 0.02118) x 10 x 472000/-]/0.02133

OR (0.00016x10x472000)/.02133 = 755.2/0.02133 35,406

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	47,23,639
Less: Interest Cost – $1,50,000 \times 0.08 \times 3/12$	<u>Rs.3,000</u>
Net Receipts	Rs.47,20,639
<u>Receipts under different methods of hedging</u>	
Forward contract	Rs.47,01,457
Futures	Rs.47,20,639
<u>No hedge</u>	
US\$ 1,00,000/0.02133	Rs.46,88,233

The most advantageous option would have been to hedge with futures.

Question 30

Spot rate 1 US \$ = Rs.48.0123

180 days Forward rate for 1 US \$ = Rs.48.8190

Annualised interest rate for 6 months – Rupee = 12%

Annualised interest rate for 6 months – US \$ = 8%

Is there any arbitrage possibility? If yes how an arbitrageur can take advantage of the situation, if he is willing to borrow Rs.40,00,000 or US \$83,312. (5 Marks) (November, 2006)

Answer

Spot Rate = Rs.4000000/- /83312 = 48.0123

Forward Premium on US\$ = $[(48.8190 - 48.0123)/48.0123] \times 12/6 \times 100$
= 3.36%

Interest rate differential = 12% - 8%
= 4% (Negative Interest rate differential)

Since the negative Interest rate differential is greater than forward premium there is a possibility of arbitrage inflow into India.

The advantage of this situation can be taken in the following manner:

1. Borrow US\$ 83312 for 6 months
Amount to be repaid after 6 months
= US \$ 83312 $(1 + 0.08 \times 6/12)$ = US\$86644.48
2. Convert US\$ 83312 into Rupee and get the principal i.e. Rs.40,00,000
Interest on Investments for 6 months – Rs.4000000/- $\times 0.06$
= Rs.240000/-
Total amount at the end of 6 months = Rs.(4000000 + 240000/-)
= Rs.4240000/-

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Converting the same at the forward rate

$$= \text{Rs.}4240000/- / \text{Rs.}48.8190=$$

$$= \text{US\$ } 86851.43$$

Hence the gain is US \$ (86851.43 – 86644.48) = US\$ 206.95 OR

Rs.10103 i.e., (\$206.95 x Rs.48.8190)

Question 31

Following are the details of cash inflows and outflows in foreign currency denominations of MNP Co. an Indian export firm, which have no foreign subsidiaries:

Currency	Inflow	Outflow	Spot rate	Forward rate
US \$	4,00,00,000	2,00,00,000	48.01	48.82
French Franc (FFr)	2,00,00,000	80,00,000	7.45	8.12
U.K. £	3,00,00,000	2,00,00,000	75.57	75.98
Japanese Yen	1,50,00,000	2,50,00,000	3.20	2.40

(i) Determine the net exposure of each foreign currency in terms of Rupees.

(ii) Are any of the exposure positions offsetting to some extent? (4 Marks) (November, 2006)

Answer

(i) Net exposure of each foreign currency in Rupees

	Inflow (Millions)	Outflow (Millions)	Net Inflow (Millions)	Spread	Net Exposure (Millions)
US\$	40	20	20	0.81	16.20
FFr	20	8	12	0.67	8.04
UK£	30	20	10	0.41	4.10
Japan Yen	15	25	-10	-0.80	8.00

(ii) The exposure of Japanese yen position is being offset by a better forward rate

Question 32

AMK Ltd. an Indian based company has subsidiaries in U.S. and U.K.

Forecasts of surplus funds for the next 30 days from two subsidiaries are as below:

U.S. \$12.5 million

U.K. £ 6 million

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Following exchange rate informations are obtained:

	\$/Rs.	£/Rs.
Spot	0.0215	0.0149
30 days forward	0.0217	0.0150

Annual borrowing/deposit rates (Simple) are available.

Rs.	6.4%/6.2%
\$	1.6%/1.5%
£	3.9%/3.7%

The Indian operation is forecasting a cash deficit of Rs.500 million.

It is assumed that interest rates are based on a year of 360 days.

- (i) Calculate the cash balance at the end of 30 days period in Rs. for each company under each of the following scenarios ignoring transaction costs and taxes:
 - (a) Each company invests/finances its own cash balances/deficits in local currency independently.
 - (b) Cash balances are pooled immediately in India and the net balances are invested/borrowed for the 30 days period.
- (ii) Which method do you think is preferable from the parent company's point of view?

(8 marksa)(May, 2007)

Answer

Cash Balances:

Acting independently

	<u>Capital</u>	<u>Interest</u>	<u>Rs. in 30 days</u>
India	-5,00,000	-2,666.67	-5,02,667
U.S.	12,500	15.63	5,76,757
U.K.	6,000	18.50	4,01,233
			4,75,323

Cash Balances:-

Immediate Cash pooling

	Rs.
India	— 5,00,000
U.S.	$\frac{12,500}{0.0215} =$
	5,81,395

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$$\text{U.K. } \frac{6,000}{0.0149} = \frac{4,02,685}{4,84,080}$$

Immediate cash pooling is preferable as it maximizes interest earnings

Note: If the company decides to invest pooled amount of Rs.4,84,080/- @ 6.2% p.a. for 30 days an interest of Rs.2,501/- will accrue.

Question 33

Following information relates to AKC Ltd. which manufactures some parts of an electronics device which are exported to USA, Japan and Europe on 90 days credit terms.

Cost and Sales information:

	Japan	USA	Europe
Variable cost per unit	Rs.225	Rs.395	Rs.510
Export sale price per unit	Yen 650	US\$10.23	Euro 11.99
Receipts from sale due in 90 days	Yen 78,00,000	US\$1,02,300	Euro 95,920

Foreign exchange rate information:

	Yen/Rs.	US\$/Rs.	Euro/Rs.
Spot market	2.417-2.437	0.0214-0.0217	0.0177-0.0180
3 months forward	2.397-2.427	0.0213-0.0216	0.0176-0.0178
3 months spot	2.423-2.459	0.02144-0.02156	0.0177-0.0179

Advice AKC Ltd. by calculating average contribution to sales ratio whether it should hedge it's foreign currency risk or not. (8 Marks)(Nov 2007)

Answer

If foreign exchange risk is hedged.

				Total (Rs.)
Sum due	Yen 78,00,000	US\$1,02,300	Euro 95,920	
Unit input price	Yen 650	US\$10.23	Euro11.99	
Unit sold	12000	10000	8000	
Variable cost per unit	Rs.225/-	395	510	
Variable cost	Rs.27,00,000	Rs.39,50,000	Rs.40,80,000	Rs.1,07,30,000
Three months forward rate for selling	2.427	0.0216	0.0178	

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Rupee value of receipts	Rs.32,13,844	Rs.47,36,111	Rs.53,88,764	Rs.1,33,38,719
Contribution	Rs.5,13,844	Rs.7,86,111	Rs.13,08,764	Rs.26,08,719
Average contribution to sale ratio				19.56%

If risk is not hedged

Rupee value of receipt	Rs.31,72,021	Rs.47,44,898	Rs.53,58,659	Rs.1,32,75,578
Total contribution				Rs.25,45,578
Average contribution to sale ratio				19.17%

AKC Ltd. Is advised to hedge its foreign currency exchange risk.

Question 34

- (a) Write a short note on the application of Double taxation agreements on Global depository receipts. (4 Marks)(Nov 2007)
- (b) "Operations in foreign exchange market are exposed to a number of risks." Discuss. (3 Marks)(Nov 2007)

Answer

- (a) (i) During the period of judiciary ownership of shares in the hands of the overseas depository bank, the provisions of avoidance of double taxation agreement entered into by the Government of India with the country of residence of the overseas depository bank will be applicable in the matter of taxation of income from dividends from the underline shares and the interest on foreign currency convertible bounds.
- (ii) During the period if any, when the redeemed underline shares are held by the non-residence investors on transfer from fudiciary ownership of the overseas depository bank, before they are sold to resident purchasers, the avoidance of double taxation agreement entered into by the government of India with the country of residence of the non-resident investor will be applicable in the matter of taxation of income from dividends from the underline shares, or interest on foreign currency convertible bonds or any capital gains arising out of the transfer of the underline shares.
- (b) A firm dealing with foreign exchange may be exposed to foreign currency exposures. The exposure is the result of possession of assets and liabilities and transactions denominated in foreign currency. When exchange rate fluctuates, assets, liabilities, revenues, expenses that have been expressed in foreign currency will result in either foreign exchange gain or loss. A firm dealing with foreign exchange may be exposed to

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the following types of risks:

- (i) **Transaction Exposure:** A firm may have some contractually fixed payments and receipts in foreign currency, such as, import payables, export receivables, interest payable on foreign currency loans etc. All such items are to be settled in a foreign currency. Unexpected fluctuation in exchange rate will have favourable or adverse impact on its cash flows. Such exposures are termed as transactions exposures.
- (ii) **Translation Exposure:** The translation exposure is also called accounting exposure or balance sheet exposure. It is basically the exposure on the assets and liabilities shown in the balance sheet and which are not going to be liquidated in the near future. It refers to the probability of loss that the firm may have to face because of decrease in value of assets due to devaluation of a foreign currency despite the fact that there was no foreign exchange transaction during the year.
- (iii) **Economic Exposure:** Economic exposure measures the probability that fluctuations in foreign exchange rate will affect the value of the firm. The intrinsic value of a firm is calculated by discounting the expected future cash flows with appropriate discounting rate. The risk involved in economic exposure requires measurement of the effect of fluctuations in exchange rate on different future cash flows.

Question 35

A company is considering hedging its foreign exchange risk. It has made a purchase on 1st. January, 2008 for which it has to make a payment of US \$ 50,000 on September 30, 2008. The present exchange rate is 1 US \$ = Rs. 40. It can purchase forward 1 US \$ at Rs. 39. The company will have to make a upfront premium of 2% of the forward amount purchased. The cost of funds to the company is 10% per annum and the rate of Corporate tax is 50%. Ignore taxation. Consider the following situations and compute the Profit/Loss the company will make if it hedges its foreign exchange risk:

- (i) *If the exchange rate on September 30, 2008 is Rs. 42 per US \$.*
- (ii) *If the exchange rate on September 30, 2008 is Rs. 38 per US \$. (8 Marks)(May, 2008)*

Answer

(b)	(Rs.)
Present Exchange Rate Rs.40 = 1 USD	
If company purchases USD 50000 forward premium is	
$50000 \times 39 \times 2\%$	39,000
Interest on Rs.39,000 for 9 months at 10%	2,925
Total hedging cost	41,925
If exchange rate is Rs.42	
Then gain (Rs.42 – 39) for USD 50000	1,50,000

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Less: Hedging cost	41,925
Net gain	1,08,075
If USD = Rs.38	
Then loss (39 – 38) for USD 50000	50,000
Add: Hedging Cost	41,925
Total Loss	91,925

Question No. 36

Sun Ltd. is planning to import an equipment from Japan at a cost of 3,400 lakh yen. The company may avail loans at 18 percent per annum with quarterly rests with which it can import the equipment. The company has also an offer from Osaka branch of an India based bank extending credit of 180 days at 2 percent per annum against opening of an irrecoverable letter of credit.

Additional information :

Present exchange rate Rs.100 = 340 yen

180 day's forward rate Rs.100 = 345 yen

Commission charges for letter of credit at 2 per cent per 12 months.

Advice the company whether the offer from the foreign branch should be accepted.

(6 marks, Nov. 2008)

Answer

Option I (to finance the purchases by availing loan at 18% per annum):

Cost of equipment		Rs. in lakhs
3400 lakh yen at Rs.100 = 340 yen	=	1000
Add: Interest at 4.5% I Quarter	=	45
Add: Interest at 4.5% II Quarter	=	47.03
(on Rs.1045 lakhs)		
Total outflow in Rupees	=	1092.03
Alternatively, interest may also be calculated on compounded basis, i.e.,		
$\text{Rs.}1000 \times [1.045]^2$	=	Rs.1092.03

Option II (To accept the offer from foreign branch):

Cost of letter of credit		Rs. in lakhs
At 1 % on 3400 lakhs yen at Rs.100 = 340 yen	=	10.00
Add: Interest I Quarter	=	0.45

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Add: Interest II Quarter	=	0.47
(A)	=	10.92

Payment at the end of 180 days:

Cost	3400.00 lakhs yen	
Interest at 2% p.a. $[3400 \times 2/100 \times 180/365]$		33.53 lakhs yen
	3433.53 lakhs yen	

Conversion at Rs.100 = 345 yen $[3433.53 / 345 \times 100]$ (B) = Rs.995.23

Total Cost: A + B = 1006.15 lakhs

Comments: Option no.2 is cheaper by $(1092.03 - 1006.15)$ lakh or 85.88 lakh
Hence, the offer may be accepted.

Question 37

Followings are the spot exchange rates quoted at three different forex markets :

USD/INR	48.30 in Mumbai
GBP/INR	77.52 in London
GBP/USD	1.6231 in New York

The arbitrageur has USD1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

(6 marks, Nov. 2008)

Answer

The arbitrageur can proceed as stated below to realize arbitrage gains.

(i) Buy I. Rs. from USD 10,000,000

At Mumbai	$48.3 \times 10,000,000$
	Rs.483,000,000

(ii) Convert I. Rs. to GBP at London $\frac{483,000,000}{77.52}$

GBP = 6,230,650.155

(iii) Convert GBP to USD at New York $6,230,650.155 \times 1.6231$

USD = 10,112,968.26

There is net gain of USD = 10,112,968.26 less 10,000,000

i.e USD = 112,968.26

THE MONEY MARKET AND THEIR OPERATION

Question 1

Write short note on commercial paper.

(6 marks) (May 2003)

Answer

Commercial Paper:

Commercial paper (CP) has its origin in the financial markets of America and Europe. When the process of financial dis-intermediation started in India in 1990, RBI allowed issue of two instruments, viz., the Commercial Paper (CP) and the Certificate of Deposit (CD) as a part of reform in the financial sector as suggested by Vaghul Committee. A notable feature of RBI Credit Policy announced on 16.10.1993 was the liberalisation of terms of issue of CP. At present it provides the cheapest source of funds for corporate sector and banks. Its market has picked up considerably in India due to interest rate differentials in the inter-bank and commercial lending rates.

Commercial Paper (CP) is an unsecured debt instrument in the form of a promissory note issued by highly rated borrowers for tenors ranging between 15 days and one year. "Corporates raise funds through CPs on an on-going basis throughout the year".

Thus, CP is a short term unsecured promissory note issued by high quality corporate bodies directly to investors to fund their business activities.

Question 2

Write short note on Treasury bills.

(4 marks) (November, 2003)

Answer

Treasury Bills: Treasury bills are short-term debt instruments of the Central Government, maturing in a period of less than one year. Treasury bills are issued by RBI on behalf of the Government of India for periods ranging from 91 days to 364 days through regular auctions. They are highly liquid instruments and issued to tide over short-term liquidity shortfalls.

Treasury bills are sold through an auction process according to a fixed auction calendar announced by the RBI. Banks and primary dealers are the major bidders in the competitive auction process. Provident Funds and other investors can make non-competitive bids. RBI makes allocation to non-competitive bidders at a weighted average yield arrived at on the basis of the yields quoted by accepted competitive bids. These days the treasury bills are

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becoming very popular on account of falling interest rates. Treasury bills are issued at a discount and redeemed at par. Hence, the implicit yield on a treasury bill is a function of the size of the discount and the period of maturity. Now, these bills are becoming part of debt market. In India, the largest holders of the treasury bills are commercial banks, trust, mutual funds and provident funds.

Question 3

M Ltd. has to make a payment on 30th January, 2004 of Rs. 80 lakhs. It has surplus cash today, i.e. 31st October, 2003; and has decided to invest sufficient cash in a bank's Certificate of Deposit scheme offering an yield of 8% p.a. on simple interest basis. What is the amount to be invested now?
(4 marks)(November, 2003)

Answer

Calculation of Investment Amount

Amount required for making payment on 30 th January, 2004	= Rs. 80,00,000
Investment in Certificates of Deposit (CDs) on 31 st October, 2003	
Rate of interest	= 8% p.a.
No. of days to maturity	= 91 days
Interest on Re. 1 of 91 days	
(Re. 1 × 0.08 × 91/365)	= 0.0199452
Amount to be received for Re. 1	
(Re.1.00 + Re. 0.0199452)	= 1.0199452

Calculation of amount to be invested now to get Rs. 80 lakhs after 91 days:

$$= \frac{\text{Rs. } 80,00,000}{\text{Rs. } 1.0199452} = \text{Rs. } 78,43,558.65$$

Or, Rs. 78,43,600 or Rs. 78,44,000 approximately.

Question 4

Explain briefly 'Call Money' in the context of financial market.
(2 marks)(May 2004)

Answer

Call Money: The Call Money is a part of the money market where, day to day surplus funds, mostly of banks, are traded. Moreover, the call money market is most liquid of all short-term money market segments.

The maturity period of call loans vary from 1 to 14 days. The money that is lent for one day in call money market is also known as 'overnight money'. The interest paid on call loans are known as the call rates. The call rate is expected to freely reflect the day-to-day lack of funds.

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These rates vary from day-to-day and within the day, often from hour-to-hour. High rates indicate the tightness of liquidity in the financial system while low rates indicate an easy liquidity position in the market.

In India, call money is lent mainly to even out the short-term mismatches of assets and liabilities and to meet CRR requirement of banks. The short-term mismatches arise due to variation in maturities i.e. the deposits mobilized are deployed by the bank at a longer maturity to earn more returns and duration of withdrawal of deposits by customers vary. Thus, the banks borrow from call money markets to meet short-term maturity mismatches.

Moreover, the banks borrow from call money market to meet the cash Reserve Ratio (CRR) requirements that they should maintain with RBI every fortnight and is computed as a percentage of Net Demand and Time Liabilities (NDTL).

Question 5

Distinguish between Money market and Capital Market. (3 marks)(November, 2004)

Answer

The capital market deals in financial assets. Financial assets comprises of shares, debentures, mutual funds etc. The capital market is also known as stock market.

Stock market and money market are two basic components of Indian financial system. Capital market deals with long and medium term instruments of financing while money market deals with short term instruments.

Some of the points of distinction between capital market and money market are as follows:

Money Market	Capital Market
(i) There is no classification between primary market and secondary market	There is a classification between primary market and secondary market.
(ii) It deals for funds of short-term requirement.	It deals with funds of long-term requirement.
(iii) Money market instruments include interbank call money, notice money upto 14 days, short-term deposits upto three months, commercial paper, 91 days treasury bills.	Capital Market instruments are shares and debt instruments.
(iv) Money market participants are banks, financial institution, RBI	Capital Market participants include retail investors, institutional investors like Mutual

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and Government

Funds, Financial Institutions, corporate and banks.

Question 6

RBI sold a 91 day T-bill of face value of Rs. 100 at an yield of 6%. What was the issue price?

(2 Marks) (May, 2005)

Answer

Let the issue price be X

By the terms of the issue of the T-bills.

$$6\% = \frac{100 - x}{x} \times \frac{365}{91} \times 100$$

$$6\% = \frac{6 \times 91 \times x}{36,500} = (100 - x)$$

$$= 0.01496 x = 100 - x$$

$$x = \frac{100}{1.01496} = \text{Rs. } 98.53$$

Question 7

(i) What is interest rate risk, reinvestment risk & default risk & what are the types of risk involved in investments in G-Sec.?

(ii) What is a Repo and a Reverse Repo? (5 Marks) (November, 2005)(4 marks, May, 2008)

Answer

(i) Interest Rate Risk: Interest Rate Risk, market risk or price risk are essentially one and the same. These are typical of any fixed coupon security with a fixed period to maturity. This is on account of inverse relation of price and interest. As the interest rate rises the price of a security will fall. However, this risk can be completely eliminated in case an investor's investment horizon identically matches the term of security.

Re-investment Risk: This risk is again akin to all those securities, which generate intermittent cash flows in the form of periodic coupons. The most prevalent tool deployed to measure returns over a period of time is the yield-to-maturity (YTM) method. The YTM calculation assumes that the cash flows generated during the life of a security is reinvested at the rate of YTM. The risk here is that the rate at which the interim cash flows are reinvested may fall thereby affecting the returns.

Default Risk: This type of risk in the context of a Government security is always zero. However, these securities suffer from a small variant of default risk i.e. maturity risk. Maturity risk is the risk associated with the likelihood of government issuing a new

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security in place of redeeming the existing security. In case of Corporate Securities it is referred to as credit risk.

G. Secs are usually referred to as risk free securities. However, these securities are subject to only one type of risk i.e. interest rate risk. Subject to changes in the overall interest rate scenario, the price of these securities may appreciate or depreciate.

- (ii) A Repo deal is one where eligible parties enter into a contract another to borrow money at a predetermined rate against the collateral of eligible security for a specified period of time. The legal title of the security does changes. The motive of the deal is to fund a position. Though the mechanics essentially remains the same and the contract virtually remains the same, in case of reverse Repo deal the underlying motive of the deal is to meet the security/instrument specific needs or to lend the money. Indian Repo market is governed by Reserve Bank of India. At present Repo is permitted between 64 players against Central and State Government Securities (including T-Bills) at Mumbai.

Question 8

From the following particulars, calculate the effective interest p.a. as well as the total cost of funds to ABC Ltd., which is planning a CP issue:

Issue Price of CP → Rs.97,350

Face Value → Rs.1,00,000

Maturity period → 3 months.

Issue Expenses:

Brokerage : 0.125% for 3 months.

Rating Charges : 0.5% p.a.

Stamp duty : 0.125% for 3 months

(6 Marks)(May, 2006)

Answer

$$\begin{aligned} \text{(a) Effective Interest} &= \left[\frac{F - P}{P} \right] \times \frac{12}{m} \times 100 \\ &= \left[\frac{100,000 - 97,350}{97,350} \right] \times \frac{12}{3} \times 100 \\ &= 0.02722 \times 4 \times 100 \\ &= 10.888 \\ &= 10.89 \end{aligned}$$

Effective Interest = 10.89% p.a

Cost of Funds to the Company:

Effective Interest 10.89%

Management Accounting and Financial Analysis

Brokerage (0.125 x 4)	0.50%
Rating Charge	0.50%
Stamp Duty (0.125 x 4)	<u>0.50%</u>
Cost of funds	<u>12.39%</u>

Question 9

Write short note on Inter Bank Participation Certificate.

(4 Marks) (November, 2006)

Answer

Inter Bank Participation Certificate

The Inter Bank Participation Certificates are short term instruments to even out the short term liquidity within the Banking system particularly when there are imbalances affecting the maturity mix of assets in Banking Book.

The primary objective is to provide some degree of flexibility in the credit portfolio of banks. It can be issued by schedule commercial bank and can be subscribed by any commercial bank.

The IBPC is issued against an underlying advance, classified standard and the aggregate amount of participation in any account time issue. During the currency of the participation, the aggregate amount of participation should be covered by the outstanding balance in account.

There are two types of participation certificates, with risk to the lender and without risk to the lender. Under 'with risk participation', the issuing bank will reduce the amount of participation from the advances outstanding and participating bank will show the participation as part of its advances. Banks are permitted to issue IBPC under 'with risk' nomenclature classified under Health Code-I status and the aggregate amount of such participation in any account should not exceed 40% of outstanding amount at the time of issue. The interest rate on IBPC is freely determined in the market. The certificates are neither transferable nor prematurely redeemable by the issuing bank.

Under without risk participation, the issuing bank will show the participation as borrowing from banks and participating bank will show it as advances to bank.

The scheme is beneficial both to the issuing and participating banks. The issuing bank can secure funds against advances without actually diluting its asset-mix. A bank having the highest loans to total asset ratio and liquidity bind can square the situation by issuing IBPCs. To the lender, it provides an opportunity to deploy the short-term surplus funds in a secured and profitable manner. The IBPC with risk can also be used for capital adequacy management.

This is simple system as compared to consortium tie up.

Question 10

A money market instrument with face value of Rs.100 and discount yield of 6% will mature in 45 days. You are required to calculate:

(i) Current price of the instrument.

The Money Market & Their Operation

(ii) Bond equivalent yield

(iii) Effective annual return.

(4 Marks) (May 2007)

Answer

$$(i) \text{ Current price of the Bond} = 100 \times [1 - \{45/360\} \times 0.06] \\ = \text{Rs.}99.25$$

Alternatively, the current price of bond may also be calculated as follows:

$$\frac{D}{100-D} \times \frac{360}{45} = 0.06$$

$$\frac{D}{100-D} = 0.06 \times \frac{45}{360}$$

$$\frac{D}{100-D} = 0.06 \times \frac{1}{8}$$

$$8D = 6 - 0.06D$$

$$8.06D = 6$$

$$D = \frac{6}{8.06} = 0.7444$$

$$\text{Current price of the bond} = \text{Face value} - D \\ = \text{Rs.}100 - 0.7444 = \text{Rs.}99.2556$$

$$(ii) \text{ Bond equivalent yield} = \frac{100 - 99.25}{99.25} \times \frac{360}{45} = 6.045\% \text{ P.A.}$$

$$(iii) \text{ Effective annual return} = \left[1 + (0.06045/8)^8 \right] - 1 \\ = 6.045\% \text{ P.A..}$$

Note: if a year of 365 days is considered the Bond equivalent yield and Effective annual return works out to 6.129% P.A.

Question 11

Discuss the major sources available to an Indian Corporate for raising foreign currency finances. (8 Marks) (May, 2007)

Answer

The major sources are:-

Foreign currency term loan from Financial Institutions.

Export credit schemes.

Management Accounting and Financial Analysis

External commercial borrowings.

Euro issues

Issues in foreign domestic markets.

They are discussed here below:-

1. **Foreign currency term loan from Financial Institutions:-** Financial Institutions provide foreign currency term loan for meeting the foreign currency expenditures towards import of plant, machinery, and equipment and also towards payment of foreign technical know how fees.
2. **Export Credit Schemes:-** Export credit agencies have been established by the government of major industrialized countries for financing exports of capital goods and related technical services. These agencies follow certain consensus guidelines for supporting exports under a convention known as the Berne Union. As per these guidelines, the interest rate applicable for export credits to Indian companies for various maturities are regulated. Two kinds of export credit are provided i.e., buyer's and supplier's credit.
Buyer's Credit:- Under this arrangement, credit is provided directly to the Indian buyer for purchase of capital goods and/or technical service from the overseas exporter.
Supplier's Credit:- This is a credit provided to the overseas exporters so that they can make available medium-term finance to Indian importers.
3. **External commercial borrowings:** Subject to certain terms and conditions, the Government of India permits Indian firms to resort to external commercial borrowings for the import of plant and machinery. Corporates are allowed to raise up to a stipulated amount from the global markets through the automatic route. Companies wanting to raise more than the stipulated amount have to get an approval of the MOF. ECBs include bank loans, supplier's and buyer's credit, fixed and floating rate bonds and borrowing from private sector windows of Multilateral Financial Institution such as International Finance Corporation.
4. **Euro Issues:** The two principal mechanisms used by Indian companies are Depository Receipts mechanism and Euro convertible Issues. The former represents indirectly equity investment while the latter is debt with an option to convert it into equity.
5. **Issues in foreign domestic markets:** Indian firms can also issue bonds and Equities in the domestic capital market of a foreign country. In recent year, Indian companies like Infosys Technologies and ICICI have successfully tapped the US equity market by issuing American Depository Receipts(ADRs). Like GDRs, ADRs represent claim on a specific number of shares. The principal difference between the two is that the GDRs are issued in the euro market whereas ADRs are issued in the U.S. domestic capital market.

SPECIAL FEATURES OF FINANCIAL MANAGEMENT IN PUBLIC SECTOR UNDERTAKINGS

Question 1

What are the matters to be considered in the context of working capital management in public sector undertakings?
(6 marks) (November, 1997)

Answer

In the context of working capital management in public sector undertakings the following should be considered:

- (1) Public sector undertakings are often blamed for over inventory resulting in blocking of capital and space or less often for under inventory upsetting production schedule. Both are signs of inefficient inventory management.
- (2) There is generally no provision for working capital margin at the time of estimating cost of project. Consequently there is no provision of long-term funds for working capital and the enterprise has to obtain financing from short-term sources.
- (3) Most of the public sector units are capital intensive hence ratio of current assets to fixed assets is generally low.
- (4) Most of the public sector undertakings lack application of working capital management techniques especially relating to receivables like discount rate, credit period and credit standards. The reason being that they sell bulk of their output to Government Departments.

Question 2

Write short note on Special features of Financial Management in a public sector undertaking.
(5 marks) (May, 1999)

Answer

Special features of Financial Management in a public sector undertaking (PSUs):

1. *Role of financial advisor:* The financial advisor occupies an important position in public sector undertakings. His concurrence is required on all proposals which have financial implications.

Management Accounting and Financial Analysis

2. *Capital budgeting decisions:* The power upto certain limits, in respect of individual capital expenditure items has been delegated to the board of public sector undertakings. For making investments beyond the limit the proposal goes to Public Investment Board which appraises and recommends projects to the Central Government.
3. *Capital structure decisions:* Such decisions involve the identification of different sources of finance. Normally PSUs are financed on the basis of half of their capital being in the shape of equity and the rest in the shape of loans. The funds are also provided to PSUs directly by the government. The following factors are taken into consideration at the time of designing capital structure (i) gestation period (ii) level of business risk (iii) capital intensity of project and (iv) freedom of pricing.
4. *Working capital management:* The inventory constitutes a major portion of the working capital of public sector undertakings and hence proper inventory management should be given top priority by public sector undertakings.
5. *Audit:* Public sector undertakings in addition to regular audit conducted by professional accountants, are subject to efficiency-cum-propriety audit by the Comptroller and Auditor General of India whose reports are presented to Parliament every year.
6. *Annual report:* The annual reports of public sector units though similar to those of private sector units, tend to provide more information.
7. *Pricing policy:* The bureau of public sector undertaking has laid down certain guidelines for pricing by PSUs with the objective to serve the overall interest of the community at large.
8. *Status of public sector undertaking:* PSUs are organized mainly as departmental enterprise or statutory corporation or companies.

Question 3

Write short note on Role of a Financial Adviser in a Public Sector Undertaking.

(5 marks) (May 2001) & (4 Marks) (May, 2007)

Answer

Role of a Financial Adviser in a Public Sector Undertaking:

The financial adviser occupies an important position in all public sector undertakings. He functions as the principal advisor to the chief executive of the enterprise on all financial matters. The committee on public sector undertakings has specified the following functions and responsibilities for a financial adviser:

1. Determination of financial needs of the firm and the ways these needs are to be met.
2. Formulation of a programme to provide most effective cost-volume profit relationship.
3. Analysis of financial results of all operations and recommendations concerning future operations.
4. Examination of feasibility studies and detailed project reports from the point of view of overall economic viability of the project.

Special Features of Financial Management in Public Sector Under Takings

5. Conduct of special studies with a view to reduce costs and improve efficiency and profitability.

Question 4

Write short note on Strategic Financial Planning in Public Sector. (4 marks) (May 2002)

Answer

Strategic Financial Planning in Public Sector:

An important aspect in the management of public sector enterprises is the relevance of strategic financial planning technique in dealing with conflicting objectives. It is an effective mode to optimize the flow of funds required by the overall corporate strategy and to make adequate provisions to meet contingencies. This requires:

1. The development of adequate financial information system.
2. The existence of clear strategic financial objectives.
3. The co-ordination of plan with the Government's economic, social, fiscal and monetary policies.

In fact, the public sector is set for a major change. It is poised for a major face lift. "The public sector will become selective in the coverage of activities and its investment will be focused on strategic high-tech and essential infrastructure." The Government has also clarified that the public sector has to mend for itself and stop relying on Government's budgetary support.

Question 5

Explain reforming the public sector enterprises (PSEs) through Greenfield privatisation.

(8 marks) (November, 2003)(5 marks, May, 2008)

Answer

Greenfield Privatisation

It is the process of reforming PSEs and aims at reducing involvement of the state or the public sector in the nation's economic activities by dividing the industries between public sector and private sector in favour of the latter. The policy of Greenfield Privatisation has made considerable progress since the introduction of the new economic policy (NEP) in 1991. The process of re-divide has been mainly through:

- (i) De-licensing
- (ii) Reduction in budget allocation
- (iii) External aid/grant
- (iv) Anomaly in duty structure
- (v) Decision-making systems.

Management Accounting and Financial Analysis

Since, October 1999 and with the run-up to Budget 2000, the Government has taken several steps. These include a full-fledged Ministry of Disinvestments, moving towards leasing out its international airport assets and the intention to privatise the two national air carriers. It would appear that the initiatives on selling off state owned enterprises have come of age.

The Government sector encompasses a wide range of activities outside what may be regarded as Government proper-both commercial and social. A large part of the "Commercial" component of the state sector has been organised as companies, including the Central and State Public Sector Enterprises (PSEs). An equally large part is not including the power sector, railways, department of telecommunications and urban water utilities - although some states have taken steps to corporatise and unbundle their electricity boards.

Privatisation of public sector enterprises holds the key to getting out of this quick-sand of fiscal deficit. There is a significant amount of shareholder value locked up in the public sector units which the Government should encash optimally and use the resulting inflows to pay off its debts. This requires political will and support from all major political parties whether in power or not.

Question 1

The Beta Co-efficient of Target Ltd. is 1.4. The company has been maintaining 8% rate of growth in dividends and earnings. The last dividend paid was Rs. 4 per share. Return on Government securities is 10%. Return on market portfolio is 15%. The current market price of one share of Target Ltd. is Rs. 36.

- (i) *What will be the equilibrium price pr share of Target Ltd.?*
 (ii) *Would you advise purchasing the share?* (10 marks) (May 1997)

Answer

- (i) CAPM formula = $E(R_s) = R_f + b [E(R_m) - R_f]$.

Where,

$E(R_s)$ = Expected rate of return of the security (OR) the cost of equity

R_f = risk free returns

$E(R_m)$ = market rate of return

b = Beta co-efficient given 1.4

Substituting the values

$$E(R_s) = 10 + 1.4 (15\% - 10\%)$$

$$E(R_s) = 17\%$$

Dividend Growth Model = $\frac{D_1}{P_0} + g$, Where D_1 , is dividend per share in year 1, g is growth rate of dividends, P_0 = Market price/share in year 0.

$E(R_s)$ being .17, we can make the equation as

$$.17 = \frac{4 (1.08)}{P_0} + 0.08$$

$$.09 = \frac{4 (1.08)}{P_0}$$

Management Accounting and Financial Analysis

$$P_0 = \frac{4(1.08)}{.09}$$
$$= \text{Rs. } 48$$

Question 2

Z Ltd. is foreseeing a growth rate of 12% per annum in the next 2 years. The growth rate is likely to fall to 10% for the third year and fourth year. After that the growth rate is expected to stabilize at 8% per annum. If the last dividend paid was Rs. 1.50 per share and the investors' required rate of return is 16%, find out the intrinsic value per share of Z Ltd. as of date. You may use the following table:

Years	0	1	2	3	4	5
Discounting Factor at 16%	1	0.86	0.74	0.64	0.55	0.48

(10 marks) (May 1997)

Answer

Present value of dividend stream for first 2 years.

$$\text{Rs. } 1.50 (1.12) \times .86 + 1.50 (1.12)^2 \times .74$$

$$\text{Rs. } 1.68 \times .86 + 1.88 \times .74$$

$$\text{Rs. } 1.45 + 1.39 = 2.84 \quad (\text{A})$$

Present value of dividend stream for next 2 years

$$\text{Rs. } 1.88 (1.1) \times .64 + 1.88 (1.1)^2 \times .55$$

$$\text{Rs. } 2.07 \times .64 + 2.28 \times .55$$

$$\text{Rs. } 1.33 + 1.25 = 2.58 \quad (\text{B})$$

Market value of equity share at the end of 4th year computed by using the constant dividend growth model, would be:

$$P_4 = \frac{D_5}{K_s - g_n}$$

Where D_5 is dividend in the fifth year, g_n is the growth rate and K_s is required rate of return.

$$\text{Now } D_5 = D_4 (1 + g_n)$$

$$\therefore D_5 = \text{Rs. } 2.28 (1 + 0.08)$$

$$= \text{Rs. } 2.46$$

$$\therefore P_4 = \frac{\text{Rs. } 2.46}{0.16 - 0.08}$$

$$= \text{Rs. } 30.75$$

$$\text{Present market value of } P_4 = 30.75 \times .55 = \text{Rs. } 16.91 \quad (\text{C})$$

Dividend Policy

Hence, the intrinsic value per share of Z Ltd. would be

A + B + C i.e. Rs. 2.84 + 2.58 + 16.91 = Rs. 22.33

Question 3

Write short note on Walter's approach to Dividend Policy.

(5 marks) (May 1998)

Answer

Walter's approach to Dividend Policy: Walter's approach to Dividend Policy supports the doctrine that the investment policy of a firm cannot be separated from its dividend policy and both are according to him interlinked. He argues that in the long run, share prices reflect only the present value of expected dividends. Retention influences stock prices only through their effect on future dividends.

The relationship between dividend and share price on the basis of Walter's formula is shown below:

$$V_c = \frac{D + R_a \frac{(E - D)}{R_c}}{R_c}$$

Where,

V_c = Market value of ordinary shares of the company.

R_a = Return on internal retention, i.e. the rate company earns on retained profits.

R_c = Capitalisation rate, i.e. the rate expected by investors by way of return from particular category of shares.

E = Earning per share.

D = Dividend per share.

Prof. Walter's formula is based on the relationship between the firm's (i) return on investment or internal rate of return (R_a) and (ii) Cost of Capital or required rate of return (i.e. R_c).

The optimum dividend policy of a firm is determined by the relationship of R_a and R_c . If $R_a > R_c$ i.e. the firm can earn higher return than what the shareholders can earn on their investments, the firm should retain the earning. Such firms are termed as growth firms, and in their case the optimum dividend policy would be to plough back the earnings. If $R_a < R_c$ i.e. the firm does not have profitable investment opportunities, the optimum dividend policy would be to distribute the entire earnings as dividend.

In case of firms, where $R_a = R_c$, it does not matter whether the firm retains or distribute its earning.

Assumptions: Walter's dividend policy is based on the following assumptions:

- (i) The firm does the entire financing through retained earnings. It does not use external sources of funds such as debt or new equity capital.

Management Accounting and Financial Analysis

- (ii) The firm R_c and R_a remain constant with additional investment.
- (iii) There is no change in the key variables, namely, beginning E , D .
- (iv) The firm has a very long life.

Question 4

Write short note on Factors influencing the dividend policy of the firm. (5 marks) (May 1999)

Answer

Factors influencing the dividend policy of the firm: The following are the important factors which generally determine the dividend policy of a firm.

- (i) *Dividend payout ratio:* A major aspect of the dividend policy of a firm is its Dividend Payout (D/P) ratio, i.e., the percentage share of the net earnings distributed to shareholders as dividends. Since dividend policy of the firm affects both the shareholders' wealth and the long term growth of the firm, an optimum dividend policy should strike out a balance between current dividends and future growth which maximises the price of the firm's shares. The D/P ratio of a firm should be determined with reference to two basic objectives maximizing the wealth of the firm's owners and providing sufficient funds to finance growth/expansion plans.
- (ii) *Stability of dividends:* Stability of dividends is another major aspect of dividend policy. The term dividend stability refers to the consistency or lack of variability in the stream of future dividends. Precisely, it means that a certain minimum amount of dividend is paid out regularly.
- (iii) *Legal, contractual and internal constraints and restrictions:* The firms' dividend decision is also affected by certain legal, contractual and internal requirements and commitments. Legal factors stem from certain statutory requirements, contractual restrictions arise from certain loan covenants and internal constraints are the result of the firm's liquidity position. Though legal rules do not require a dividend declaration, they specify the conditions under which dividends can be declared. Such conditions pertain to (a) capital impairment, (b) net profits, (c) insolvency, (d) illegal accumulation of excess profit and, (e) payment of statutory dues before declaration of dividends.
- (iv) *Tax consideration:* The firm's dividend policy is directed by the provisions of income-tax law. If a firm has a large number of owners, in high tax bracket, its dividend policy may be to have higher retention. As against this if the majority of shareholders are in lower tax bracket requiring regular income the firm may resort to higher dividend payout, because they need current income and the greater certainty associated with receiving the dividend now, instead of the less certain prospect of capital gains later.
- (v) *Capital market consideration:* If the firm has an access to capital market for fund raising, it may follow a policy of declaring liberal dividend. However, if the firm has only limited access to capital markets, it is likely to adopt-low dividend payout ratio. Such firms are likely to rely more heavily on retained earnings.

Dividend Policy

- (vi) *Inflation*: Lastly, inflation is also one of the factors to be reckoned with at the time of formulating the dividend policy. With rising prices, accumulated depreciation may be inadequate to replace obsolete equipments. These firms have to rely upon retained earnings as a source of funds to make up the deficiency. This consideration becomes all the more important if the assets are to be replaced in the near future. Consequently, their dividend payout ratio tends to be low during periods of inflation.

Question 5

Write short note on effect of a Government imposed freeze on dividends on stock prices and the volume of capital investment in the background of Miller-Modigliani (MM) theory on dividend policy.
(5 marks) (November, 2000)

Answer

Effect of a Government imposed freeze on dividends on stock prices and the volume of capital investment in the background of (Miller-Modigliani) (MM) theory on dividend policy:

According to MM theory, under a perfect market situation, the dividend of a firm is irrelevant as it does not affect the value of firm. Thus under MM's theory the government imposed freeze on dividend should make no difference on stock prices. Firms if do not pay dividends will have higher retained earnings and will either reduce the volume of new stock issues, repurchase more stock from market or simply invest extra cash in marketable securities. In all the above cases, the loss by investors of cash dividends will be made up in the form of capital gains. Whether the Government imposed freeze on dividends have effect on volume of capital investment in the background of MM theory on dividend policy have two arguments. One argument is that if the firms keep their investment decision separate from their dividend and financing decision then the freeze on dividend by the Government will have no effect on volume of capital investment. If the freeze restricts dividends the firm can repurchase shares or invest excess cash in marketable securities e.g. in shares of other companies. Other argument is that the firms do not separate their investment decision from dividend and financing decisions. They prefer to make investment from internal funds. In this case, the freeze of dividend by government could lead to increased real investment.

Question 6

Piyush Loonker and Associates presently pay a dividend of Re. 1.00 per share and has a share price of Rs. 20.00.

- (i) *If this dividend were expected to grow at a rate of 12% per annum forever, what is the firm's expected or required return on equity using a dividend-discount model approach?*
- (ii) *Instead of this situation in part (i), suppose that the dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter. Now what is the firm's expected, or required, return on equity?*
(8 marks) (May 2001)

Answer

(i) Firm's expected or required return on equity
(Using a dividend discount model approach)

According to Dividend discount model approach the firm's expected or required return on equity is computed as follows:

$$K_e = \frac{D_1}{P_0} + g$$

Where,

K_e = Cost of equity share capital or (Firm's expected or required return on equity share capital)

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Now, $D_1 = D_0 (1 + g)$ or Rs. 1 (1 + 0.12) or Rs. 1.12, $P_0 =$ Rs. 20 and $g = 12\%$ per annum

$$\text{Therefore, } K_e = \frac{\text{Rs. 1.12}}{\text{Rs. 20}} + 12\%$$

or $K_e = 17.6\%$

(ii) Firm's expected or required return on equity

(if dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter)

Since in this situation if dividends are expected to grow at a super normal growth rate g_s , for n years and thereafter, at a normal, perpetual growth rate of g_n beginning in the year $n + 1$, then the cost of equity can be determined by using the following formula:

$$P_0 = \sum_{t=1}^n \frac{\text{Div}_0 (1+g_s)^t}{(1+K_e)^t} + \frac{\text{Div}_{n+1}}{K_e - g_n} \times \frac{1}{(1+K_e)^n}$$

Where,

g_s = Rate of growth in earlier years.

g_n = Rate of constant growth in later years.

P_0 = Discounted value of dividend stream.

K_e = Firm's expected, required return on equity (cost of equity capital).

Dividend Policy

Now,

$g_s = 20\%$ for 5 years, $g_n = 10\%$

Therefore,

$$P_0 = \sum_{t=1}^5 \frac{D_0 (1+0.20)^t}{(1+K_e)^t} + \frac{\text{Div}_{5+1}}{K_e - 0.10} \times \frac{1}{(1+K_e)^5}$$

$$P_0 = \frac{1.20}{(1+K_e)^1} + \frac{1.44}{(1+K_e)^2} + \frac{1.73}{(1+K_e)^3} + \frac{2.07}{(1+K_e)^4} + \frac{2.49}{(1+K_e)^5} + \frac{2.49(1+0.10)}{K_e - 0.10} \times \frac{1}{(1+K_e)^5}$$

$$\text{or } P_0 = \text{Rs. } 1.20 (\text{PVF}_1, K_e) + \text{Rs. } 1.44 (\text{PVF}_2, K_e) + \text{Rs. } 1.73 (\text{PVF}_3, K_e) + \text{Rs. } 2.07 (\text{PVF}_4, K_e) + \text{Rs. } 2.49 (\text{PVF}_5, K_e) + \frac{\text{Rs. } 2.74 (\text{PVF}_5, K_e)}{K_e - 0.10}$$

By trial and error we are required to find out K_e

Now, assume $K_e = 18\%$ then we will have

$$\begin{aligned} P_0 &= \text{Rs. } 1.20 (0.8475) + \text{Rs. } 1.44 (0.7182) + \text{Rs. } 1.73 (0.6086) + \text{Rs. } 2.07 (0.51589) + \\ &\quad \text{Rs. } 2.49 (0.43710) + \text{Rs. } 2.74 (0.4371) \times \frac{1}{0.18 - 0.10} \\ &= \text{Rs. } 1.017 + \text{Rs. } 1.034 + \text{Rs. } 1.052 + \text{Rs. } 1.067 + \text{Rs. } 1.09 + \text{Rs. } 14.97 \\ &= \text{Rs. } 20.23 \end{aligned}$$

Since the present value of dividend stream is more than required it indicates that K_e is greater than 18%.

Now, assume $K_e = 19\%$ we will have

$$\begin{aligned} P_0 &= \text{Rs. } 1.20 (0.8403) + \text{Rs. } 1.44 (0.7061) + \text{Rs. } 1.73 (0.5934) + \text{Rs. } 2.07 (0.4986) + \text{Rs. } \\ &\quad 2.49 (0.4190) + \text{Rs. } 2.74 (0.4190) \times \frac{1}{0.19 - 0.10} \\ &= \text{Rs. } 1.008 + \text{Rs. } 1.016 + \text{Rs. } 1.026 + \text{Rs. } 1.032 + \text{Rs. } 1.043 + \text{Rs. } 12.76 \\ &= \text{Rs. } 17.89 \end{aligned}$$

Since the market price of share (expected value of dividend stream) is Rs. 20. Therefore, the discount rate is closer to 18% than it is to 19%, we can get the exact rate by interpolation by using the following formula:

$$K_e = \frac{r - (PV_s - PV_D)}{\Delta PV} \times \Delta r$$

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Where,

r = Either of two interest rates

PV_s = Present value of share

PV_D = Present value of dividend stream

Δr = Difference in value of dividend stream

ΔPV = Difference in calculated present value of dividend stream.

$$K_e = \frac{18\% - (Rs. 20 - Rs. 20.23)}{Rs. 20.23 - Rs. 17.89} \times 0.01$$

$$= \frac{18\% - (-Rs. 0.23)}{Rs. 2.34} \times 0.01$$

$$= \frac{18\% + (Rs. 0.23)}{Rs. 2.34} \times 0.01$$

$$= 18\% + 0.10\%$$

$$= 18.10\%$$

Therefore, the firm's expected, or required, return on equity is 18.10%. At this rate the present discounted value of dividend stream is equal to the market price of the share.

Question 7

Write short note on Factors determining the dividend policy of a company.

(5 marks) (November, 2001)

Answer

Factors determining the dividend policy of a company:

- (i) *Liquidity*: In order to pay dividends, a company will require access to cash. Even very profitable companies might sometimes have difficulty in paying dividends if resources are tied up in other forms of assets.
- (ii) *Repayment of debt*: Dividend payout may be made difficult if debt is scheduled for repayment.
- (iii) *Stability of Profits*: Other things being equal, a company with stable profits is more likely to pay out a higher percentage of earnings than a company with fluctuating profits.
- (iv) *Control*: The use of retained earnings to finance new projects preserves the company's ownership and control. This can be advantageous in firms where the present disposition of shareholding is of importance.
- (v) *Legal consideration*: The legal provisions lay down boundaries within which a company can declare dividends.
- (vi) Likely effect of the declaration and quantum of dividend on market prices.

Dividend Policy

- (vii) Tax considerations and
- (viii) Others such as dividend policies adopted by units similarly placed in the industry, management attitude on dilution of existing control over the shares, fear of being branded as incompetent or inefficient, conservative policy Vs non-aggressive one.
- (ix) *Inflation*: Inflation must be taken into account when a firm establishes its dividend policy.

Question 8

- (a) *What are the determinants of Dividend Policy?*
- (b) *Sahu & Co. earns Rs. 6 per share having capitalisation rate of 10 per cent and has a return on investment at the rate of 20 per cent. According to Walter's model, what should be the price per share at 30 per cent dividend payout ratio? Is this the optimum payout ratio as per Walter?* (2 + 2 = 4 marks)(November, 2002)

Answer

(a) Determinants of dividend policy

Many factors determine the dividend policy of a company. The factors determining the dividend policy can be classified into:

- (i) Dividend payout ratio
- (ii) Stability of dividends
- (iii) Legal, contractual and internal constraints and restriction.
- (iv) Owners considerations
- (v) Capital market conditions
- (vi) Inflation
- (vii) General corporate behaviour regarding dividend or the practices of the Industry.

Each of the above points are further discussed as given here in below:

- (i) **Dividend Payout ratio:** A certain share of earnings to be distributed as dividend has to be worked out. This involves the decision to pay out or to retain. The payment of dividends results in the reduction of cash and, therefore, depletion of assets. In order to maintain the desired level of assets as well as to finance the investment opportunities, the company has to decide upon the payout ratio. D/P ratio should be determined with two bold objectives – maximising the wealth of the firms' owners and providing sufficient funds to finance growth.
- (ii) **Stability of Dividends:** Generally investors favour a stable dividend policy. The policy should be consistent and there should be a certain minimum dividend that should be paid regularly. The liability can take any form, namely, constant dividend per share; stable D/P ratio and constant dividend per share plus something extra. Because this entails – the investor's desire for current income, it contains the information content about the profitability or efficient working of the company; creating interest for institutional investor's etc.

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- (iii) **Legal, contractual and internal constraints and restriction:** Legal and Contractual requirements have to be followed. All requirements of Companies Act, SEBI guidelines, capital impairment guidelines, net profit and insolvency etc., have to be kept in mind while declaring dividend. For example, insolvent firm is prohibited from paying dividends; before paying dividend accumulated losses have to be set off, however, the dividends can be paid out of current or previous years' profit. Also there may be some contractual requirements which are to be honoured. Maintenance of certain debt equity ratio may be such requirements. In addition, there may be certain internal constraints which are unique to the firm concerned. There may be growth prospects, financial requirements, availability of funds, earning stability and control etc.
- (iv) **Owner's considerations:** This may include the tax status of shareholders, their opportunities for investment dilution of ownership etc.
- (v) **Capital market conditions and inflation:** Capital market conditions and rate of inflation also play a dominant role in determining the dividend policy. The extent to which a firm has access to capital market, also affects the dividend policy. A firm having easy access to capital market will follow a liberal dividend policy as compared to the firm having limited access. Sometime dividends are paid to keep the firms 'eligible' for certain things in the capital market. In inflation, rising prices eat into the value of money of investors which they are receiving as dividends. Good companies will try to compensate for rate of inflation by paying higher dividends. Replacement decision of the companies also affects the dividend policy.

(b) Walter Model is
$$V_c = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

Where:

V_c = Market value of the share

R_a = Return on Retained earnings

R_c = Capitalisation Rate

E = Earning per share

D = Dividend per share

Hence, if Walter model is applied

$$\text{Market value of the share } P = \frac{1.80 + \frac{.20}{.10}(6 - 1.80)}{.10}$$

Dividend Policy

$$P = \frac{1.80 + \frac{.20}{.10}(4.20)}{10}$$

$$P = \frac{1.80 + 8.40}{.10}$$

$$P = \text{Rs. } 102$$

This is not the optimum pay out ratio because $R_a > R_c$ and therefore V_c can further go up if payout ratio is reduced.

Question 9

X Ltd., has 8 lakhs equity shares outstanding at the beginning of the year 2003. The current market price per share is Rs. 120. The Board of Directors of the company is contemplating Rs. 6.4 per share as dividend. The rate of capitalisation, appropriate to the risk-class to which the company belongs, is 9.6%:

- (i) *Based on M-M Approach, calculate the market price of the share of the company, when the dividend is – (a) declared; and (b) not declared.*
- (ii) *How many new shares are to be issued by the company, if the company desires to fund an investment budget of Rs. 3.20 crores by the end of the year assuming net income for the year will be Rs. 1.60 crores?* (10 marks)(May 2003)

Answer

Modigliani and Miller (M-M) – Dividend Irrelevancy Model:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where P_0 = Existing market price per share i.e. Rs. 120

P_1 = Market price of share at the year end (to be determined)

D_1 = Contemplated dividend per share i.e. Rs. 6.4

K_e = Capitalisation rate i.e. 9.6%.

- (i) (a) Calculation of share price when dividend is declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 6.4}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 6.4$$

$$P_1 = 120 \times 1.096 - 6.4$$

$$= 125.12$$

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(b) Calculation of share price when dividend is not declared:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$120 = \frac{P_1 + 0}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 0$$

$$P_1 = 131.52$$

(ii) Calculation of No. of shares to be issued:

	(Rs. in lakhs)	
Particulars	If dividend declared	If dividend not declared
Net Income	160	160
Less: Dividend paid	<u>51.20</u>	—
Retained earnings	108.80	160
Investment budget	<u>320</u>	<u>320</u>
Amount to be raised by issue of new shares	<u>211.20</u>	<u>160</u>
(i)		
Market price per share (ii)	125.12	131.52
No. of new shares to be issued (ii)	1,68,797.95	1,21,654.50
Or say	1,68,798	1,21,655

Question 10

Capital structure of Sun Ltd., as at 31.3.2003 was as under:

	(Rs. in lakhs)
Equity share capital	80
8% Preference share capital	40
12% Debentures	64
Reserves	32

Sun Ltd., earns a profit of Rs. 32 lakhs annually on an average before deduction of income-tax, which works out to 35%, and interest on debentures.

Normal return on equity shares of companies similarly placed is 9.6% provided:

- Profit after tax covers fixed interest and fixed dividends at least 3 times.
- Capital gearing ratio is 0.75.

Dividend Policy

(c) Yield on share is calculated at 50% of profits distributed and at 5% on undistributed profits.

Sun Ltd., has been regularly paying equity dividend of 8%.

Compute the value per equity share of the company. (12 marks)(November, 2003)

Answer

Calculation of Profit after tax (PAT)

	Rs.
Profit before interest and tax (PBIT)	32,00,000
Less: Debenture interest (Rs. 64,00,000 × 12/100)	<u>7,68,000</u>
Profit before tax (PBT)	24,32,000
Less: Tax @ 35%	<u>8,51,200</u>
Profit after tax (PAT)	15,80,800
Less: Preference Dividend	
(Rs. 40,00,000 × 8/100)	3,20,000
Equity Dividend (Rs. 80,00,000 × 8/100)	<u>6,40,000</u>
Retained earnings (Undistributed profit)	<u>9,60,000</u>
	6,20,800

Calculation of Interest and Fixed Dividend Coverage

$$\begin{aligned} &= \frac{\text{PAT} + \text{Debenture interest}}{\text{Debenture interest} + \text{Preference dividend}} \\ &= \frac{15,80,800 + 7,68,000}{7,68,000 + 3,20,000} = \frac{23,48,800}{10,88,000} = 2.16 \text{ times} \end{aligned}$$

Calculation of Capital Gearing Ratio

$$\begin{aligned} \text{Capital Gearing Ratio} &= \frac{\text{Fixed interest bearing funds}}{\text{Equity shareholders' funds}} \\ &= \frac{\text{Preference Share Capital} + \text{Debentures}}{\text{Equity Share Capital} + \text{Reserves}} \\ &= \frac{40,00,000 + 64,00,000}{80,00,000 + 32,00,000} = \frac{1,04,00,000}{1,12,00,000} \\ &= 0.93 \end{aligned}$$

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Calculation of Yield on Equity Shares:

Yield on equity shares is calculated at 50% of profits distributed and 5% on undistributed profits:

	(Rs.)
50% on distributed profits (Rs. 6,40,000 × 50/100)	3,20,000
5% on undistributed profits (Rs. 6,20,800 × 5/100)	<u>31,040</u>
Yield on equity shares	<u>3,51,040</u>

$$\begin{aligned}\text{Yield on equity shares \%} &= \frac{\text{Yield on shares}}{\text{Equity share capital}} \times 100 \\ &= \frac{3,51,040}{80,00,000} \times 100 = 4.39\% \text{ or, } 4.388\%.\end{aligned}$$

Calculation of Expected Yield on Equity shares

Note: There is a scope for assumptions regarding the rates (in terms of percentage for every one time of difference between Sun Ltd. and Industry Average) of risk premium involved with respect to Interest and Fixed Dividend Coverage and Capital Gearing Ratio. The below solution has been worked out by assuming the risk premium as:

- (i) 1% for every one time of difference for Interest and Fixed Dividend Coverage.
 - (ii) 2% for every one time of difference for Capital Gearing Ratio.
- (i) Interest and fixed dividend coverage of Sun Ltd. is 2.16 times but the industry average is 3 times. Therefore, risk premium is added to Sun Ltd. Shares @ 1% for every 1 time of difference.
- $$\begin{aligned}\text{Risk Premium} &= 3.00 - 2.16 (1\%) \\ &= 0.84 (1\%) = 0.84\%\end{aligned}$$
- (ii) Capital Gearing ratio of Sun Ltd. is 0.93 but the industry average is 0.75 times. Therefore, risk premium is added to Sun Ltd. shares @ 2% for every 1 time of difference.
- $$\begin{aligned}\text{Risk Premium} &= 0.75 - 0.93 (2\%) \\ &= 0.18 (2\%) \\ &= 0.36\%\end{aligned}$$

Dividend Policy

	(%)
Normal return expected	9.60
Add: Risk premium for low interest and fixed dividend coverage	0.84
Add: Risk premium for high interest gearing ratio	<u>0.36</u>
	<u>10.80</u>

Value of Equity Share

$$= \frac{\text{Actual yield}}{\text{Expected yield}} \times \text{Paid-up value of share}$$

$$= \frac{4.39}{10.80} \times 100 = \text{Rs. 40.65}$$

Question 11

Mr. A is contemplating purchase of 1,000 equity shares of a Company. His expectation of return is 10% before tax by way of dividend with an annual growth of 5%. The Company's last dividend was Rs. 2 per share. Even as he is contemplating, Mr. A suddenly finds, due to a budget announcement dividends have been exempted from tax in the hands of the recipients. But the imposition of dividend Distribution tax on the Company is likely to lead to a fall in dividend of 20 paise per share. A's marginal tax rate is 30%.

Required:

Calculate what should be Mr. A's estimates of the price per share before and after the Budget announcement?
(6 marks)(November, 2004)

Answer

The formula for determining value of a share based on expected dividend is:

$$P_0 = \frac{D_0 (1 + g)}{(k - g)}$$

Where

P_0 = Price (or value) per share

D_0 = Dividend per share

g = Growth rate expected in dividend

k = Expected rate of return

Hence,

Price estimate before budget announcement:

$$P_0 = \frac{2 \times (1 + 0.05)}{(0.10 - 0.05)} = \text{Rs. 42.00}$$

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Price estimate after budget announcement:

$$P_0 = \frac{1.80 \times (1.05)}{(.07 - .05)} = \text{Rs. } 94.50$$

Question 12

A Company pays a dividend of Rs. 2.00 per share with a growth rate of 7%. The risk free rate is 9% and the market rate of return is 13%. The Company has a beta factor of 1.50. However, due to a decision of the Finance Manager, beta is likely to increase to 1.75. Find out the present as well as the likely value of the share after the decision. (6 Marks) (May, 2005)

Answer

In order to find out the value of a share with constant growth model, the value of K_e should be ascertained with the help of 'CAPM' model as follows:

$$K_e = R_f + \beta (K_m - R_f)$$

Where,

K_e = Cost of equity

R_f = Risk free rate of return

β = Portfolio Beta i.e. market sensitivity index

K_m = Expected return on market portfolio

By substituting the figures, we get

$$K_e = 0.09 + 1.5 (0.13 - 0.09)$$

$$= 0.15 \text{ or } 15\%$$

and the value of the share as per constant growth model is

$$P_0 = \frac{D_1}{(k_e - g)}$$

Where,

P_0 = Price of a share

D_1 = Dividend at the end of the year 1

K_e = Cost of equity

G = growth

$$P_0 = \frac{2.00}{(k_e - g)}$$

$$P_0 = \frac{2.00}{0.15 - 0.07}$$

$$= \text{Rs. } 25.0$$

Dividend Policy

However, if the decision of finance manager is implemented, the beta (β) factor is likely to increase to 1.75 therefore, K_e would be

$$\begin{aligned}K_e &= R_f + \beta (K_m - R_f) \\&= 0.09 + 1.75 (0.13 - 0.09) \\&= 0.16 \text{ or } 16\%\end{aligned}$$

The value of share is

$$\begin{aligned}P_0 &= \frac{D_1}{(k_e - g)} \\P_0 &= \frac{2.00}{0.16 - 0.07} \\&= \text{Rs. } 22.22\end{aligned}$$

Question 13

The following figures are collected from the annual report of XYZ Ltd.:

	Rs.
Net Profit	30 lakhs
Outstanding 12% preference shares	100 lakhs
No. of equity shares	3 lakhs
Return on Investment	20%

What should be the approximate dividend pay-out ratio so as to keep the share price at Rs. 42 by using Walter model? 6 marks) (May, 2005)

Answer

	Rs. in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Therefore earning per share	18/3 = Rs. 6.00
Cost of capital i.e. (k_e)	
(Assumed)	16%

Let, the dividend pay out ratio be X and so the share price will be:

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$$P = \frac{D}{K_e} + \frac{r(E-D)}{K_e}$$

Here $D = 6x$; $E = \text{Rs. } 6$; $r = 0.20$ and $K_e = 0.16$ and $P = \text{Rs. } 42$

$$\text{Hence Rs. } 42 = \frac{6x}{0.16} + \frac{0.2(6-6x)}{0.16 \times 0.16}$$

$$\text{or Rs. } 42 = 37.50X + 46.875(1-x)$$

$$= 9.375x = 4.875$$

$$x = 0.52$$

So, the required dividend payout ratio will be = 52%

Question 14

The following information pertains to M/s XY Ltd.

Earnings of the Company	Rs.5,00,000
Dividend Payout ratio	60%
No. of shares outstanding	1,00,000
Equity capitalization rate	12%
Rate of return on investment	15%

- (i) What would be the market value per share as per Walter's model?
(ii) What is the optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio? (8 Marks) (May, 2006)

Answer

(a) M/s X Y Ltd.

- (i) Walter's model is given by

$$P = \frac{D + (E-D)(r / k_e)}{K_e}$$

Where	P	=	Market price per share.
	E	=	Earnings per share = Rs.5
	D	=	Dividend per share = Rs.3
	r	=	Return earned on investment = 15%
	K_e	=	Cost of equity capital = 12%

Dividend Policy

$$P = \frac{3 + (5-3) \times \frac{0.15}{0.12}}{0.12} = \frac{3 + 2.0 \times \frac{.15}{.12}}{0.12} \\ = \text{Rs.52.08}$$

- (ii) According to Walter's model when the return on investment is more than the cost of equity capital, the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil.

So, at a pay-out ratio of zero, the market value of the company's share will be:

$$\frac{0 + (5-0) \frac{0.15}{0.12}}{0.12} = \text{Rs.52.08}$$

Question 15

Determinants of Dividend Policy.

(3 Marks) (May, 2006)

Answer

Determinants of Dividend Policy: Many factors determine the dividend policy of a company. The factors determining the dividend policy are as follows:

- (a) **Dividend payout Ratio:** A certain share of earnings to be distributed as dividend has to be worked out. This involves the decision to pay out or to retain. The payment of dividends results in the reduction of cash and therefore depletion of assets. In order to maintain the desired level of assets as well as to enhance the investment opportunities, the company has to decide upon the pay-out ratio. Dividend Payout Ratio should be determined with 2 basic objectives – maximising the wealth of the firm's owners and providing sufficient funds to finance growth.
- (b) **Stability of Dividend:** Generally investors favour a stable dividend policy. The policy should be consistent and there should be a certain minimum dividend that should be paid regularly. The liability can take any form, namely, constant dividend per share, stable D/P Ratio and constant dividend per share plus something extra.
- (c) **Legal, Contractual and Internal Constraints and Restriction:** Legal and Contractual requirements have to be followed. All requirements of Companies Act, SEBI Guidelines, Capital Impairment Guidelines, net profit and insolvency etc., have to be kept in mind while declaring dividends. Also, there may be some contractual requirements which are to be honoured. Maintenance of certain debt-equity ratio may be one of such requirements. In addition, there may be certain internal constraints which are unique to the firm concerned. There may be growth prospects, financial requirements, availability of funds, earning stability and control etc.
- (d) **Owner's Considerations:** This includes the tax status of shareholders, their opportunities for investment, dilution of ownership etc.

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- (e) **Capital Market Conditions and Inflation:** Capital Market conditions and rate of inflation also play a dominant role in determining the dividend payout. The extent to which a firm has access to capital market, also affects the dividend policy. A firm having easy access to capital market will follow a unique dividend policy. During inflation, rising prices eat into the value of money of investors which they receive as dividends. Good companies will try to compensate for rate of inflation by paying higher dividend. Replacement decisions of the companies also affects the dividend policy.

Question 16

ABC Ltd. has 50,000 outstanding shares. The current market price per share is Rs.100 each. It hopes to make a net income of Rs.5,00,000 at the end of current year. The Company's Board is considering a dividend of Rs.5 per share at the end of current financial year. The company needs to raise Rs.10,00,000 for an approved investment expenditure. The company belongs to a risk class for which the capitalization rate is 10%. Show, how does the M-M approach affect the value of firm if the dividends are paid or not paid.

(6 Marks) (November, 2006)

Answer

When dividends are paid

$$100 = (5 + P_1)/(1 + 0.10)$$

Therefore, $P_1 = \text{Rs.}105/-$.

Value of firm

$$= \text{Rs.}([50,000/- + 7,50,000/-/105/-) \times 105/-] - 10,00,000/- + 5,00,000/-)/1.10$$

$$= \text{Rs.}(60,00,000/- - 5,00,000/-)/1.10$$

$$= \text{Rs.}50,00,000/-$$

When dividend is not paid

$$100 = 1/1.1 \times P_1$$

Therefore, $P_1 = \text{Rs.}110/-$.

Value of firm

$$= \text{Rs.}([50,000/- + (5,00,000/-/110/-) \times 110/-] - 10,00,000/- + 5,00,000/-)/1.10$$

$$= \text{Rs.}(60,00,000/- - 5,00,000/-) / 1.10$$

$$= \text{Rs.}50,00,000/-$$

M.M. approach indicates that the value of the firm in both the situations will be the same.

Question 17

How tax considerations are relevant in the context of a dividend decision of a company?

(4 Marks) (November, 2006)

Answer

DIVIDEND DECISION AND TAX CONSIDERATIONS

Traditional theories might have said that distribution of dividend being from after-tax profits, tax considerations do not matter in the hands of the payer-company. However, with the arrival of Corporate Dividend Tax on the scene in India, the position has changed. Since there is a clear levy of such tax with related surcharges, companies have a consequential cash outflow due to their dividend decisions which has to be dealt with as and when the decision is taken.

In the hands of the investors too, the position has changed with total exemption from tax being made available to the receiving-investors. In fact, it can be said that such exemption from tax has made the equity investment and the investment in Mutual Fund Schemes very attractive in the market.

Broadly speaking Tax consideration has the following impacts on the dividend decision of a company:

Before introduction of dividend tax: Earlier, the dividend was taxable in the hands of investor. In this case the shareholders of the company are corporates or individuals who are in higher tax slab, it is preferable to distribute lower dividend or no dividend. Because dividend will be taxable in the hands of the shareholder @ 30% plus surcharges while long term capital gain is taxable @ 10%. On the other hand, if most of the shareholders are the people who are in no tax zone, then it is preferable to distribute more dividend.

We can conclude that before distributing dividend, company should look at the shareholding pattern.

After introduction of dividend tax: Dividend tax is payable @ 12.5% - surcharge + education cess, which is effectively near to 14%. Now if the company were to distribute dividend, shareholder will indirectly bear a tax burden of 14% on their income. On the other hand, if the company were to provide return to shareholder in the form of appreciation in market price – by way of Bonus shares – then shareholder will have a reduced tax burden. For securities on which STT is payable, short term capital gain is taxable @ 10% while long term capital gain is totally exempt from tax.

Therefore, we can conclude that if the company pays more and more dividend (while it still have reinvestment opportunities) then to get same after tax return shareholders will expect more before tax return and this will result in lower market price per share.

Question 18

Determinants of Dividend Policy.

Answer

Determinants of Dividend Policy: Many factors determine the dividend policy of a company. The factors determining the dividend policy are as follows:

- (a) **Dividend payout Ratio:** A certain share of earnings to be distributed as dividend has to be worked out. This involves the decision to pay out or to retain. The payment of

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dividends results in the reduction of cash and therefore depletion of assets. In order to maintain the desired level of assets as well as to enhance the investment opportunities, the company has to decide upon the pay-out ratio. Dividend Payout Ratio should be determined with the basic objectives of maximising the wealth of the firm's owners and providing sufficient funds to finance growth.

- (b) **Stability of Dividend:** Generally investors favour a stable dividend policy. The policy should be consistent and there should be a certain minimum dividend that should be paid regularly. The policy can take any form, namely, constant dividend per share, stable D/P Ratio and constant dividend per share plus something extra.
- (c) **Legal, Contractual and Internal Constraints and Restriction:** Legal and Contractual requirements have to be followed. All requirements of Companies Act, SEBI Guidelines, Capital Impairment Guidelines, net profit and insolvency etc., have to be kept in mind while declaring dividends. Also, there may be some contractual requirements which are to be honoured. Maintenance of certain debt-equity ratio may be one of such requirements. In addition, there may be certain internal constraints which are unique to the firm concerned. There may be growth prospects, financial requirements, availability of funds, earning stability and control etc.

Question 19

The following information are supplied to you:

	Rs.
Total Earnings	2,00,000
No. of equity shares (of Rs.100 each)	20,000
Dividend paid	1,50,000
Price/Earning ratio	12.5

- (i) Ascertain whether the company is the following an optimal dividend policy.
- (ii) Find out what should be the P/E ratio at which the dividend policy will have no effect on the value of the share.
- (iii) Will your decision change, if the P/E ratio is 8 instead of 12.5? (8 Marks) (May, 2007)

Answer

- (i) The EPS of the firm is Rs.10 (i.e., Rs.2,00,000/20,000). The P/E Ratio is given at 12.5 and the cost of capital, k_e , may be taken at the inverse of P/E ratio. Therefore, k_e is 8 (i.e., $1/12.5$). The firm is distributing total dividends of Rs.1,50,000 among 20,000 shares, giving a dividend per share of Rs.7.50. the value of the share as per Walter's model may be found as follows:

$$P = \frac{D}{K_e} + \frac{(r/K_e)(E-D)}{K_e}$$

Dividend Policy

$$= \frac{7.50}{.08} + \frac{(.10 / .08)(10 - 7.5)}{.08}$$
$$= \text{Rs.132.81}$$

The firm has a dividend payout of 75% (i.e., Rs.1,50,000) out of total earnings of Rs.2,00,000. since, the rate of return of the firm, r , is 10% and it is more than the k_e of 8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be

$$P = \frac{D}{k_e} + \frac{(r / K_e)(E - D)}{K_e}$$
$$= \frac{0}{.08} + \frac{(.10 / .08)(10 - 0)}{.08}$$
$$= \text{Rs.156.25}$$

So, theoretically the market price of the share can be increased by adopting a zero payout.

- (ii) The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the k_e would be equal to the rate of return, r , of the firm. The K_e would be 10% ($=r$) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.
- (iii) If the P/E is 8 instead of 12.5, then the k_e which is the inverse of P/E ratio, would be 12.5 and in such a situation $k_e > r$ and the market price, as per Walter's model would be

$$P = \frac{D}{K_e} + \frac{(r / K_e)(E - D)}{K_e}$$
$$= \frac{7.50}{.125} + \frac{(.1 / .125)(10 - 7.5)}{.125}$$
$$= \text{Rs.76}$$

Question 20

M Ltd. belongs to a risk class for which the capitalization rate is 10%. It has 25,000 outstanding shares and the current market price is Rs. 100. It expects a net profit of Rs. 2,50,000 for the year and the Board is considering dividend of Rs. 5 per share.

M Ltd. requires to raise Rs. 5,00,000 for an approved investment expenditure. Show, how does the MM approach affect the value of M Ltd., if dividends are paid or not paid.

(8 Marks)(May, 2008)

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Answer

A When dividend is paid

(a) Price per share at the end of year 1

$$100 = \frac{1}{1.10}(\text{Rs.}5 + P_1)$$

$$110 = \text{Rs.}5 + P_1$$

$$P_1 = 105$$

(b) Amount required to be raised from issue of new shares

$$\text{Rs.}5,00,000 - (2,50,000 - 1,25,000)$$

$$\text{Rs.}5,00,000 - 1,25,000 = \text{Rs.}3,75,000$$

(c) Number of additional shares to be issued

$$\frac{3,75,000}{105} = \frac{75,000}{21} \text{ shares or say 3572 shares}$$

(d) Value of M Ltd.

$$(\text{Number of shares} \times \text{Expected Price per share})$$

$$\text{i.e., } (25,000 + 3,572) \times \text{Rs.}105 = \text{Rs.}30,00,060$$

B When dividend is not paid

(a) Price per share at the end of year 1

$$100 = \frac{P_1}{1.10}$$

$$P_1 = 110$$

(b) Amount required to be raised from issue of new shares

$$\text{Rs.}5,00,000 - 2,50,000 = 2,50,000$$

(c) Number of additional shares to be issued

$$\frac{2,50,000}{110} = \frac{25,000}{11} \text{ shares or say 2273 shares.}$$

(d) Value of M Ltd.,

$$(25,000 + 2273) \times \text{Rs.}110$$

$$= \text{Rs.}30,00,030$$

Whether dividend is paid or not, the value remains the same.

Dividend Policy

Question 21

T Ltd. has promoted an open-ended equity oriented scheme in 1999 with two plans – Dividend Reinvestment Plan (Plan-A) and a Bonus Plan (Plan-B); the face value of the units was Rs.10 each. X and Y invested Rs.5,00,000 each on 1.4.2001 respectively in Plan-A and Plan-B, when the NAV was Rs.42.18 for Plan A and Rs.35.02 for Plan-B, X and Y both redeemed their units on 31.3.2008. Particulars of dividend and bonus declared on the units over the period were as follows:

Date	Dividend	Bonus Ratio	NAV	
			Plan A	Plan B
15.9.2001	15	-	46.45	29.10
28.7.2002	-	1 : 6	42.18	30.05
31.3.2003	20	-	48.10	34.95
31.10.2003	-	1 : 8	49.60	36.00
15.3.2004	18	-	52.05	37.00
24.3.2005	-	1 : 11	53.05	38.10
27.3.2006	16	-	54.10	38.40
28.2.2007	12	1 : 12	55.20	39.10
31.3.2008	-	-	50.10	34.10

You are required to calculate the annual return for X and Y after taking into consideration the following information :

- (i) Securities transaction tax @ 2% on redemption.
- (ii) Liability of capital gains to income tax
 - (a) Long-term capital gain-exempt; and
 - (b) Short-term capital gains at 10% plus education cess at 3%.

(8 Marks) (November, 2008)

Answer

X : Plan A

$$\text{Unit acquired} = \frac{500,000}{42.18} = 11,854$$

Date	Units held	Dividend %	Dividend Amount	Reinvestment Rate	New Units	Total Units
01.04.00						11,854
15.09.01	11,854	15	17,781	46.45	383	12,237
31.03.03	12,237	20	24,474	48.10	509	12,746
15.03.04	12,746	18	22,943	52.05	441	13,187
27.03.06	13,187	16	21,099	54.10	390	13,577
28.02.07	13,577	12	16,292	55.20	295	13,872
31.03.08	Redemption 13,872 × 50.10			Rs.		694,987

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Less: STT 0.2 %	<u>1,390</u>
	693,597
Less: Short-term capital gains	<u>-</u>
Net proceeds	693,597
Less: Cost of acquisition	<u>500,000</u>
Total Gain	<u>Rs. 193,597</u>

CVAF

r, 8	6.936
Annual Return	27.67%

$$\frac{Y : \text{Plan B}}{\text{Units acquired}} = \frac{500,000}{35.02} = 14,278$$

Date	Units held	Ratio	Bonus Number	Total Units
01.04.00				14,278
28.07.02	14,278	1 : 6	2,380	16,658
31.10.03	16,658	1 : 8	2,082	18,740
24.03.05	18,740	1 : 11	1,704	20,444
28.02.07	20,444	1 : 12	1,704	22,148

31.03.08	Redemption 22,148 × 34.10	Rs.	755,247
	Less: STT 0.2 %		<u>1,510</u>
			753,737
	Less: Short-term capital gains		<u>-</u>
	Net proceeds		753,737
	Less: Cost of acquisition		<u>500,000</u>
	Total Gain	Rs.	<u>253,737</u>

CVAF

r, 8	7.5374
Annual Return	29.29 %

Question 1

Describe the interface of Financial Policy with Corporate Strategic Management.

(7 marks) (November, 1998)

Answer

The two important functions of the finance manager are: (i) allocation of funds (viz. investment decision) and (ii) generation of funds (viz. financing decision). The theory of finance makes two crucial assumptions to provide guidance to the finance manager in making these decisions. These are:

1. The objective of the firm is to maximize the wealth of shareholders.
2. The capital markets are efficient.

The corporate finance theory implies that:

1. Owners have the primary interest in the firm.
2. The current value of share is the measure of shareholders' wealth.
3. The firm should accept only those investments which generate positive net present values.
4. The firm's capital structure and dividend decisions are irrelevant as they are solely guided by efficient capital markets and management has no control over them.

However, the theory of finance has undergone fundamental changes over the past. It is felt that finance theory is not complete and meaningful without its linkage with the strategic management. Strategic management establishes an efficient and effective match between the firm's competence and opportunities with the risk created by the environmental changes.

Interface of Finance Policy and Strategic Management:

- (1) Finance policy require the resource deployments such as materials, labour etc. strategic management considers all markets such as material, labour and capital as imperfect and changing. Strategies are developed to manage the business firm in uncertain and imperfect market conditions and environment. For forecasting, planning and formulation of financial policies, for generation and allocation of resources the finance manager is required to analyze changing market conditions and environment.

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- (2) The strategy focuses as to how to compete in a particular product-market segment or industry. For framing strategy it is considered that the shareholders are not the only interested group; in the firm. There are many other influential constituent such as lenders, employees, customers, suppliers, etc. The success of a company depends on its ability to service in the product-market environment which is possible only when the company consider to maintain and improve its product-market positions. Such consideration have important implications for framing corporate financial policies.
- (3) The strategic management is multi-dimensional. It focuses on growth, profitability and flow of funds rather than only on the maximization of market value of shares. This focus helps the management to create enough corporate wealth for achieving market dominance and the ultimate successful survival of the company. It requires to frame financial policy keeping in view the interest of other parties such as government, employees, society etc. and not only of shareholders.

Hence, the financial policy of a company is closely linked with its corporate strategy. The company strategy establishes an efficient and effective match between its competencies and opportunities and environmental risks. Financial policies of a company should be developed in the context of its corporate strategy. Within the overall framework of the firm's strategy, there should be consistency between financial policies-investment, debt and dividend. For example, a company can sustain a high growth strategy only when investment projects generate high profits and it follows a policy of low payout and high debt.

Question 2

Write short note on Inflation and financial management.

(5 marks) (November, 1998)

Answer

Inflation and financial management: Financial management is basically concerned with the proper management of finance which is regarded as the life blood of business enterprise. The direct consequence of inflation has been to distort the significance of operating results and utility of financial statements (based on historical cost) for various managerial accounting and decision making purposes. Even though it is beyond the scope of finance manager to control inflation. He, however, tries to measure the impact of inflation on his business so as to re-orient various financial management policies according to the fast changing circumstances. Some of the prominent areas which are affected by inflation and are required to be re-oriented are as follows:

1. *Financing decisions:* This involves identifying the sources from which the finance manager should raise the quantum of funds required by a company. The debentureholder and preference shareholders are interested in fixed income while equity shareholders are interested in higher profits to earn high dividend. The finance manager is required to estimate the amount of profits he is going to earn in future. While estimating the revenue and costs, he must take into consideration the inflation factor.
2. *Investment decisions:* The capital budgeting decisions will be biased if the impact of inflation is not correctly factored in the analysis. This is because the cash flows of an

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investment project occur over a long period of time. Therefore, the finance manager should be concerned about the impact of inflation on the project's profitability.

3. *Working Capital decisions:* The finance manager is required to consider the impact of inflation while estimating the requirements of working capital. This is because of the increasing input prices and manufacturing costs, more funds may have to be tied up in inventories and receivables.
4. *Dividend payout policy:* This involves the determination of the percentage of profits earned by the enterprise which is to be paid to the shareholders. While taking this decision, the finance manager has to keep in mind the inflation factor. Therefore, while making this decision he has to see that the capital of the company remain intact even after the payment of dividend. This is because in a inflationary situation the depreciation provided on the basis of historical costs of assets would not provide adequate funds for replacement of fixed assets at the expiry of their useful lives.

Question 3

Write short note on Inter-relationship between investment, financing and dividend decisions.

(5 marks) (November, 1999)

Answer

Inter-relationship between investment, financing and dividend decisions:

The finance functions are divided into three major decisions, viz., investment, financing and dividend decisions. It is correct to say that these decisions are inter-related because the underlying objective of these three decisions is the same, i.e. maximization of shareholders' wealth. Since investment, financing and dividend decisions are all interrelated, one has to consider the joint impact of these decisions on the market price of the company's shares and these decisions should also be solved jointly. The decisions to invest in a new project needs the finance for the investment. The financing decision, in turn, is influenced by dividend decision because retained earnings used in internal financing deprive shareholders of their dividends. An efficient financial management can ensure optimal joint decisions. This is possible by evaluating each decisions in relation to its effect on the shareholders' wealth.

The above three decisions are briefly examined below in the light of their inter-relationship and to see how they can help in maximizing the shareholders' wealth i.e. market price of the company's shares:

Investment decision: The investment of long term funds is made after a careful assessment of the various projects through capital budgeting and uncertainty analysis. However, only that investment proposal is to be accepted which is expected to yield at least so much return as is adequate to meet its cost of financing. This have an influence on the profitability of the company and ultimately on its wealth.

Financing decision: Funds can be raised from various sources. Each source of funds involves different issues. The finance manager has to maintain a proper balance between long-term and short-term funds. Within the total volume of long-term funds, he has to ensure a proper mix of loan funds and owners' funds. The optimum financing mix will increase return to equity

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shareholders and thus maximize their wealth.

Dividend decision: The finance manager is also concerned with the decisions to pay or declare dividend. He assists the top management in deciding as to what portion of the profit should be paid to the shareholders by way of dividends and what portion should be retained in the business. An optimal dividend pay-out ratio maximizes shareholders' wealth.

The above discussion makes it clear that investment, financing and dividend decisions are interrelated and are to be taken jointly keeping in view their joint effect on the shareholders' wealth.

Question 4

Write short note on Current cost accounting method adjusting financial statements.

(5 marks) (November, 1999)

Answer

Current cost accounting method adjusting financial statements:

It is a well-known method of adjusting financial statements according to changing price level i.e., inflation. Generally, two main accounting problems are encountered when there is severe inflation in the economy. These are:

- (a) How to adjust profit/loss shown by conventional profit and loss statement so that it shows a realistic operating result; and
- (b) How to reflect the shareholders' investment (or the net assets) more truly.

Under the inflationary condition, if financial statements are prepared under conventional accounting system, profit figure is overstated and financial position understated. In order to remove these limitations, items of the financial statements are brought to their current values using specific price index. It thus requires the following adjustments:

- (i) Depreciation adjustment
- (ii) Cost of sales adjustment
- (iii) Monetary working capital adjustment
- (iv) Gearing adjustment.

As a result of these adjustments, fixed assets are shown in the Balance Sheet at their current value and not at their depreciated original cost value. Similarly, stocks are shown at their value to the business and not at the lower of cost or market value.

It thus enables a realistic assessment of performance (accounting and economic profit will not differ) and helps in making a better comparison of two companies set-up at different points of time, makes the rate of return more meaningful, provides a more meaningful information for investment and credit decisions, and prevents distortion in share prices.

Question 5

Write short note on Impact of corporate taxation on corporate financing. (5 marks) (May 2000)

Answer

Impact of corporate taxation on corporate financing:

Tax is levied on the profits of the company. Tax is also levied on the dividends payable by a company. This dividend tax is in addition to the corporate tax payable by a company. Thus the corporate entity suffer tax twice. This pushes the cost of equity capital. On the other hand interest paid on the debt capital is a deductible expenditure and hence company does not pay tax on interest on debt capital. This reduces the cost of debts. Debt is a less costly source of funds and if the finance manager prudently mixes debt and equity, the weighted average cost of capital will get greatly reduced.

Depreciation is not an outgo in cash but it is deductible in computing the income subject to tax. There will be saving in tax on depreciation and such savings could be profitably employed. Thus, both interest and depreciation provide tax shield and have a tendency to increase EPS. Further, the unabsorbed depreciation can be carried forward indefinitely and this will be helpful for loss making concerns which start earning profits in future. The business loss and depreciation loss of one company can be carried forward and set off in another company's profit in case of amalgamations in specified circumstances and such a provision will help in the growth of companies and rehabilitation of sick units. The finance manager of amalgamating company will bear this benefit for tax shield it carries in planning the activities.

Thus, the impact of tax will be felt in cost of capital, earnings per share and the cash in flows which are relevant for capital budgeting and in planning the capital structure.

Tax considerations are important as they affect the liquidity of the concerns. They are relevant in deciding the leasing of assets, transactions of sale and lease back, and also in floating joint venture in foreign countries where tax rates and concessions may be advantageous. Tax implications will be felt in choosing the size and nature of industry and incentives are given for backward areas. Tax considerations in these matters are relevant for purposes of preserving and protecting internal funds.

Question 6

Write short notes on

(a) *Effect of Inflation on Inventory Management.*

(b) *Advantage of Debt Securitisation.*

(5 + 5 = 10 marks) (May 2001)

Answer

(a) **Effect of Inflation on Inventory Management:** The main objective of inventory management is to determine and maintain the optimum level of investment in inventories. For inventory management a moderate inflation rate say 3% can be ignored but if inflation rate is higher it becomes important to take into consideration the effect of inflation on inventory management. The effect of inflation on goods which the firm stock is relatively constant can be dealt easily, one simply deducts the expected Annual rate of inflation from the carrying cost percentage and uses this modified version in the EOQ model to compute the optimum stock. The reason for making this deduction is that inflation causes the value of the Inventory to rise, thus offsetting somewhat the effects of

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depreciation and other carrying cost factors. Since carrying cost will now be smaller, the calculated EOQ and hence the average Inventory will increase. However, if rate of inflation is higher the interest rates will also be higher, and this will cause carrying cost to increase and thus lower the EOQ and average inventories.

Thus, there is no evidence as to whether inflation raises or lowers the optimal level of Inventories of firms in the aggregate. It should still be thoroughly considered, however, for it will raise the individual firm's optimal holdings if the rate of inflation for its own inventories is above average and is greater than the effects of inflation on interest rates and vice-versa.

- (b) **Advantage of Debt Securitisation:** Debt securitisation is a method of recycling of funds and is especially beneficial to financial intermediaries to support lending volumes. Simply stated, under debt securitisation a group of illiquid assets say a mortgage or any asset that yields stable and regular cash flows like bank loans, consumer finance, credit card payment are pooled together and sold to intermediary. The intermediary then issue debt securities.

The advantages of debt securitisation to the originator are the following:

1. The assets are shifted off the Balance Sheet, thus giving the originator recourse to off-balance sheet funding.
2. It converts illiquid assets to liquid portfolio.
3. It facilitates better balance sheet management, assets are transferred off balance sheet facilitating satisfaction of capital adequacy norms.
4. The originator's credit rating enhances.

For the investors securitisation opens up new investment avenues. Though the investor bears the credit risk, the securities are tied up to definite assets.

Question 7

Write short note on Economic Value Added method (EVA). (5 marks) (November, 2001)

Answer

Economic Value Added method (EVA): It is defined in terms of returns earned by the company in excess of the minimum expected return of the shareholders. EVA is calculated as follows:

$$\text{EVA} = \text{EBIT} - \text{Taxes} - \text{Cost of funds employed} = \text{Net operating profit after taxes} - \text{Cost of Capital employed.}$$

Where, net operating profit after taxes = Profit available to provide a return to lenders and the shareholders.

$$\text{Cost of Capital employed} = \text{Weighted average cost of capital} \times \text{Capital employed}$$

EVA is a residual income which a company earns after capital costs are deducted. It measures the profitability of a company after having taken into account the cost of all capital including equity. Therefore, EVA represents the value added to the shareholders by generating

operating profits in excess of the cost of capital employed in the business.

EVA increases if:

- (i) Operating profits grow without employing additional capital.
- (ii) Additional capital is invested in projects that give higher returns than the cost of incurring new capital and
- (iii) Unproductive capital is liquidated i.e. curtailing the unproductive uses of capital.

In India, EVA has emerged as a popular measure to understand and evaluate financial performance of a company. Several Companies have started showing EVA during a year as a part of the Annual Report. Infosys Technologies Ltd. and BPL Ltd. are a few of them.

Question 8

Discuss briefly the impact of taxation on Corporate Financial Management.

(4 marks) (May 2002)

Answer

The Impact of taxation on Corporate Financial Management:

The tax payments represent a cash outflow from business and therefore, these tax cash outflows are critical part of the financial decision making in a business. Taxation affects a firm in numerous ways, the most significant effects are as under:

1. *Tax implications and Financial Planning:* While considering the financial aspects or arranging the funds for carrying out the business, the tax implications arising therefrom should also be taken into account. The Income of all business undertakings is subject to tax at the rates given in Finance Act.
The weighted average cost of capital is reduced because interest payments are allowable for computing taxable income.
2. Where a segment of the firm incurs loss, but the firm gets overall profits from other segments, loss of loss making segment will reduce the overall tax liability of the firm by set off of losses.
3. The Income Tax Act allows depreciation on machinery, plant, furniture and buildings owned by the assessee and used by him for carrying on his business, occupation, profession. This depreciation is allowed for full year if an asset was used for the purposes of business or profession for more than 180 days. Unabsorbed depreciation can be carried forward indefinitely. Further, depreciation will also be available on intangible assets acquired on or after 1.4.1998 owned by the assessee and used for the purpose of his business.
4. *Capital Budgeting decisions:* The setting up of a new project involves consideration of the tax effects. The decision to set up a project under a particular form of business organisation, at a particular place, choice of the nature of the business and the type of activities to be undertaken etc. requires that a number of tax considerations should be taken into account before arriving at the appropriate decision from the angle of sound

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financial management. The choice of a particular manufacturing activity may be influenced by the special tax concessions available such as

- (i) Higher depreciation allowance
- (ii) Amortisation of expenditures on know-how, scientific research related to business, preliminary expenses, etc.
- (iii) Deductions in respect of profit derived from the publications of books etc.
- (iv) Deductions in respect of profit derived from export business.

Question 9

Distinguish between Factoring and Bill discounting.

(2 marks) (May 2002)

Answer

Factoring and Bill discounting: The main differences between Factoring and Bill discounting are:

- (1) While factoring is management of book-debts, bill discounting is a sort of borrowing from commercial banks.
- (2) In factoring no grace period is given, whereas in bill discounting grace period is 3 days.
- (3) For factoring there is no Specific Act, whereas in case of bill discounting Negotiable Instruments Act applies.
- (4) Factoring is a portfolio of complementary financial services whereas bill discounting is usually on case to case basis.
- (5) In factoring the basis of financing is turnover. Whereas in bill discounting it is the security provision as well as the requirement of finance which determine the amount of financing.
- (6) In factoring the risk of bad debts is passed on to the factor, whereas in bill discounting it is still retained by the business.

Question 10

Write short notes on

- (i) *Curvilinear Break-even-Analysis*
- (ii) *Financial Intermediation*
- (iii) *Financial Engineering*
- (iv) *Shareholder Value Analysis*
- (v) *Sustainable Growth Rate*

(5 × 4 = 20 marks) (May 2002)

Answer

- (i) **Curvilinear Break-even-Analysis:** Under marginal costing approach, the main assumption is that selling price and variable cost per unit will remain constant at any level of activity. The basic assumption is that of cost-volume-profit relationship is linear.

The practical business scene, increased sales-volume may be obtained by offering price concessions to customers. The costs behave variedly due to economies of scale. The effect of the decreasing price per unit with increase in demand and the increasing cost per unit due to diminishing returns is to have a profit figure that increases upto a point and then decreases until it is converted into a loss. The break-even chart, therefore, becomes curvilinear instead of linear model. In the curvilinear model, the optimum production level is where the total revenue line exceeds the total cost line by the largest amount.

- (ii) **Financial Intermediation:** it involves financial institutions acquiring funds from the public by issuing their own instruments and then using the funds to buy primary securities. It is a sort of indirect financing in which savers deposit funds with financial institutions rather than directly buying bonds and the financial institutions, in turn, lend to the ultimate borrowers.

Financial intermediaries are in a better position than individuals to bear and spread the risks of primary security ownership. Because of their large size, intermediaries can diversify their portfolios and minimize the risk involved in holding any security. They employ skilled portfolio managers, possess expertise in evaluation of borrower credit characteristics and take advantage of economies in large scale buying and selling.

Financial Intermediaries are firms that provide services and products that customers may not be able to get more efficiently by themselves in the financial market. A good example of a financial intermediary is a mutual fund, which pools the financial resources of a number of people and invests in a basket of securities.

- (iii) **Financial Engineering:** 'Financial Engineering' involves the design, development and implementation of innovative financial instruments and processes and the formulation of creative solutions to problems in finance. Financial Engineering lies in innovation and creativity to promote market efficiency. It involves construction of innovative asset-liability structures using a combination of basic instruments so as to obtain hybrid instruments which may either provide a risk-return configuration otherwise unviable or result in gain by heading efficiently, possibly by creating an arbitrage opportunity. It is of great help in corporate finance, investment management, money management, trading activities and risk management.

Over the years, Financial Managers have been coping up with the challenges of changing situations. Different new techniques of financial analysis and new financial instruments have been developed. The process that seeks to adopt existing financial instruments and develop new ones so as to enable financial market participants to cope more effectively with changing conditions is known as financial engineering.

In recent years, the rapidity with which corporate finance and investment finance have changed in practice has given birth to a new area of study known as financial engineering. It involves use of complex mathematical modeling and high speed computer solutions. Financial Engineering refers to and includes all this. It also involves any moral twist to an existing idea and is not limited to corporate finance. It has been practised by commercial banks in offering new and tailor made products to different types

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of customers. Financial engineering has been used in schemes of merges and acquisitions.

The term financial engineering is often used to refer to risk management also because it involves a strategic approach to risk management.

- (iv) **Shareholder Value Analysis:** SVA is an approach to Financial Management developed in 1980s. Which focuses on the creation of economic value for shareholders, as measured by share price performance and flow of funds. SVA is used as a way of linking management strategy and decisions to the creation of value for shareholders. The factors, called 'value drivers' are identified which will influence the shareholders' value. They may be – growth in sales, improvement in profit margin, capital investment decisions, capital structure decisions etc. The management is required to pay attention to such value drivers while taking investment and finance decisions. SVA helps the management to concentrate on activities which create value to the shareholders rather than on short-term profitability.
- (v) **Sustainable Growth Rate:** SGR is the maximum annual percentage increase in sales that can be achieved based on target operating, debt and dividend – pay out ratios.

The formula for computing SGR is:

$$= b \left(\frac{NP}{S} \right) (S_o + \Delta S) + \left[b \left(\frac{NP}{S} \right) (S_o + \Delta S) \right] \frac{D}{Eq.}$$
$$\text{or SGR} = \frac{b \left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq.} \right)}{\left(\frac{A}{S} \right) - \left[b \left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq.} \right) \right]}$$

SGR is a broad-gauged planning tool.

Question 11

Explain what is meant by 'Debt securitisation'.

(6 marks)(May 2004)

Answer

Debt securitisation is the process by which financial assets such as loan receivables, mortgage backed receivables, credit card balances, hire-purchase debtors, lease receivables, trade debtors, etc., are transformed into securities. Debt Securitisation is different from 'factoring'. 'Factoring' involves transfer of debts without transformation thereof into securities. A securitisation transaction, normally, has the following features:

Financial assets such as loan assets, mortgages, credit card balances, hire-purchase debtors, trade debtors, etc., or defined rights therein, are transferred, fully or partly, by the owner (the Originator) to a Special Purpose Entity (SPE) in return for an immediate cash payment and/or other consideration. The assets so transferred are the 'securitised assets' and the assets or rights, if any, retained by the Originator are the 'retained assets'.

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The SPE finances the assets transferred to it by issue of securities such as Pass Through Certificates (PTCs) and/or debt securities to investors.

A usual feature of securitisation is 'credit enhancement', i.e. an arrangement which is designed to protect the holders of the securities issued by an SPE from losses and/or cash flow mismatches arising from shortfall or delays in collections from the securitised assets. The arrangement often involves one or more of the following:

Provision of cash collateral, i.e., a deposit of cash which in specified circumstances can be used by the SPE for discharging its financial obligation in respect of the securities held by the investors.

Over collateralisation, i.e., making available to the SPE assets in excess of the securitised assets, the realisation of which can be used in specified circumstances to fund the shortfalls and/or mismatches in fulfillment of its financial obligations by the SPE.

Resource obligation accepted by the Originator.

Third party guarantee, i.e., a guarantee given by a third party by accepting the obligation to fund any shortfall on the part of the SPE in meeting its financial obligations in respect of the securitisation transaction.

Structuring of the instruments issued by an SPE into senior and subordinated securities so that the senior securities (issued to investors) are cushioned against the risk of shortfalls in realization of securitised assets by the subordinated securities (issued normally to the Originator). Payments on subordinated securities are due only after the amounts due on the senior securities are discharged.

The Originator may continue to service the securitised assets (i.e., to collect amounts due from borrowers, etc.) with or without servicing fee for the same.

The Originator may securities or agree to securities future receivables, i.e., receivables that are not existing at the time of agreement but which would be arising in future. IN case of such securitisation, the future receivable are estimated at the time of entering into the transaction and the purchase consideration for the same is received by the Originator in advance. Securitisation can also be in the form of 'Revolving Period Securitisation' where future receivables are transferred as and when they arise or at specified intervals; the transfers being on prearranged terms.

Debt securitisation is thus a financial market process by which individual /retail debts are pooled and restructured into a security instrument. Such restructured instrument assumes appropriate personality to be recognized in a larger market, bought and sold.

Essentially, there are three phases in a securitisation process:

- (i) *The origination phase*: In this phase, a borrower seeks a loan from a financial institution. The latter assesses the creditworthiness of the borrower, determines the terms and conditions and extends the loans.
- (ii) *The pooling phase*: Many small loans are pooled together to create an underlying pool of receivables/assets.

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- (iii) *The securitisation phase:* The pooled assets are often transferred to a Special Purpose Vehicle (SPV) which structures the market security based on the underlying pool. The SPV issues pass through securities or some other types of securities to beneficiaries (retail investors).

Securitisation helps to reduce the cost of capital and improves recycling of funds.

Usually SPV takes the form of a trust.

Question 12

A firm has a sales of Rs.6 crores, Variable cost Rs.3.5 crores and Fixed cost of Rs.0.65 crores. The firm has debt and equity resources worth of Rs.7 crores and 10 crores respectively. With the data given show:

- (i) The firm's ROI.
(ii) EBIT if sales decline to Rs.4 crores.
(iii) If the industry's assets turnover is 4 times, does the firm has high or low asset turnover? The cost of debt is 10%, ignore taxation. (6 Marks) (November, 2006)

Answer

		(Rs. Crore)
	Sales	6.0
Less	Variable cost	<u>3.5</u>
	Contribution	2.5
Less	Fixed Cost	<u>0.65</u>
	EBIT	1.85
Less:	Interest	<u>.70</u>
	EBT	1.15
	Total Investment = Debt + Capital	
	7 + 10 =	17 Crores
(i)	$ROI = \frac{EBIT}{Total Investment} = \frac{1.85}{17} =$	10.88%
(ii)	If Sales declines to 4 crores	
	Sales	4.0
	Variable Cost 33% as Sales decline by 33%	<u>2.33</u>
	Contribution	1.67
Less:	Fixed Cost	<u>.65</u>
	EBIT	1.02
Less:	Interest	<u>.70</u>
	EBT	0.32
(iii)	$Asset\ turnover = \frac{Sales}{Total Asset} = \frac{6}{17} = .3529$	

The firm has a lower Asset turnover as compared to the industry.

Question 13

Write brief notes on Leveraged Buyouts (LBOs).

(4 Marks) (May, 2007)

Answer

Leveraged Buyouts (LBOs)

- (1) A popular technique that was widely used during the 1980s to make acquisition is the leveraged buyouts, which involves the use of a large amount of debt to purchase a firm.
- (2) While some leveraged buyouts involve a company in its entirety, most involve a business unit of a company. After the buyout, the company invariably becomes a Private Company.
- (3) A large part of the borrowing is secured by the firms assets, and the lenders, because of a high risk, take a portion of the firms equity. Junk bonds have been routinely used to raise amounts of debt needed to finance the LBO transaction.
- (4) The success of the entire operation depends on their ability to improve the performance of the unit, contain its business risk, exercise cost controls and liquidate disposable assets. If they fail to do so, the high fixed financial costs can jeopardize the venture.
- (5) An attractive candidate for acquisition through leveraged buyout should possess three basic attributes:
 - (a) It must have a good position in its industry with a solid profit history and reasonable expectations of growth.
 - (b) The firm should have a relatively low level of debt and a high level of bankable assets that can be used as loan collateral.
 - (c) It must have a stable and predictable cash flows that are adequate to meet interest and principal payment on the debt and provide adequate working capital.

Of course, a willingness on the part of existing ownership and management to sell the company on a leveraged basis is also needed.

Question 14

What do you mean by 'Financial Engineering'? State its significance in the present regime of globalization.

(6 marks) (Nov 2008)

Answer

FINANCIAL ENGINEERING:

"Financial Engineering" involves the design, development and implementation of innovative financial instruments and processes and the formulation of creative solutions and problems in finance. Financial engineering lies in innovation and creativity to promote market efficiency. It involves construction of innovative asset-liability structures using a combination of basic instruments so as to obtain hybrid instruments which may either provide a risk-return configuration otherwise unviable or result in gain by heading efficiently, possibly by creating

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an arbitrage opportunity. It is of great help in corporate finance, investment management, trading activities and risk management.

Over the years, Financial managers have been coping up with the challenges of changing situations. Different new techniques of financial analysis and new financial instruments have been developed. The process that seeks to adopt existing financial instruments and develop new ones so as to enable financial market participants to cope more effectively with changing conditions is known as financial engineering.

In recent years, the rapidity with which corporate finance and investment finance have changed in practice has given birth to new area of study known as financial engineering. It involves use of complex mathematical modeling and high speed computer solutions. Financial engineering includes all this. It also involves any moral twist to an existing idea and is not limited to corporate finance. It has been practiced by commercial banks in offering new and tailor made products to different types of customers. Financial engineering has been used in schemes of merger and acquisitions.

The term financial engineering is often used to refer to risk management.

Question 15

Write short notes on the following:

- (a) *Venture capital financing*
- (b) *Inter-bank participation certificate*
- (c) *Distinction between Money market and Capital market*
- (d) *Credit cards as part of Consumer finance*
- (e) *Stock Lending Scheme.* (4 x 5 = 20 Marks)(May, 2008)

Answer

- (a) Venture capital financing refers to financing of new high-risk ventures promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas. A venture capitalist invests in equity or debt securities floated by such entrepreneurs who undertake highly risky ventures with a potential of success.

Common methods of venture capital financing include:

- (i) **Equity financing:** The undertaking's requirements of long-term funds are met by contribution by the venture capitalist but not exceeding 49% of the total equity capital;
- (ii) **Conditional Loan:** Which is repayable in the form of royalty after the venture is able to generate sales;
- (iii) **Income Note:** A hybrid security combining features of both a conventional and conditional loan, where the entrepreneur pays both interest and royalty but at substantially lower rates;
- (iv) **Participating debenture:** The security carries charges in three phases – start

phase, no interest upto a particular level of operations; next stage, low interest; thereafter a high rate.

- (b) **Inter-bank Participation Certificate (IBPC):** This is a Money Market instrument to even out the short-term liquidity within the banking system. It is issued by a bank requiring funds and is subscribed to by another bank wanting to deploy surplus funds. It is issued against an underlying 'standard' advance and during the term of participation should always be covered by the outstanding balance in the account concerned.

IBPC can provide advantage to both the issuing bank and the participating bank. To the issuing bank it provides an opportunity to obtain funds against its advances without actually diluting the asset portfolio. To the participating lender-bank it provides an opportunity to deploy short-term funds profitably against assets qualified for bank funding.

IBPC is an instrument that has to comply with Reserve Bank of India's norms and can be issued by any scheduled commercial bank. IBPC's can be issued in two types – one with risk to the lender and the other without risk to the lender. If it is with risk to the lender, the issuing bank will reduce the amount of participation from the advances outstanding and the participating bank will show the participation as part of its advances. When the issue is without risk passing on, the issuing bank will show the participation as borrowings from banks and the participating bank will show it as advances to other banks. Inter-bank Participation Certificates are short-term instruments to even out issues of short-term liquidity within the banking system.

The primary objective is to provide some degree of flexibility in the credit portfolio of banks.

- (c) There is a basic difference between the money market and capital market. The operation in the money market are for a duration upto one year and deals in short term financial assets whereas in the capital market operations are for a larger period beyond one year and therefore deals in medium and long term financial assets. Secondly, the money market is not a well-defined place like the capital market where business is normally done at a defined place like a stock-exchange. The transactions in the money market are done through electronic media and other written documents.
- (a) In the capital market, there is a classification between primary market and secondary market. There is no such sub-division of the money market. Lately, however issues are afoot to develop a secondary money market.
- (b) Capital market deals for fund requirements of a long-term whilst money market generally caters to short-term requirements.
- (c) The quantum of transactions in the capital market is decidedly not as large as in the money market.
- (d) The type of instruments dealt in the money market are like inter bank call money, notice money upto 14 days, short-term deposits upto three months, 91 days/182

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days treasury bills, commercial paper etc.

- (e) The players in the capital market are general/retail investors, brokers, merchant bankers, registrars to the issue, under-writers, corporate investors, FIs and bankers while the money market participants are the Government, Reserve Bank of India and the banks.
- (d) Credit cards are a simple and convenient means of access to short term credit for consumers. They enable the consumer to:
 - (a) Dispense with using cash for every transaction.
 - (b) Make Monthly payments.
 - (c) No interest charges if paid on due date every month.
 - (d) Insurance benefits are available.
 - (e) Special discounts can be availed which are not applicable on cash transactions.
 - (f) For high value purchases the consumer can use the roll over facility and pay for his purchases in instalments.

The disadvantages of credit cards are:

- (a) The consumer commits his future income.
- (b) If not used wisely the consumer lands into a debt trap.
- (c) The rate of interest on credit cards for long term finance (roll over) is around 40% per annum.
- (e) In stock lending, the legal title of a security is temporarily transferred from a lender to a borrower. The lender retains all the incidents of ownership, other than the voting rights. The borrower is entitled to use the securities/shares as required but is liable to the lender for all benefits such as dividends, interest, rights etc. The stock lending scheme is a means to cover short sales viz., selling shares without possessing them.

The procedure is used by the lenders to maximize yield on their portfolio. Incidentally, borrowers use the shares/securities lending programme to avoid settlement failures.

Securities/stock lending provides income opportunities for security-holders and creates liquidity to facilitate trading strategies among borrowers. Stock lending is particularly attractive for large institutional areas, as this is an easy way of generating income to off-set custody fees and requires little, if any, of their involvement or time.

Stock lending gives borrowers access to tender portfolios which provide the flexibility necessary when borrowing for strategic posturing and financing inventories. From the point of view of market, stock lending and borrowing facilitates timely settlement, increases the settlements, reduces market volatility and improves liquidity.

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Question No. 1 is compulsory. Answer any four questions from the rest. Working notes should form part of the answer.

Question 1

- (a) Shivam Ltd. is considering two mutually exclusive projects A and B. Project A costs Rs.36,000 and project B Rs.30,000. You have been given below the net present value probability distribution for each project.

Project A		Project B	
NPV estimates (Rs.)	Probability	NPV estimates (Rs.)	Probability
15,000	0.2	15,000	0.1
12,000	0.3	12,000	0.4
6,000	0.3	6,000	0.4
3,000	0.2	3,000	0.1

- (i) Compute the expected net present values of projects A and B.
- (ii) Compute the risk attached to each project i.e. standard deviation of each probability distribution.
- (iii) Compute the profitability index of each project.
- (iv) Which project do you recommend? State with reasons. (14 Marks)
- (b) Presently a company is working with an earning before interest and taxes (EBIT) of Rs.90 lakhs. Its present borrowings are as follows:

	Rs. in lakhs
12% term loan	300
Working capital borrowings:	
Borrowing from bank at 15%	200
Fixed deposits at 11%	90

The sales of the company are growing and to support this, the company proposes to obtain additional borrowing of Rs.100 lakhs at a cost of 16%. The increase in EBIT is expected to be 18%. Calculate the present and the revised interest coverage ratio and comment. (6 Marks)

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Answer

- (a) (i) Statement showing computation of expected net present value of Projects A and B :

Project A			Project B		
NPV Estimate (Rs.)	Probability	Expected Value	NPV Estimate	Probability	Expected Value
15,000	0.2	3,000	15,000	0.1	1,500
12,000	0.3	3,600	12,000	0.4	4,800
6,000	0.3	1,800	6,000	0.4	2,400
3,000	0.2	600	3,000	0.1	300
	1.0	EV = 9,000		1.0	EV = 9,000

- (ii) Computation of Standard deviation of each project

Project A

P	X	(X – EV)	P (X-EV) ²
0.2	15,000	6,000	72,00,000
0.3	12,000	3,000	27,00,000
0.3	6,000	- 3,000	27,00,000
0.2	3,000	- 6,000	72,00,000
			Variance = 1,98,00,000

Standard Deviation of Project A = $\sqrt{1,98,00,000}$ = Rs.4,450

Project B

P	X	(X – EV)	P (X-EV) ²
0.1	15,000	6,000	36,00,000
0.4	12,000	3,000	36,00,000
0.4	6,000	- 3,000	36,00,000
0.1	3,000	- 6,000	36,00,000
			Variance = 1,44,00,000

Standard Deviation of Project A = $\sqrt{1,44,00,000}$ = Rs.3,795

- (iii) Computation of profitability of each project

Profitability index = Discount cash inflow / Initial outlay

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$$\text{In case of Project A : PI} = \frac{9,000 + 36,000}{36,000} = \frac{45,000}{36,000} = 1.25$$

$$\text{In case of Project B : PI} = \frac{9,000 + 30,000}{30,000} = \frac{39,000}{30,000} = 1.30$$

- (iv) Measurement of risk is made by the possible variation of outcomes around the expected value and the decision will be taken in view of the variation in the expected value where two projects have the same expected value, the decision will be the project which has smaller variation in expected value. In the selection of one of the two projects A and B, Project B is preferable because the possible profit which may occur is subject to less variation (or dispersion). Much higher risk is lying with project A.

(b) Present EBIT = Rs.90 lakhs

Interest Charges (Present)	(Rs. in lakhs)
Term Loan @ 12%	36.00
Bank Borrowings @ 15%	30.00
Public Deposit @ 11%	<u>9.90</u>
	<u>75.90</u>

$$\text{Present Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest Charges}}$$

$$\text{or } \frac{\text{Rs.90 Lakhs}}{\text{Rs.75.90 Lakhs}} = 1.19$$

$$\text{Revised EBIT} = \text{Rs.90 lakhs} \times \frac{118}{100} = \text{Rs. 106.2 lakhs}$$

Proposed interest charges	(Rs. in lakhs)
Existing charges	75.90
Add: Additional Charges (16% on 100 lakhs)	<u>16.00</u>
Total	<u>91.90</u>

$$\therefore \text{ Revised Interest Coverage Ratio} = \frac{\text{Rs.106.2 lakhs}}{\text{Rs.91.90 lakhs}} = 1.16$$

Analysis: With the proposed increase in the sales the burden of interest on additional borrowing of Rs.100 lakhs will adversely affect the interest coverage ratio which has been reduced by 3% (from 1.19 to 1.16).

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Question 2

- (a) Following information is provided relating to the acquiring company Mani Ltd. and the target company Ratnam Ltd:

	Mani Ltd.	Ratnam Ltd.
Earnings after tax (Rs. lakhs)	2,000	4,000
No. of shares outstanding (lakhs)	200	1,000
P/E ratio (No. of times)	10	5

Required:

- (i) What is the swap ratio based on current market prices?
 - (ii) What is the EPS of Mani Ltd. after the acquisition?
 - (iii) What is the expected market price per share of Mani Ltd. after the acquisition, assuming its P/E ratio is adversely affected by 10%?
 - (iv) Determine the market value of the merged Co.
 - (v) Calculate gain/loss for the shareholders of the two independent entities, due to the merger. (10 Marks)
- (b) X Ltd. reported a profit of Rs.65 lakhs after 35% tax for the financial year 2007-08. An analysis of the accounts revealed that the income included extraordinary items Rs.10 lakhs and an extraordinary loss Rs.3 lakhs. The existing operations, except for the extraordinary items, are expected to continue in the future; in addition, the results of the launch of a new product are expected to be as follows:

	Rs. lakhs
Sales	60
Material costs	15
Labour Costs	10
Fixed costs	8

You are required to :

- (a) Compute the value of the business, given that the capitalization rate is 15%.
- (b) Determine the market price per equity share, with X Ltd.'s share capital being comprised of 1,00,000 11% preference shares of Rs. 100 each and 40,00,000 equity shares of Rs. 10 each and the P/E ratio being 8 times. (10 Marks)

Answer

- (a) (i) SWAP ratio based on current market prices:

EPS before acquisition:

Mani Ltd. : Rs.2,000 lakhs / 200 lakhs: Rs.10

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Ratnam Ltd.: Rs.4,000 lakhs / 1,000 lakhs: Rs. 4

Market price before acquisition:

Mani Ltd.: Rs.10 × 10 Rs.100

Ratnam Ltd.: Rs.4 × 5 Rs. 20

SWAP ratio: 20/100 or 1/5 i.e. 0.20

(ii) EPS after acquisition:

$$\frac{\text{Rs. (2,000 + 4,000) Lakhs}}{(200 + 200) \text{ Lakhs}} = \text{Rs.15.00}$$

(iii) Market Price after acquisition:

EPS after acquisition : Rs.15.00

P/E ratio after acquisition 10 × 0.9 9

Market price / share (Rs. 15 X 9) Rs.135.00

(iv) Market value of the merged Co.:

Rs.135 × 400 lakhs shares Rs. 540.00 Crores
or Rs. 54,000 Lakhs

(v) Gain/loss per share:

	Rs. Crore	
	Mani Ltd.	Ratnam Ltd.
Total value before Acquisition	200	200
Value after acquisition	<u>270</u>	<u>270</u>
Gain (Total)	<u>70</u>	<u>70</u>
No. of shares (pre-merger) (lakhs)	200	1,000
Gain per share (Rs.)	35	7
(b)		(Rs. Lakhs)

(a) Profit before tax $\frac{65}{1-0.35}$	100
Less: Extraordinary income	(10)
Add: Extraordinary losses	<u>3</u>
	93

Profit from new product

Sales 60

Less: Material costs 15

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Labour costs	10		
Fixed costs	<u>8</u>	<u>(33)</u>	<u>27</u>
Expected profits before taxes			120
Taxes @ 35%			<u>(42)</u>
Profit after taxes			<u>78</u>
Capitalization rate	15%		
Value of business	$\frac{\text{Rs.78Lakhs}}{0.15} =$		520
(b) Future maintainable profits (After Tax)			78
Less: Preference share dividends			
100,000 shares of Rs.100 @ 11%			<u>(11)</u>
			<u>67</u>
Earning per share	$= \frac{\text{Rs.67,00,000}}{40,00,000} =$		Rs.1.675
PE ratio			8
Market price per share			Rs.13.40

Question 3

- (a) Sundaram Ltd. discounts its cash flows at 16% and is in the tax bracket of 35%. For the acquisition of a machinery worth Rs.10,00,000, it has two options – either to acquire the asset by taking a bank loan @ 15% p.a. repayable in 5 yearly installments of Rs.2,00,000 each plus interest or to lease the asset at yearly rentals of Rs.3,34,000 for five (5) years. In both the cases, the instalment is payable at the end of the year. Depreciation is to be applied at the rate of 15% using 'written down value' (WDV) method. You are required to advise which of the financing options is to be exercised and why.

Year	1	2	3	4	5
P.V factor @16%	0.862	0.743	0.641	0.552	0.476

(14 Marks)

- (b) Briefly explain the terms "capital rationing". (6 Marks)

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Answer

(a) Alternative I: Acquiring the asset by taking bank loan:

Years	1	2	3	4	5
(a) Interest (@15% p.a. on opening balance)	150,000	120,000	90,000	60,000	30,000
Depreciation (@15%WDV)	<u>150,000</u>	<u>127,500</u>	<u>108,375</u>	<u>92,119</u>	<u>78,301</u>
	300,000	247,500	198,375	152,119	108,301
(b) Tax shield (@35%)	<u>105,000</u>	<u>86,625</u>	<u>69,431</u>	<u>53,242</u>	<u>37,905</u>
Interest less Tax shield (a)-(b)	45,000	33,375	20,569	6,758	(-)7,905
Principal Repayment	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>	<u>2,00,000</u>
Total cash outflow	2,45,000	2,33,375	2,20,569	2,06,758	1,92,095
Discounting Factor @ 16%	<u>0.862</u>	<u>0.743</u>	<u>0.641</u>	<u>0.552</u>	<u>0.476</u>
Present Value	2,11,190	1,73,397	1,41,385	1,14,131	91,437

Total P.V of cash outflow = Rs.731,540

Alternative II: Acquire the asset on lease basis

Year	Lease Rentals Rs.	Tax Shield @35%	Net Cash Outflow	Discount Factor	Present Value
1.	3,34,000	1,16,900	2,17,100	0.862	1,87,140
2.	3,34,000	1,16,900	2,17,100	0.743	1,61,305
3.	3,34,000	1,16,900	2,17,100	0.641	1,39,161
4.	3,34,000	1,16,900	2,17,100	0.552	1,19,839
5.	3,34,000	1,16,900	2,17,100	0.476	1,03,340
Present value of Total Cash out flow					7,10,785

Advice -By making Analysis of both the alternatives, it is observed that the present value of the cash outflow is lower in alternative II by Rs.20,755 (i.e.Rs.731,540 – Rs.7,10,785) Hence, it is suggested to acquire the asset on lease basis.

- (b) Capital rationing refers to a situation where a company cannot undertake all positive NPV projects it has identified because of shortage of capital under such situation. A decision maker is compelled to reject some of the viable projects, this is known as a situation involving capital rationing .

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Following questions are very much relevant, in terms of financing investment projects.

- (i) What would be the requirement of funds for capital investments in the forthcoming planning period?
- (ii) How much fund is available for capital investment?
- (iii) How to allocate available fund to viable investment proposals?

Profitability index may be used to rank the viable investment proposals to facilitate ultimate selection.

In Capital rationing, it may also be more desirable to accept several small investment proposals than a few large investment proposals so that there may be full utilization of budgeted amount. This may result in accepting relatively less profitable investment proposals in full utilization of budget is a primary consideration capital rationing may lead to a situation where a firm foregoes the next most profitable investment considering the budget ceiling even though it is estimated to yield a rate of return much higher than the required rate of return.

Thus capital rationing may not always lead to optimum results.

Question 4

- (a) The equity share of VCC Ltd. is quoted at Rs. 210. A 3-month call option is available at a premium of Rs.6 per share and a 3-month put option is available at a premium of Rs. 5 per share. Ascertain the net payoffs to the optionholder of a call option and a put option.
 - (i) the strike price in both cases in Rs. 220; and
 - (ii) the share price on the exercise day is Rs. 200,210,220,230,240.

Also indicate the price range at which the call and the put options may be gainfully exercised. (10 Marks)

- (b) A mutual fund that had a net asset value of Rs.16 at the beginning of a month, made income and capital gain distribution of Rs.0.04 and Rs.0.03 respectively per unit during the month, and then ended the month with a net asset value of Rs.16.08. Calculate monthly and annual rate of return. (4 Marks)
- (c) Explain the term "debt securitisation". (6 Marks)

Answer

- (a) Net payoff for the holder of the call option (Rs.)

Strike price on exercise day	200	210	220	230	240
Option exercise	No	No	No	Yes	Yes
Outflow (Strike price)	Nil	Nil	Nil	220	220
Out flow (premium)	6	6	6	6	6
Total Outflow	6	6	6	226	226

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Less inflow (Sales proceeds)	-	-	-	230	240
Net payoff	-6	-6	-6	4	14

Net payoff for the holder of the put option (Rs.)

Strike price on exercise day	200	210	220	230	240
Option exercise	Yes	Yes	No	No	No
Inflow (strike price)	220	220	Nil	Nil	Nil
Less outflow (purchase price)	200	210	-	-	-
Less outflow (premium)	5	5	5	5	5
Net Payoff	15	5	-5	-5	-5

The loss of the option holder is restricted to the amount of premium paid. The profit (positive payoff) depends on the difference between the strike price and the share price on the exercise day.

- (b) Calculation of monthly return on the mutual funds:

$$r = \frac{(\text{NAV}_t - \text{NAV}_{t-1}) + I_t + G_t}{\text{NAV}_{t-1}}$$

$$\text{Or, } r = \frac{(\text{Rs.16.08} - \text{Rs.16.00}) + (\text{Rs.0.04} + \text{Rs.0.03})}{16}$$

$$= \frac{0.08 + 0.07}{16} = 0.009375$$

or, $r = 0.9375\%$ or 11.25% p.a

- (c) Debt securitization: - It is a financial market process by which individual/Retail debts are pooled and restructured into a security instrument. Such restructured instrument assumes appropriate personality to be recognized in a larger market, bought and sold freely.

Essentially, there are three phases in a securitization process:

- (i) The Origination phase: In this phase, a borrower seeks a loan from a financial institution. The latter assesses the credit worthiness of the borrower, determines the terms and conditions and extends the loans.
- (ii) The pooling phase: Many small loans are pooled together to create an underlying pool of receivables/assets.
- (iii) The securitization phase: The pooled assets are often transferred to a special purpose vehicle (SPV) which structures the market security based on the underlying

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pool. The SPV issues pass through securities or some other types of securities to beneficiaries (Retail Investors), usually, SPV takes the form of a trust.

Securitisation helps to reduce the cost of capital and improves recycling of funds.

Question 5

- (a) The following 2-way quotes appear in the foreign exchange market:

	Spot	2-months forward
RS/US \$	Rs.46.00/Rs.46.25	Rs.47.00/Rs.47.50

Required:

- (i) How many US dollars should a firm sell to get Rs.25 lakhs after 2 months?
 - (ii) How many Rupees is the firm required to pay to obtain US \$ 2,00,000 in the spot market?
 - (iii) Assume the firm has US \$ 69,000 in current account earning no interest. ROI on Rupee investment is 10% p.a. Should the firm encash the US \$ now or 2 months later? (6 Marks)
- (b) X & Co. is contemplating whether to replace an existing machine or to spend money in overhauling it. X & Co. currently pays no taxes. The replacement machine costs Rs. 95,000 and requires maintenance of Rs.10,000 every year at the year end for eight years. At the end of eight years, it would have a salvage value of Rs.25,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

Year	Maintenance (Rs.)	Salvage (Rs.)
Present	0	40,000
1	10,000	25,000
2	20,000	15,000
3	30,000	10,000
4	40,000	0

The opportunity cost of capital for X & Co. is 15%. You are required to state, when should the firm replace the machine:

(Given : Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% - 4.4873; present value of Re.1.00 to be received after 8 years at interest rate of 15% - 0.3269) (10 Marks)

- (c) According to the position taken by Miller and Modigliani, dividend decision does not influence value. Please state briefly any two reasons, why companies should declare dividend and not ignore it. (4 Marks)

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Answer

- (a) (i) US \$ required to get Rs. 25 lakhs after 2 months at the Rate of Rs. 47/\$

$$\therefore \frac{\text{RS.}25,00,000}{\text{Rs.}47} = \text{US \$ } 53191.489$$

- (ii) Rs. required to get US\$ 2,00,000 now at the rate of Rs. 46.25/\$

$$\therefore \text{US \$ } 200,000 \times \text{Rs.}46.25 = \text{Rs.}92,50,000$$

- (iii) Encashing US \$ 69000 : now Vs 2 month later

Proceed if we can encash in open mkt \$ 69000 × Rs.46 = Rs. 31,74,000

Opportunity gain

$$= 31,74,000 \times \frac{10}{100} \times \frac{2}{12} \quad \text{Rs. } 52,900$$

Likely sum at end of 2 months 32,26,900

Proceeds if we can encash by forward rate :

$$\text{\$ } 69000 \times \text{Rs.}47.00 \quad \text{Rs. } 32,43,000$$

It is better to encash the proceeds after 2 months and get opportunity gain.

- (b) X & Co. -Equivalent cost of new machine

	Rs.
Cost of New Machine at present	95,000
Add: PV of annual repairs @ Rs.10,000 per	
Annum for 8 years (Rs.10,000 × 4.4873)	<u>44,873</u>
	1,39,873
Less: PV of salvage value at the end	
of 8 th year (Rs.25,000 × 0.3269)	<u>8,173</u>
	<u>1,31,700</u>

Equivalent annual cost (EAC) – Rs.1,31,700/4.4873 = Rs 29,350

Equivalent Annual Cost (EAC) of keeping the machine				
	I year (Rs.)	II Years (Rs.)	III Year (Rs.)	IV Year (Rs.)
Salvage value	40,000	25,000	15,000	10,000
Add: PV of Annual Maintenance (AM/1.15)	8,696	17,391	26,087	34,783

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Total	48,696	42,391	41,087	44,783
Less: PV of salvage				
Values at end of the year (S.V/1.15)	21,739	13,043	8,696	Nil
	26,957	29,348	32,391	44,783
×	1.15	1.15	1.15	1.15
Equivalent Annual cost	31,000	33,750	37,250	51,500

Recommendation:-

The firm should replace the old machine immediately because the equivalent annual cost (EAC) of the new machine at Rs.29,350 is lower than the cost of using the existing machine in all the years, i.e. first year, second year, third and fourth year .

- (c) The position taken by M & M regarding dividend does not take into account certain practical realities is the market place. Companies are compelled to declare annual cash dividends for reasons cited below:-
- (i) Shareholders expect annual reward for their investment as they require cash for meeting needs of personal consumption.
 - (ii) Tax considerations sometimes may be relevant. For example, dividend might be tax free receipt, whereas some part of capital gains may be taxable.
 - (iii) Other forms of investment such as bank deposits, bonds etc, fetch cash returns periodically, investors will shun companies which do not pay appropriate dividend.
 - (iv) In certain situations, there could be penalties for non-declaration of dividend, e.g. tax on undistributed profits of certain companies.

Question 6

- (a) What is sensitivity analysis in Capital budgeting? (6 Marks)

- (b) Z Co. Ltd. issued commercial paper worth Rs.10 crores as per following details:

Date of issue : 16th January, 2009

Date of maturity: 17th April, 2009

No. of days : 91

Interest rate 12.04% p.a

What was the net amount received by the company on issue of CP? (Charges of intermediary may be ignored) (4 Marks)

- (c) Explain briefly the advantages of investing in mutual funds. (5 Marks)
- (d) Write a brief note on the Small Industries Development Bank of India. (5 Marks)

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Answer

- (a) Sensitivity analysis in capital budgeting: Sensitivity analysis is used in capital budgeting for measuring the risk more precisely future being always uncertain and estimations are always subject to error, sensitivity analysis takes care of estimation errors by using a number of possible outcomes in evaluating a project. The methodology adopted here is to evaluate a project by using a number of estimated cash flows so as to provide to the decision maker an insight into the variability of outcome. Thus, it is a technique of risk analysis which studies the responsive of NPV or IRR to variation in underlying factors like selling price, quantity sold, return from an investment etc.

However, it should not be viewed as the method to remove the risk or uncertainty, it is only a tool to analyse and measure the risk and uncertainty. In terms of capital budgeting the possible cash flows are based on three assumptions (namely):-

- (a) Cash flows may be worst (Pessimistic).
- (b) Cash flows may be most likely,
- (c) Cash flows may be most optimistic.

Sensitivity analysis involves following three steps:-

- (i) Identification of all the variables.
- (ii) Definition of the underlying quantitative relationship among the variables, and
- (iii) Analysis of the impact of the changes in each of the variables on the NPV of the project.

- (b) The company had issued commercial paper worth Rs.10 crores

No. of days Involves = 91 days

Interest rate applicable = 12.04 % p.a.

Interest for 91 days = $12.04\% \times \frac{91\text{days}}{365\text{days}} = 3.001\%$

= or Rs. 10 crores $\times \frac{3.001}{100 + 3.001} = \text{Rs.} 29,13,563$
or Rs. 29.1356 Lakhs

∴ Net amount received at the time of issue:-

Rs.10.00 Crores – 0.2913 Crore = Rs.9.7087 Crore

- (c) The advantages of investing in mutual funds are as under:

1. Professional Management

Investors can avail of the services of experienced and skilled professionals, backed by a dedicated investment research team that analyses performance and prospects of companies to select suitable investments.

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2. Diversification

Mutual funds invest in a number of companies across a broad cross section of industries and sectors. Investors achieve this diversification with far less money and risk they could do on their own.

3. Return potential

Over a medium to long term, mutual funds have the potential to provide a higher return as the investments are diversified.

4. Low costs

Mutual funds are a less expensive way to invest as compared with direct investment in the capital market.

5. Liquidity

In open-ended schemes, investors get money promptly at NAV from the mutual fund itself.

In close-ended schemes, investors can sell units on a stock exchange at the prevailing market price or avail of direct repurchase at NAV-related prices which some such schemes offer periodically.

6. Transparency

Investors get regular information on the value of their investments.

(d) Small Industries Development Bank of India (SIDBI)

The small industries Bank of India (SIDBI) was set up in the 1980 by industrial development bank of India (IDBI) to give special funding focus to small scale units. Besides normal fixed capital and working capital funding schemes, SIDBI makes available financial assistance under technology development and modernization, ISO9000 series certification schemes etc. Like NABARD in the area of agricultural finance, SIDBI functions as a re-financing institution operating special funds sanctioned by Government.

SIDBI participates in venture capital funds set up by public sector institutions dedicated to financing of small scale units.

SIDBI schemes for working capital financing of SSI through the re-financing route are very popular.

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Answer all questions.

Working notes should form part of the answer.

Question 1

- (a) From the following details relating to a project, analyse the sensitivity of the project to changes in initial project cost, annual cash inflow and cost of capital:

Initial Project Cost (Rs.)	1,20,000
Annual Cash Inflow (Rs.)	45,000
Project Life (Years)	4
Cost of Capital	10%

To which of the three factors, the project is most sensitive? (Use annuity factors: for 10% 3.169 and 11% ... 3.109). (10 Marks)

- (b) ABC Company is considering acquisition of XYZ Ltd. which has 1.5 crores shares outstanding and issued. The market price per share is Rs. 400 at present. ABC's average cost of capital is 12%. Available information from XYZ indicates its expected cash accruals for the next 3 years as follows:

Year	Rs. Cr.
1	250
2	300
3	400

Calculate the range of valuation that ABC has to consider. (PV factors at 12% for years 1 to 3 respectively: 0.893, 0.797 and 0.712). (4 Marks)

- (c) Describe the interface of financial policy with corporate strategic management. (6 Marks)

Answer

- (a) CALCULATION OF NPV

	Rs.
PV of cash inflows (Rs. 45,000 x 3.169)	1,42,605
Initial Project Cost	<u>1,20,000</u>
NPV	<u>22,605</u>
If initial project cost is varied adversely by 10%*	
NPV (Revised) (Rs. 1,42,605 - Rs. 1,32,000)	Rs. 10,605
Change in NPV (Rs. 22,605 – Rs. 10,605)/ Rs. 22,605 i.e	53.08 %

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If annual cash inflow is varied adversely by 10%*

Revised annual inflow Rs. 40,500

NPV (Revised) $(Rs. 40,500 \times 3.169) - (Rs. 1,20,000)$ (+) Rs. 8,345

Change in NPV $(Rs. 22,605 - Rs. 8,345) / Rs. 22,605$ 63.08 %

If cost of capital is varied adversely by 10%*

NPV (Revised) $(Rs. 45,000 \times 3.109) - Rs. 1,20,000$ (+) Rs. 19,905

Change in NPV $(Rs. 22,605 - Rs. 19,905) / Rs. 22,605$ 11.94 %

Conclusion: Project is most sensitive to 'annual cash inflow'.

*Note: Students may please note that they may assume any other percentage rate other than 10 % say 15% , 20 % 25 % etc.

(b) VALUATION BASED ON MARKET PRICE

Market Price per share Rs. 400

Thus value of total business is $(Rs. 400 \times 1.5 \text{ Cr.})$ Rs. 600 Cr.

VALUATION BASED ON DISCOUNTED CASH FLOW

Present Value of cash flows

$(Rs. 250 \text{ cr} \times 0.893) + (Rs. 300 \text{ cr.} \times 0.797) + (Rs. 400 \text{ cr.} \times 0.712) = Rs. 747.15 \text{ Cr.}$

Value of per share $(Rs. 747.15 \text{ Cr.} / 1.5 \text{ Cr.})$ Rs. 498.10 per share

RANGE OF VALUATION

	Per Share	Total
	Rs.	Rs. Cr.
Minimum	400.00	600.00
Maximum	498.10	747.15

(c) INTERFACE OF FINANCIAL POLICY AND STRATEGIC MANAGEMENT

Financial policy required the resource deployments such as materials, labour etc., whereas strategic management considers all markets such as material, labour and capital as imperfect and changing. Strategies are developed to manage the business firm in uncertain and imperfect market conditions and environment, for forecasting planning and formulation of financial policies, for generation and allocation of resources, the finance manager is required to analyse changing market conditions and environment.

The strategy focuses on how to compete in a particular product-market segment or industry. For framing strategy it is considered that the shareholders are not the only interested group in the unit. There are many other influential constituents such as lenders, employees, customers, suppliers etc. The success of a company depends on its ability to service in the product market environment which is possible only when the company considers to maintain and improve its product market positions.

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The strategic management is multi-dimensional. It focuses on growth profitability and flow of funds rather than only on the maximization of market value of shares. This focus helps the management to create enough corporate wealth for achieving market dominance and the ultimate successful survival of the company.

Hence, the financial policy of a company is closed linked with its corporate strategy. The corporate strategy establishes an efficient and effective match between its competences and opportunities and environmental risks. Financial policies of a company should be developed in the context of its corporate strategy. Within the overall framework of a company's strategy, there should be consistency between financial policies- investment, debt and dividend.

Question 2

- (a) New Projects Ltd. is evaluating 3 projects, P-I, P-II, P-III. Following information is available in respect of these projects:

	P-I	P-II	P-III
Cost	Rs. 15,00,000	Rs. 11,00,000	Rs. 19,00,000
Inflows-Year 1	6,00,000	6,00,000	4,00,000
Year 2	6,00,000	4,00,000	6,00,000
Year 3	6,00,000	5,00,000	8,00,000
Year 4	6,00,000	2,00,000	12,00,000
Risk Index	1.80	1.00	0.60

Minimum required rate of return of the firm is 15% and applicable tax rate is 40%. The risk free interest rate is 10%.

Required:

- (i) Find out the risk-adjusted discount rate (RADR) for these projects.
- (ii) Which project is the best? (10 Marks)
- (b) The following data relate to Anand Ltd.'s share price:
- | | |
|-------------------------------|-----------|
| Current price per share | Rs. 1,800 |
| 6 months future's price/share | Rs. 1,950 |
- Assuming it is possible to borrow money in the market for transactions in securities at 12% per annum, you are required:
- (i) to calculate the theoretical minimum price of a 6-months forward purchase; and
- (ii) to explain arbitrating opportunity. (6 Marks)
- (c) Saranam Ltd. has issued convertible debentures with coupon rate 12%. Each debenture has an option to convert to 20 equity shares at any time until the date of maturity. Debentures will be redeemed at Rs. 100 on maturity of 5 years. An investor generally

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requires a rate of return of 8% p.a. on a 5-year security. As an investor when will you exercise conversion for given market prices of the equity share of (i) Rs. 4, (ii) Rs. 5 and (iii) Rs. 6.

Cumulative PV factor for 8% for 5 years : 3.993
 PV factor for 8% for year 5 : 0.681 (4 Marks)

Answer

- (a) (i) The risk free rate of interest and risk factor for each of the projects are given. The risk adjusted discount rate (RADR) for different projects can be found on the basis of CAPM as follows:

Required Rate of Return = $I_{Rf} + (k_e - I_{Rf}) \text{ Risk Factor}$

For P-I : RADR = $0.10 + (0.15 - 0.10) 1.80$
 = 19%

For P-II : RADR = $0.10 + (0.15 - 0.10) 1$
 = 15 %

For P-III : RADR = $0.10 + (0.15 - 0.10) 0.60$
 = 13 %

- (ii) The three projects can now be evaluated at 19%, 15% and 13% discount rate as follows:

Project P-I

Annual Inflows	Rs. 6,00,000
PVAF (19 %, 4)	2.639
PV of Inflows (Rs. 6,00,000 x 2.639)	Rs. 15,83,400
Less: Cost of Investment	<u>Rs. 15,00,000</u>
Net Present Value	<u>Rs. 83,400</u>

Project P-II

Year	Cash Inflow (Rs.)	PVF (15%,n)	PV (Rs.)
1	6,00,000	0.870	5,22,000
2	4,00,000	0.756	3,02,400
3	5,00,000	0.658	3,29,000
4	2,00,000	0.572	<u>1,14,400</u>
Total Present Value			12,67,800
Less: Cost of Investment			<u>11,00,000</u>
Net Present Value			<u>1,67,800</u>

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Project P-III			
Year	Cash Inflow (Rs.)	PVF (13%,n)	PV (Rs.)
1	4,00,000	0.885	3,54,000
2	6,00,000	0.7831	4,69,860
3	8,00,000	0.693	5,54,400
4	12,00,000	0.613	<u>7,35,600</u>
Total Present Value			21,13,860
Less: Cost of Investment			<u>19,00,000</u>
Net Present Value			<u>2,13,860</u>

Project P-III has highest NPV. So, it should be accepted by the firm

(b) Anand Ltd

(i) Calculation of theoretical minimum price of a 6 months forward contract-

Theoretical minimum price = Rs. 1,800 + (Rs. 1,800 x 12/100 x 6/12) Rs. 1,908

(ii) Arbitrage Opportunity-

The arbitrageur can borrow money @ 12 % for 6 months and buy the shares at Rs. 1,800. At the same time he can sell the shares in the futures market at Rs. 1,950. On the expiry date 6 months later, he could deliver the share and collect Rs. 1,950 pay off Rs. 1,908 and record a profit of Rs. 42 (Rs. 1,950 – Rs. 1,908)

(c) If Debentures are not converted its value is as under: -

	<u>PVF @ 8 %</u>	<u>Rs.</u>
Interest @ Rs. 12 % for 5 years	3.993	47.916
Redemption Rs. 100 in 5 th year	0.681	<u>68.100</u>
		<u>116.016</u>

Value of equity shares:-

<u>Market Price</u>	<u>No.</u>	<u>Total</u>
Rs. 4	20	Rs. 80
Rs. 5	20	Rs. 100
Rs. 6	20	Rs. 120

Hence, unless the market price is Rs. 6 conversion should not be exercised.

Question 3

(a) Mr. Sinha has invested in three Mutual fund schemes as per details below:

	Scheme X	Scheme Y	Scheme Z
Date of Investment	01.12.2008	01.01.2009	01.03.2009

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Amount of Investment	Rs. 5,00,000	Rs. 1,00,000	Rs. 50,000
Net Asset Value at entry date	Rs. 10.50	Rs. 10.00	Rs. 10.00
Dividend received upto 31.03.2009	Rs. 9,500	Rs. 1,500	Nil
NAV as at 31.3.2009	Rs. 10.40	Rs. 10.10	Rs. 9.80

You are required to calculate the effective yield on per annum basis in respect of each of the three schemes to Mr. Sinha upto 31.03.2009. (6 Marks)

- (b) Classic Finance, a Leasing Company, has been approached by a prospective customer intending to acquire a machine whose cash down price is Rs. 6 crores. The customer, in order to leverage his tax position, has requested a quote for a three year lease with rentals payable at the end of each year but in a diminishing manner such that they are in the ratio of 3 : 2 : 1. Depreciation can be assumed to be on WDV basis at 25% and Classic Finance's marginal tax rate is 35%. The target rate of return for Classic Finance on the transaction is 10%. You are required to calculate the lease rents to be quoted for the lease for three years. (8 Marks)
- (c) Explain briefly the capital Asset pricing model used in the context of valuation of securities. (6 Marks)

Answer

- (a) Calculation of effective yield on per annum basis in respect of three mutual fund schemes to Mr. Sinha up to 31-03-2009:

PARTICULARS	MFX	MFY	MFZ
(a) Investments	Rs. 5,00,000	Rs. 1,00,000	Rs. 50,000
(b) No. of units	47,619.05	10,000	5,000
(c) Unit NAV ON 31-3-2009	Rs. 10.40	Rs. 10.10	Rs. 9.80
(d) Total NAV on 31-3-2009 (b x c)	Rs . 4,95,238.12	Rs. 1,01,000	Rs. 49,000
(e) Increase / Decrease of NAV (a-d)	(Rs. 4,761.88)	Rs. 1,000	(Rs. 1000)
((f) Dividend Received	Rs. 9,500	Rs. 1,500	Nil
(g) Total yield (e + f)	Rs. 4,738.12	Rs. 2,500	(Rs. 1,000)
(h) Number of Days	121	90	31
(i) Effective yield p.a. (g/a x 365/h x 100)	2.859%	10.139%	(-) 23.55%

- (b) Calculation of depreciation tax shield

(Rs. Lakhs)

Year	Cost / WDV	Dep. @ 25 %	Tax shield @ 0.35	PVF	PV of dep. tax shield
1	600.00	150.00	52.50	0.909	47.72
2	450.00	112.50	39.38	0.826	32.53

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3	337.50	84.38	29.53	0.751	<u>22.18</u>
					<u>102.43</u>
Capital sum to be placed on lease					(Rs. Lakhs)
Cash down price					600.00
Less: PV of depreciation tax shield					<u>102.43</u>
To be placed on lease					<u>497.57</u>
Let the normal annual lease rent were to be "x" then					
Year	Post tax	PVF	PV of cash flow		
1	3 x (1-0.35) or 1.95 x	0.909	1.773 x		
2	2x (1-0.35) or 1.30x	0.826	1.074x		
3	1x (1-0.35) or 0.65x	0.751	<u>0.488x</u>		
			<u>3.335 x</u>		
Value of x = Rs. 497.57 lakhs / 3.335 i.e					Rs. 149.196 lakhs
Year wise lease rental will be					
					Rs.lakhs
	Year 1	3X 149.196	447.59		
	Year 2	2X 149.196	298.39		
	Year 3	1X 149.196	149.20		

(c) Capital Asset Pricing Model (CAPM)

Capital Asset Pricing Model was developed by Sharpe, Mossin and Lintner in 1960s. The model explains the relationship between the expected return, non-diversifiable risk and the valuation of securities. It considers the required rate of return of a security on the basis of its contribution to the total risk. It is based on the premise that the diversifiable risk of a security is eliminated when more and more securities are added to the portfolio. However, the systematic risk cannot be diversified and is correlated with that of the market portfolio. All securities do not have same level of systematic risk. Therefore, the required rate of return goes with the level of systematic risk. The systematic risk can be measured by beta, β . Under CAPM, the expected return from a security or portfolio can be expressed as:

$$\text{Expected return on security (Er)} = R_f + \beta (R_m - R_f)$$

Where,

R_f = Risk-free rate of return

β = Beta of security or portfolio

$(R_m - R_f)$ = Risk premium

R_m = Market return

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The model shows that the expected return of a security or a portfolio consists of the risk-free rate of interest plus a risk premium. If the expected return does not meet the required return, then the investment should not be undertaken. The CAPM, when plotted on a graph, is known as the Security Market Line (SML). A major implication of CAPM is that not only every security but all portfolios too must plot on SML. This implies that in an efficient market, all securities are expected to yield returns commensurate with their riskiness, measured by β .

CAPM is based on following assumptions:

- (i) The Investor's objective is to maximise the utility of terminal wealth.
- (ii) Investors make choices on the basis of risk and return.
- (iii) Investors have homogenous expectations of risk and return.
- (iv) Investors have identical time horizon.
- (v) Information is freely and simultaneously available to investors.
- (vi) There is a risk-free asset, and investors can borrow and lend unlimited amounts at the risk-free rate.
- (vii) There are no taxes, transaction costs, restrictions on short rates, or other market imperfections.
- (viii) Total asset quantity is fixed, and all assets are marketable and divisible.

Thus, CAPM provides a conceptual frame work for evaluating any investment decision where capital is committed with a goal of producing future returns. However, there are certain limitations of the theory. Some of these limitations are as follows:

- (i) Reliability of Beta: Statistically reliable Beta might not exist for shares of many firms. It may not be possible to determine the cost of equity of all firms using CAPM. All shortcomings that apply to Beta value apply to CAPM too.
- (ii) Other Risks: It emphasis only on systematic risk while unsystematic risks are also important to share holders who do not possess a diversified portfolio.
- (iii) Information Available: It is extremely difficult to obtain important information on risk- free interest rate and expected return on market portfolio as there are multiple risk- free rates for one while for another, markets being volatile it varies over time period.

Question 4

- (a) B Ltd. is a highly successful company and wishes to expand by acquiring other firms. Its expected high growth in earnings and dividends is reflected in its PE ratio of 17. The Board of Directors of B Ltd. has been advised that if it were to take over firms with a lower PE ratio than it own, using a share-for-share exchange, then it could increase its reported earnings per share. C Ltd. has been suggested as a possible target for a

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takeover, which has a PE ratio of 10 and 1,00,000 shares in issue with a share price of Rs. 15. B Ltd. has 5,00,000 shares in issue with a share price of Rs. 12.

Calculate the change in earnings per share of B Ltd. if it acquires the whole of C Ltd. by issuing shares at its market price of Rs.12. Assume the price of B Ltd. shares remains constant. (8 Marks)

- (b) An exporter is a UK based company. Invoice amount is \$3,50,000. Credit period is three months. Exchange rates in London are:

Spot Rate	(\$/£) 1.5865 - 1.5905
3-Month Forward Rate	(\$/£) 1.6100 - 1.6140

Rate of Interest in Money Market:

	Deposit	Loan
\$	7%	9%
£	5%	8%

Compute and show how a money-market hedge can be put in place. Compare and contrast the outcome with a forward contract. (7 Marks)

- (c) Explain the importance of the budget and the revised budget to public sector undertakings. (5 Marks)

Answer

- (a) Total market value of C Ltd is = 1,00,000 x Rs. 15 = Rs. 15,00,000
PE ratio (given) = 10
Therefore , earnings = Rs. 15,00,000 /10
= Rs. 1,50,000
Total market value of B Ltd. is = 5,00,000 x Rs. 12 = 60,00,000
PE ratio (given) = 17
Therefore, earnings = Rs. 60,00,000/17
= Rs. 3,52,941

The number of shares to be issued by B Ltd.

$$\begin{aligned} \text{Rs. 15,00,000} \div 12 &= 1,25,000 \\ \text{Total number of shares of B Ltd} &= 5,00,000 + 1,25,000 = 6,25,000 \\ \text{The EPS of the new firm is} &= (\text{Rs. 3,52,941} + 1,50,000) / 6,25,000 \\ &= \text{Re. 0.80} \end{aligned}$$

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The present EPS of B Ltd is $= \text{Rs. } 3,52,941 / 5,00,000$
 $= \text{Re. } 0.71$

So the EPS of firm B will increase from Re. 0.71 to Rs. 0.80 as a result of merger.

- (b) Identify: Foreign Currency is an asset. Amount \$ 3,50,000.

Create: \$ Liability.

Borrow: In \$. The borrowing rate is 9 % per annum or 2.25 % per quarter.

Amount to be borrowed $\$ 3,50,000 / 1.0225 = \$ 3,42,298.29$

Convert: Sell \$ and buy £. The relevant rate is the Ask rate, namely, \$ 1.5905 per £,

(Note: This is an indirect quote). Amount of £s received on conversion is £ 2,15,214.27
[£ 3,42,298.29 / 1.5905]

Invest: £ 2,15,214.27 will be invested at 5 % for 3 months to get £ 2,17,904.45.

Settle: The liability of \$ 3,42,298.29 at interest of 2.25 per cent per quarter matures to \$ 3,50,000/-. This will be settled with the amount of \$ 3,50,000 received from customer.

Using forward rate, amount received is $= \text{£ } 3,50,000 / 1.6140 = \text{£ } 2,16,852.54$

Amount received through money market hedge $= \text{£ } 2,17,904.45$

Gain $= \text{£ } 2,17,904.45 - \text{£ } 2,16,852.54 = \text{£ } 1,051.91$

So, money market hedge is beneficial for the exporter.

- (c) Importance of Budget and Revised Budget to Public Sector Undertakings (PSUs)

The budget exercise in public sector undertakings is an annual exercise. All revenue and expenditure, (including capital expenditures) and sources and application of funds are budgeted prior to the commencement of financial year. The budget is very important exercise in the public sector undertakings. The budget is important to the PSUs due to the following reasons:

- (i) There is a separate Budget Section of the Accounts and Finance Department responsible for coordinating the budget exercise, collecting data from all departments/divisions concerned and finalising the budget for presentation to the Board of Directors.
- (ii) The budget is prepared on the basis of 'Zero based budgeting' i.e. revenue and expenditure are estimated from scratch or afresh based only on targets set to be achieved during the ensuing year as broadly determined by the Board of Directors or the Management Committee.
- (iii) The budget approved by the Board of Directors forms the basis for all expenditure and yardstick for revenue earning.
- (iv) The works of budgeting- estimating revenue and expenditure is meticulously done and the sanctioned budget becomes a sort of 'bible' for the operating departments. No expenditure can be incurred unless it has been included in the budget. Items of

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expenditure are screened for prior sanction under the budget.

- (v) The revenue target set in the budget needs to be achieved.
- (vi) To keep the expenditure trend balanced with revenue, a fortnightly or monthly reporting of budgeted and actuals is done to all departmental heads.
- (vii) Budget variance report is to be regularly submitted to the top management for its review, decision and corrective directions, where and when necessary.

Revised Budget : In public sector units, there is a also convention of preparing a revised budget ,if required, after expiry of the first two quarters or three quarters of the financial year depending upon exigencies. The revised budget is important to the PSUs due to the following reasons:

- (i) It helps in recognizing developments after the initial budget preparation exercise and in coordinating action plans for the balance part of the year.
- (ii) It also takes into consideration any material change taking place which could not have been envisaged at the time of preparation of the original budget and which is bound to affect the budgeted estimates and actual performance. Thus, the original budget is revised accordingly. Example of significant happenings could be change in exchange rate, new levy of substantial Direct and Indirect taxes and duties, etc.
- (iii) Same level of exercise is carried out in preparation of revised budget as in the case of original budget.

It is, however, very important to keep in mind that the practice of preparing the Revised Budget be strictly followed only when the situation compels such an exercise and should not be liberally pursued.

Question 5

- (a) XYZ established the following spread on the Delta Corporation's stock:
 - (i) Purchased one 3-month call option for 100 Nos. with a premium of Rs. 30 and an exercise price of Rs. 550.
 - (ii) Purchased one 3-month put option for 100 Nos. with a premium of Rs. 5 and an exercise price of Rs. 450.

The current price of Delta Corporation's stock is Rs. 500. Determine XYZ profit or loss if the price of Delta Corporation:

- (i) Stays at Rs. 500 after 3 months.
 - (ii) Falls to Rs. 350 after 3 months.
 - (iii) Rises to Rs. 600. (6 Marks)
- (b) Subhash & Co. earns Rs. 8 per share having capitalisation rate of 10 per cent and has a return on investment at the rate of 20 per cent. According to Walter's model, what should

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be the price per share at 25 per cent dividend payout ratio? Is this the optimum payout ratio as per Walter? (6 Marks)

- (c) A stock costing Rs. 120 pays no dividends. The possible prices that the stock might sell for at the end of the year with the respective probabilities are:

Price	Probability
115	0.1
120	0.1
125	0.2
130	0.3
135	0.2
140	0.1

Required:

- (i) Calculate the expected return.
(ii) Calculate the Standard deviation of returns. (8 Marks)

Answer

- (a) (i) Total premium paid on purchasing a call and put option
= (Rs. 30 per share x 100) + (Rs. 5 per share x 100).
= Rs. 3,000 + Rs. 500 = Rs. 3,500

In this case, XYZ exercises neither the call option nor the put option as both will result in a loss for her.

$$\begin{aligned}\text{Ending value} &= -\text{Rs. 3,500} + \text{Zero gain} \\ &= -\text{Rs. 3,500}\end{aligned}$$

$$\text{i.e. Net loss} = \text{Rs. 3,500}$$

- (ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

$$\begin{aligned}\text{Total premium paid} &= \text{Rs. 3,500} \\ \text{Ending value} &= -\text{Rs. 3,500} + \text{Rs. } [(450 - 350) \times 100] \\ &= -\text{Rs. 3,500} + \text{Rs. 10,000} = \text{Rs. 6,500} \\ \text{i.e. Net gain} &= \text{Rs. 6,500}\end{aligned}$$

- (iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

$$\text{Total premium paid} = \text{Rs 3,500}$$

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Ending value = – Rs. 3,500 + Rs. [(600-550) x 100]

Net Gain = – Rs. 3,500 + Rs. 5,000 = Rs. 1,500

(b) Walter Model is as follows:-

$$V_e = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

V_c = market value of the share

R_a = Return on retained earnings

R_e = Capitalisation rate

E = Earnings per share

D = Dividend per share

Hence, if Walter model is applied-

$$\text{Market value of the share } V_c = \frac{\text{Rs.2.00} + \frac{0.20}{0.10}(\text{Rs.8.00} - \text{Rs.2.00})}{0.10}$$

or

$$V_c = \frac{\text{Rs.2.00} + \frac{0.20}{0.10}(\text{Rs.6.00})}{0.10}$$

or

$$V_c = \frac{\text{Rs.2.00} + \text{Rs.12.00}}{0.10} = \frac{\text{Rs.14.00}}{0.10} = \text{Rs.140}$$

This is not the optimum payout ratio because $R_a > R_c$ and therefore V_e can further group if payout ratio is reduced.

(c) Here, the probable returns have to be calculated using the formula

$$R = \frac{D}{P_0} + \frac{P_1 - P_0}{P_0}$$

Calculation of Probable Returns

Possible prices (P_1)	$P_1 - P_0$	$[(P_1 - P_0) / P_0] \times 100$
Rs.	Rs.	Return (per cent)
115	-5	-4.17
120	0	0.00
125	5	4.17

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130	10	8.33
135	15	12.50
140	20	16.67

Calculation of Expected Returns

Possible return	Probability	Product
X_i	$p(X_i)$	$X_i \cdot p(X_i)$
-4.17	0.1	-0.417
0.00	0.1	0.000
4.17	0.2	0.834
8.33	0.3	2.499
12.50	0.2	2.500
16.67	0.1	<u>1.667</u>

$$X = \underline{7.083}$$

Expected return $X = 7.08$ per

Calculation of Standard Deviation of Returns

Probable	Probability	Deviation	Deviation squared	Product
return X_i	$p(X_i)$	$(X_i - X)$	$(X_i - X)^2$	$(X_i - X)^2 p(X_i)$
-4.17	0.1	-11.25	126.56	12.66
0.00	0.1	-7.083	50.17	5.017
4.17	0.2	-2.913	8.49	1.698
8.33	0.3	1.247	1.56	0.467
12.50	0.2	5.417	29.34	5.869
16.67	0.1	9.587	91.91	<u>9.191</u>

$$\sigma^2 = \underline{34.902}$$

Variance, $\sigma^2 = 34.902$ per cent

Standard deviation, $\sigma = \sqrt{34.902} = 5.908$ per cent

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Attempt **all** questions.

Working notes should form part of the answer.

Question 1

- (a) Alfa Ltd. desires to acquire a diesel generating set costing Rs. 20 lakh which will be used for a period of 5 years. It is considering two alternatives (i) taking the generating set on lease or (ii) purchasing the asset outright by raising a loan. The company has been offered a lease contract with a lease payment of Rs. 5.2 lakh per annum for five years payable in advance. Company's banker requires the loan to be repaid @ 12% p.a. in 5 equal annual instalments, each installment being due at the beginning of the each year. Tax relevant depreciation of the generator is 20% as per WDV method. At the end of 5th year the generator can be sold at Rs. 2,00,000. Marginal Tax rate of Alfa Ltd. is 30% and its post tax cost of capital is 10%.

Determine:

- (a) The Net Advantage of Leasing to Alfa Ltd. and recommend whether leasing is financially viable.
- (b) Break Even Lease Rental. (12 Marks)
- (b) The credit sales and receivables of M/s M Ltd. at the end of the year are estimated at Rs. 3,74,00,000 and Rs. 46,00,000 respectively.

The average variable overdraft interest rate is 5%. M Ltd. is considering a proposal for factoring its debts on a non-recourse basis at an annual fee of 3% on credit sales. As a result, M Ltd. will save Rs. 1,00,000 per year in administrative cost and Rs. 3,50,000 as bad debts. The factor will maintain a receivables collection period of 30 days and advance 80% of the face value thereof at an annual interest rate of 7%. Evaluate the viability of the proposal.

Note: 365 days are to be taken in a year for the purpose of calculation of receivables.

(8 Marks)

Answer

(a) Workings:

- 1.) Calculation of annual installment

Rs. 20 lakh/ 4.038 = Rs. 4.95 lakh

$3.038^* + 1 = 4.038$

* PVIAF @ 12% for 4 years

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2.) Calculation of Present Value (PV) of tax shield or tax benefit on interest on debt : -

Yr.	Installment (Rs. lakh)	Opening value (Rs. lakh)	Principal payment (Rs. lakh)	Interest 12% (Rs. lakh)	Tax shield (Rs. lakh)	PVF (10%)	PV 10% (Rs. lakh)
0	4.95	20.00	4.95	-	-	-	-
1	4.95	15.05	3.15	1.80	0.54	0.909	0.49
2	4.95	11.90	3.52	1.43	0.43	0.826	0.36
3	4.95	8.38	3.95	1.00	0.30	0.751	0.23
4	4.95	4.43	4.43	0.52	0.16	0.683	0.11
							<u>1.19</u>

3.) Calculation of Present Value (PV) of tax shield or tax benefit on depreciation: -

Year	Opening value (Rs. lakh)	Depreciation Tax allowance (Rs. lakh)	Tax Saving @ 30% (Rs. lakh)	PVF (10%)	PV (Rs. lakh)
1	20	4.00	1.20	0.909	1.09
2	16	3.20	0.96	0.826	0.79
3	12.80	2.56	0.77	0.751	0.58
4	10.24	2.05	0.62	0.683	0.42
5	8.19	1.64	0.49	0.621	0.30
					<u>3.18</u>

4.) Calculation of Present Value (PV) of lease decision : -

Particulars	Years	Amount (Rs. lakh)	PVF @ 12%	PV (Rs. lakh)
Lease Rent	0 -4	5.2	4.038	(-) 21.00
Tax relief on lease	1 -5	1.56	3.605	5.62
				<u>(-) 15.38</u>

5.) Calculation of Present Value (PV) of buying decision: -

	(Rs. lakh)
Purchase price	- 20.00
Present Value of Tax saving on Interest	1.19
Present Value of tax saving on Depreciation	3.18
Salvage (Rs. 2 lakh x 0.621)	1.24
Present Value of buying decision	<u>(-) 14.39</u>

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(a) Calculation of Net Advantage of Leasing (NAL):

Particulars	(Rs. lakh)
Present Value of lease decision	- 15.38
Less: Present Value of buying decision	- 14.39
Net Advantage of Leasing	<u>- 0.99</u>

Recommendation:

Since Net Advantage of Leasing is negative the lease is financially not viable.

(b) Computation of Break Even Lease Rental (BELR)

Benefits from leasing : -

Let us assume the lease rental be L

Cost of the generator	Rs. 20 lakh
PV of Tax shield on rentals	$3.605 \times 0.3 \times L = 1.0815 L$

Cost of leasing: -

Present Value of lease rentals	4.038 L
Present Value of Tax shield on interest on debt	1.19
Present Value of Tax shield on depreciation	3.18
Present Value of salvage	<u>1.24</u>
	<u>4.038 L + 5.61</u>

Benefits from leasing = Cost of leasing

$$20 + 1.0815 L = 4.038 L + 5.61$$

Thus, $L = 14.39/2.9565 = \text{Rs. 4.87 lakh (BELR)}$

Note: Some students may also discount cash flows under both alternatives at after tax cost of debt i.e. $12\% (1-0.3) = 8.4\%$. In such situation the alternative solution will be as follows:

Workings:

1.) Calculation of annual installment

$$\text{Rs. 20 lakh} / 4.038 = \text{Rs. 4.95 lakh}$$

$$3.038^* + 1 = 4.038$$

* PVIAF @ 12% for 4 years

PAPER – 2 : MANAGEMENT ACCOUNTING AND FINANCIAL ANALYSIS

2.) Calculation of Present Value (PV) of tax shield or tax benefit on interest on debt : -

Yr.	Installment (Rs. lakh)	Opening value (Rs. lakh)	Principal payment (Rs. lakh)	Interest 12% (Rs. lakh)	Tax shield (Rs. lakh)	PVF (10%)	PV 10% (Rs. lakh)
0	4.95	20.00	4.95	-	-	-	-
1	4.95	15.05	3.15	1.80	0.54	0.909	0.49
2	4.95	11.90	3.52	1.43	0.43	0.826	0.36
3	4.95	8.38	3.95	1.00	0.30	0.751	0.23
4	4.95	4.43	4.43	0.52	0.16	0.683	0.11
							<u>1.19</u>

3.) Calculation of Present Value (PV) of tax shield or tax benefit on depreciation: -

Year	Opening value (Rs. lakh)	Depreciation Tax allowance (Rs. lakh)	Tax Saving @ 30% (Rs. lakh)	PVF (10%)	PV (Rs. lakh)
1	20	4.00	1.20	0.909	1.09
2	16	3.20	0.96	0.826	0.79
3	12.80	2.56	0.77	0.751	0.58
4	10.24	2.05	0.62	0.683	0.42
5	8.19	1.64	0.49	0.621	0.30
					<u>3.18</u>

4.) Calculation of Present Value (PV) of lease decision : -

Particulars	Years	Amount (Rs. lakh)	PVF @ 8.4%	PV (Rs. lakh)
Lease Rent	0 -4	5.2	4.283	(-) 22.27
Tax relief on lease	1 -5	1.56	3.951	6.16
				<u>(-) 16.11</u>

5.) Calculation of Present Value (PV) of buying decision : -

	(Rs. lakh)
Purchase price	- 20.00
Present Value of Tax saving on Interest	1.19
Present Value of tax benefit on depreciation	3.18
Salvage (Rs. 2 lakh x 0.621)	1.24
Present Value of buying decision	<u>(-) 14.39</u>

FINAL (OLD) EXAMINATION : MAY, 2010

Calculation of Net Advantage of Leasing (NAL):

Particulars	(Rs. lakh)
Present Value of lease decision	- 16.11
Less: Present Value of buying decision	- 14.39
Net Advantage of Leasing	<u>- 1.72</u>

Recommendation:

Since Net Advantage of Leasing is negative the lease is financially not viable.

b) Computation of Break Even Lease Rental (BELR)

Benefits from leasing :-

Let us assume the lease rental be L

Cost of the generator	Rs. 20 lakh
PV of Tax shield on rentals	$3.951 \times 0.3 \times L = 1.1853 L$

Cost of leasing: -

Present Value of lease rentals	4.283 L
Present Value of Tax shield on interest on debt	1.19
Present Value of Tax shield on depreciation	3.18
Present Value of salvage	<u>1.24</u>
	<u>4.283 L + 5.61</u>

Benefits from leasing = Cost of leasing

$$20 + 1.1853 L = 4.283 L + 5.61$$

$$\text{Thus, } L = 14.39/3.0977 = \text{Rs. 4.65 lakh (BELR)}$$

(b)

		Rs.
Estimated Receivables		46,00,000
Estimated Receivables under Factor ($3,74,00,000 \times \frac{30}{365}$)		30,73,973
Reduction in Receivables (Rs. 46,00,000 – Rs. 30,73,973)		<u>15,26,027</u>
Total Savings (A)		
Reduction in finance costs	Rs. 15,26,027 @ 5%	76,301
Saving of Administration costs		1,00,000
Saving of Bad debts		<u>3,50,000</u>
Total		<u>5,26,301</u>

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Total Cost of Factoring (B)

Interest on advances by Factor		
Advances 30,73,973 @ 80%	Rs. 24,59,178	
Interest on Rs. 24,59,178 @ 7%	Rs.1,72,142	
Overdraft Interest rate 5%	<u>(Rs. 1,22,959)</u>	49,183
Charges payable to Factor (Rs 3,74,00,000 @ 3%)		11,22,000
Total		<u>11,71,183</u>
Net Saving (A) – (B)		(6,44,882)

Since Net Saving is negative the proposal is not viable and cannot be accepted

Question 2

- (a) Following informations are available in respect of XYZ Ltd. which is expected to grow at a higher rate for 4 years after which growth rate will stabilize at a lower level:

Base year information:

Revenue	- Rs. 2,000 crores
EBIT	- Rs. 300 crores
Capital expenditure	- Rs. 280 crores
Depreciation	- Rs.200 crores

Information for high growth and stable growth period are as follows:

	High Growth	Stable Growth
Growth in Revenue & EBIT	20%	10%
Growth in capital expenditure and depreciation	20%	Capital expenditure are offset by depreciation
Risk free rate	10%	9%
Equity beta	1.15	1
Market risk premium	6%	5%
Pre tax cost of debt	13%	12.86%
Debt equity ratio	1 : 1	2 : 3

For all time, working capital is 25% of revenue and corporate tax rate is 30%.

What is the value of the firm? (10 Marks)

- (b) A Mutual Fund has a NAV of Rs. 20 on 1.12.09. During December 2009, it has earned a regular income of Re. 0.0375 and capital gain of Re. 0.03 per unit. On 31.12.09, the NAV was Rs. 20.06. Calculate the monthly return and annual return. (5 Marks)
- (c) Write a short note on the role of the financial advisor in a public sector undertaking. (5 Marks)

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Answer

(a) High growth phase :

$$k_e = 0.10 + 1.15 \times 0.06 = 0.169 \text{ or } 16.9\%.$$

$$k_d = 0.13 \times (1 - 0.3) = 0.091 \text{ or } 9.1\%.$$

$$\text{Cost of capital} = 0.5 \times 0.169 + 0.5 \times 0.091 = 0.13 \text{ or } 13\%.$$

Stable growth phase :

$$k_e = 0.09 + 1.0 \times 0.05 = 0.14 \text{ or } 14\%.$$

$$k_d = 0.1286 \times (1 - 0.3) = 0.09 \text{ or } 9\%.$$

$$\text{Cost of capital} = 0.6 \times 0.14 + 0.4 \times 0.09 = 0.12 \text{ or } 12\%.$$

Determination of forecasted Free Cash Flow of the Firm (FCFF)

(Rs. in crores)

	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Terminal Year
Revenue	2,400	2,880	3,456	4,147.20	4,561.92
EBIT	360	432	518.40	622.08	684.29
EAT	252	302.40	362.88	435.46	479.00
Capital Expenditure	96	115.20	138.24	165.89	-
Less Depreciation					
Δ Working Capital	<u>100.00</u>	<u>120.00</u>	<u>144.00</u>	<u>172.80</u>	<u>103.68</u>
Free Cash Flow (FCF)	<u>56.00</u>	<u>67.20</u>	<u>80.64</u>	<u>96.77</u>	<u>375.32</u>

Present Value (PV) of FCFF during the explicit forecast period is:

FCFF	PVF @ 13%	PV
(Rs. in crores)		(Rs. in crores)
56.00	0.885	49.56
67.20	0.783	52.62
80.64	0.693	55.88
96.77	0.613	59.32
		<u>Rs. 217.38</u>

PV of the terminal, value is:

$$\frac{375.32}{0.12 - 0.09} \times \frac{1}{(1.13)^4} = \text{Rs. } 12,510.67 \text{ Crores} \times 0.613318 = \text{Rs. } 7,673.02 \text{ Crores}$$

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The value of the firm is :

Rs. 217.38 Crores + Rs. 7,673.02 Crores = Rs. 7,890.40 Crores

(b)

$$\text{Monthly return (r)} = \frac{(\text{NAV}_1 - \text{NAV}_2) + I_1 + G_1}{\text{NAV}_2}$$

where r = Return of MF

NAV_1 = NAV on 31.12.09

NAV_2 = NAV on 01.12.09

I_1 = Income during December 2009

G_1 = Capital gain

$$r = \frac{\text{Rs. (20.06 - 20.00) + 0.0375 + 0.03}}{\text{Rs. 20.00}}$$

$$= \frac{\text{Rs. 0.06 + 0.0375 + 0.03}}{\text{Rs. 20.00}}$$

$$= \frac{\text{Rs. 0.1275}}{\text{Rs. 20.00}} = 0.006375$$

$$= \text{Rs. } 0.006375 \times 100 = 0.6375\%$$

$$\text{Annual return} = 0.6375\% \times 12 = 7.65\%$$

(c) Role of the financial advisor in a Public Sector Undertaking (PSU)

The financial advisor occupies an important position in all public sector undertakings (PSUs). He functions as the principal advisor to the chief executive in all financial matters.

The functions and responsibilities of the financial advisor include :

1. Determination of the financial needs of the enterprise and the manner in which the same are to be met.
2. Appraisal of Capital budgeting projects with a view to ascertain their commercial/ economic viability and financial soundness.
3. Formulation of a programme to provide most effective cost-volume profit relationship.
4. Analysis of financial results of all operations and recommendations concerning future operations.
5. Examination of feasibility studies and detailed project reports from the point of view of overall economic viability of the project.

special studies with a view to reduce costs and

- ### Question 3

- Market price of put Re. 1

(iv) Write 1.0 put

Should Mr. A buy the share? If so, what maximum price should he pay for each share? Assume no tax on dividend income and capital gain. (4 Marks)

- | Security | Expected Return | Beta | σ^2_{ci} |
|-----------------|------------------------|-------------|-----------------------------------|
| A | 15 | 1.5 | 40 |
| B | 12 | 2 | 20 |
| C | 10 | 2.5 | 30 |
| D | 09 | 1 | 10 |
| E | 08 | 1.2 | 20 |
| F | 14 | 1.5 | 30 |

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Answer

(a) Expiration date cash flows

Stock Prices	Rs. 50	Rs. 55	Rs. 60	Rs. 65	Rs. 70
Buy 1.0 call	0	0	0	-60	-60
Write 1.0 call	0	0	0	60	60
Buy 1.0 put	60	60	0	0	0
Write 1.0 put	-60	-60	0	0	0

Expiration date investment value

Stock Prices	Rs. 50	Rs. 55	Rs. 60	Rs. 65	Rs. 70
Buy 1.0 call	0	0	0	5	10
Write 1.0 call	0	0	0	-5	-10
Buy 1.0 put	10	5	0	0	0
Write 1.0 put	-10	-5	0	0	0

Expiration date net profits

Stock Prices	Rs. 50	Rs. 55	Rs. 60	Rs. 65	Rs. 70
Buy 1.0 call	-9	-9	-9	-4	1
Write 1.0 call	9	9	9	4	-1
Buy 1.0 put	9	4	-1	-1	-1
Write 1.0 put	-9	-4	1	1	1

(b) P.V. of dividend stream and sales proceeds

Year	Divd. /Sale	PVF (12%)	PV (Rs.)
1	Rs. 20/-	0.893	17.86
2	Rs. 20/-	0.797	15.94
3	Rs. 20/-	0.712	14.24
4	Rs. 24/-	0.636	15.26
5	Rs. 24/-	0.567	13.61
6	Rs. 24/-	0.507	12.17
7	Rs. 24/-	0.452	10.85
7	Rs. 1026/- (Rs. 900 x 1.2 x 0.95)	0.452	463.75
			Rs. 563.68
	Less : - Cost of Share (Rs. 500 x 1.05)		Rs. 525.00
	Net gain		Rs. 38.68

Since Mr. A is gaining Rs. 38.68 per share, he should buy the share.

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Maximum price Mr. A should be ready to pay is Rs. 563.68 which will include incidental expenses. So the maximum price should be Rs. 563.68 x 100/105 = Rs. 536.84

- (c) Securities need to be ranked on the basis of excess return to beta ratio from highest to the lowest.

Security	R_i	β_i	$R_i - R_f$	$\frac{R_i - R_f}{\beta_i}$
A	15	1.5	8	5.33
B	12	2	5	2.5
C	10	2.5	3	1.2
D	9	1	2	2
E	8	1.2	1	0.83
F	14	1.5	7	4.67

Ranked Table:

Sec urity	$R_i - R_f$	β_i	σ^2_{ei}	$\frac{(R_i - R_f) \times \beta_i}{\sigma^2_{ei}}$	$\sum_{e=1}^N \frac{(R_i - R_f) \times \beta_i}{\sigma^2_{ei}}$	$\frac{\beta_i^2}{\sigma^2_{ei}}$	$\sum_{e=1}^N \frac{\beta_i^2}{\sigma^2_{ei}}$	C_i
A	8	1.5	40	0.30	0.30	0.056	0.056	1.923
F	7	1.5	30	0.35	0.65	0.075	0.131	2.814
B	5	2	20	0.50	1.15	0.20	0.331	2.668
D	2	1	10	0.20	1.35	0.10	0.431	2.542
C	3	2.5	30	0.25	1.60	0.208	0.639	2.165
E	1	1.2	20	0.06	1.66	0.072	0.711	2.047

$$CA = 10 \times 0.30 / [1 + (10 \times 0.056)] = 1.923$$

$$CF = 10 \times 0.65 / [1 + (10 \times 0.131)] = 2.814$$

$$CB = 10 \times 1.15 / [1 + (10 \times 0.331)] = 2.668$$

$$CD = 10 \times 1.35 / [1 + (10 \times 0.431)] = 2.542$$

$$CC = 10 \times 1.60 / [1 + (10 \times 0.639)] = 2.165$$

$$CE = 10 \times 1.66 / [1 + (10 \times 0.711)] = 2.047$$

Cut off point is 2.814

$$Z_i = \frac{\beta_i}{\sigma^2_{ei}} \left[\frac{(R_i - R_f)}{\beta_i} - C \right]$$

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$$Z_A = \frac{1.5}{40} (5.33 - 2.814) = 0.09435$$

$$Z_F = \frac{1.5}{30} (4.67 - 2.814) = 0.0928$$

$$X_A = 0.09435 / [0.09435 + 0.0928] = 50.41\%$$

$$X_F = 0.0928 / [0.09435 + 0.0928] = 49.59\%$$

Funds to be invested in security A & F are 50.41% and 49.59% respectively.

Question 4

- (a) ABC, a large business house is planning to sell its wholly owned subsidiary KLM. Another large business entity XYZ has expressed its interest in making a bid for KLM. XYZ expects that after acquisition the annual earning of KLM will increase by 10%.

Following information, ignoring any potential synergistic benefits arising out of possible acquisitions, are available:

- Profit after tax for KLM for the financial year which has just ended is estimated to be Rs. 10 crore.
- KLM's after tax profit has an increasing trend of 7% each year and the same is expected to continue.
- Estimated post tax market return is 10% and risk free rate is 4%. These rates are expected to continue.
- Corporate tax rate is 30%.

	XYZ	ABC	Proxy entity for KLM in the same line of business
No. of shares	100 lakhs	80 lakhs	--
Current share price	Rs. 287	Rs. 375	--
Dividend pay out	40%	50%	50%
Debt : Equity at market values	1 : 2	1 : 3	1 : 4
P/E ratio	10	13	12
Equity beta	1	1.1	1.1

Assume gearing level of KLM to be the same as for ABC and a debt beta of zero.

You are required to calculate:

- (a) Appropriate cost of equity for KLM based on the data available for the proxy entity.

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- (b) A range of values for KLM both before and after any potential synergistic benefits to XYZ of the acquisition. (8 Marks)
- (b) A Ltd. of U.K. has imported some chemical worth of USD 3,64,897 from one of the U.S. suppliers. The amount is payable in six months time. The relevant spot and forward rates are:

Spot rate	USD 1.5617-1.5673
6 months' forward rate	USD 1.5455 –1.5609

The borrowing rates in U.K. and U.S. are 7% and 6% respectively and the deposit rates are 5.5% and 4.5% respectively.

Currency options are available under which one option contract is for GBP 12,500. The option premium for GBP at a strike price of USD 1.70/GBP is USD 0.037 (call option) and USD 0.096 (put option) for 6 months period.

The company has 3 choices:

- (i) Forward cover
- (ii) Money market cover, and
- (iii) Currency option

Which of the alternatives is preferable by the company? (8 Marks)

- (c) What is a depository? Who are the major players of a depository system? What advantages does the depository system offer to the clearing member? (4 Marks)

Answer

- (a) a. β equity ungereared for the proxy company = $1.1 \times 4 / [4 + (1 - 0.3)] = 0.9362$

$$0.9362 = \beta \text{ equity geared} \times 3 / [3 + (1 - 0.3)]$$

$$\beta \text{ equity geared} = 1.1546$$

$$\begin{aligned} \text{Cost of equity} &= 0.04 + 1.1546 \times (0.1 - 0.04) \\ &= 10.93\% \end{aligned}$$

b. P/E valuation

(Based on earning of Rs. 10 Crore)

	Using proxy Entity's P/E	Using XYZ's P/E
Pre synergistic value	12 X Rs. 10 Crore = Rs. 120 Crore	10 X Rs. 10 Crore = Rs. 100 Crore
Post synergistic value	12 X Rs. 10 Crore X 1.1 = Rs. 132 Crore	10 X Rs. 10 Crore X 1.1 = Rs. 110 Crore

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Divided valuation model

	Based on 50% payout	Based on 40% payout
Pre synergistic value	$\frac{0.5 \times 10 \times 1.07}{0.1093 - 0.07}$ = Rs. 136.13 Crore	$\frac{0.4 \times 10 \times 1.07}{0.1093 - 0.07}$ =Rs. 108.91 Crore
Post synergistic value	$\frac{0.5 \times 10 \times 1.1 \times 1.07}{0.1093 - 0.07}$ = Rs. 149.75 Crore	$\frac{0.4 \times 10 \times 1.1 \times 1.07}{0.1093 - 0.07}$ = Rs. 119.79 Crore

Market Price

Although no information is available about the value of KLM, it may be possible to calculate a market value based on proportion of earnings of ABC that is generated by KLM.

Market value of ABC = 80 Lakh Shares X Rs. 375 = Rs. 300 Crore

Post Tax earnings of ABC = Rs. 300/13 = Rs. 23.08 Crore

If market value of ABC is allocated to KLM in the proportion of relative earning of KLM to that of ABC, KLM would have a market value of Rs. 300 crore X [10/23.08] = Rs. 130 Crore.

KLM's Post Tax earning = Rs. 10 Crore.

If ABC's P/E ratio is applied to it, the market value of KLM becomes Rs. 10 Crore X 13 = Rs. 130 Crore.

Therefore, it assumes that KLM has the same P/E ratio as that of ABC.

Range of valuation

Pre synergistic	Rs. 100 Crore	Rs. 136.13 Crore
Post synergistic	Rs. 110 Crore	Rs. 149.75 Crore

- (b) In the given case, the exchange rates are indirect. These can be converted into direct rates as follows:

Spot rate

$$\text{GBP} = \frac{1}{\text{USD } 1.5617} \quad \text{to} \quad \frac{1}{\text{USD } 1.5673}$$

$$\text{USD} = \text{GBP } 0.64033 \quad - \quad \text{GBP } 0.63804$$

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6 months' forward rate

$$\text{GBP} = \frac{1}{\text{USD } 1.5455} \quad \text{to} \quad \frac{1}{\text{USD } 1.5609}$$

$$\text{USD} = \text{GBP } 0.64704 \quad - \quad \text{GBP } 0.64066$$

Payoff in 3 alternatives

i. Forward Cover

Amount payable	USD 3,64,897
Forward rate	GBP 0.64704
Payable in GBP	GBP 2,36,103

ii. Money market Cover

Amount payable	USD 3,64,897
PV @ 4.5% for 6 months i.e. $\frac{1}{1.0225} = 0.9779951$	USD 3,56,867
Spot rate purchase	GBP 0.64033
Borrow GBP 3,56,867 x 0.64033	GBP 2,28,512
Interest for 6 months @ 7 %	7,998
	<u>-</u>
Payable after 6 months	<u>GBP 2,36,510</u>

iii. Currency options

Amount payable	USD 3,64,897
Unit in Options contract	GBP 12,500
Value in USD at strike rate of 1.70 (GBP 12,500 x 1.70)	USD 21,250
Number of contracts USD 3,64,897 / USD 21,250	17.17
Exposure covered USD 21,250 x 17	USD 3,61,250
Exposure to be covered by Forward (USD 3,64,897 – USD 3,61,250)	USD 3,647
Options premium 17 x GBP 12,500 x 0.096	USD 20,400
Premium in GBP (USD 20,400 x 0.64033)	GBP 13,063

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Total payment in currency option

Payment under option (17 x 12,500)	GBP 2,12,500
Premium payable	GBP 13,063
Payment for forward cover (USD 3,647 x 0.64704)	<u>GBP 2,360</u>
	GBP <u>2,27,923</u>

Thus total payment in:

- | | |
|-----------------------|--------------|
| (i) Forward Cover | 2,36,103 GBP |
| (ii) Money Market | 2,36,510 GBP |
| (iii) Currency Option | 2,27,923 GBP |

The company should take currency option for hedging the risk.

- (c) (i) A depository is an organization where the securities of a shareholder are held in the form of electronic accounts in the same way as a bank holds money. The depository holds electronic custody of securities and also arranges for transfer of ownership of securities on the settlement dates.
- (ii) Players of the depository system are:
- Depository
 - Issuers or Company
 - Depository participants
 - Clearing members
 - Corporation
 - Stock brokers
 - Clearing Corporation
 - Investors
 - Banks
- (iii) **Advantages to Clearing Member**
- Enhanced liquidity, safety, and turnover on stock market.
 - Opportunity for development of retail brokerage business.
 - Ability to arrange pledges without movement of physical scrip and further increase of trading activity, liquidity and profits.
 - Improved protection of shareholder's rights resulting from more timely communications from the issuer.
 - Reduced transaction costs.

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- Elimination of forgery and counterfeit instruments with attendant reduction in settlement risk from bad deliveries.
- Provide automation to post-trading processing.
- Standardisation of procedures.

Question 5

(a) ABC Bank is seeking fixed rate funding. It is able to finance at a cost of six months LIBOR + 1/4% for Rs. 200 million for 5 years. The bank is able to swap into a fixed rate at 7.5% versus six month LIBOR treating six months as exactly half a year.

(a) What will be the "all in cost" funds to ABC Bank?

(b) Another possibility being considered is the issue of a hybrid instrument which pays 7.5% for first three years and LIBOR – ¼% for remaining two years.

Given a three year swap rate of 8%, suggest the method by which the bank should achieve fixed rate funding. (10 Marks)

(b) What do you know about swaptions and their uses? (4 Marks)

(c) What are the reasons for stock index futures becoming more popular financial derivatives over stock futures segment in India? (6 Marks)

Answer

(a)

a) ABC Bank pays LIBOR + 0.25% p.a. for 5 years. The swap involves payment of 7.5% p.a. and receipt of LIBOR.

In flow

LIBOR

Net interest payment 7.75%

Cash flows per six month period

In flow

(LIBOR/2) x Rs.200 million

Out flow

LIBOR + 0.25% + 7.5%

Out flow

(LIBOR/2) x Rs.200 million

+ Rs.2,50,000 + Rs. 75,00,000

Therefore All in cost of funds = Rs. 77,50,000.

Alternatively it can also be calculated as follows:

$$\text{Rs. 200 million} \times 7.75\% \times \frac{6}{12} = \text{Rs. 7.75 millions or Rs. 77,50,000}$$

b) ABC Bank issues hybrid and enters both the five year and three year swaps.

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First three years:-

Bank pays on hybrid	7.5% p.a.
Bank pays on five year swap	7.5% p.a.
Bank receives on three year swap	8% p.a.
Bank receives on five year swap	LIBOR
Bank pays on three year swap	LIBOR
Net interest payment	<u>7% p.a.</u>

Final two years:-

Bank pays on hybrid	LIBOR – 0.25%
Bank received on five year swap	LIBOR
Bank pays on five year swap	7.5% p.a.
Net interest payment	<u>7.25% p.a.</u>

Therefore the arrangement in (b) compared to (a) saves 0.75% p.a. over the first three years and 0.5% p.a. over final two years.

- (b) (i) Swaptions are combination of the features of two derivative instruments, i.e., option and swap.
- (ii) A swaption is an option on an interest rate swap. It gives the buyer of the swaption the right but not obligation to enter into an interest rate swap of specified parameters (maturity of the option, notional principal, strike rate, and period of swap). Swaptions are traded over the counter, for both short and long maturity expiry dates, and for wide range of swap maturities.
- (iii) The price of a swaption depends on the strike rate, maturity of the option, and expectations about the future volatility of swap rates.
- (iv) The swaption premium is expressed as basis points

Uses of swaptions:

- (a) Swaptions can be used as an effective tool to swap into or out of fixed rate or floating rate interest obligations, according to a treasurer's expectation on interest rates. Swaptions can also be used for protection if a particular view on the future direction of interest rates turned out to be incorrect.
- (b) Swaptions can be applied in a variety of ways for both active traders as well as for corporate treasurers. Swap traders can use them for speculation purposes or to hedge a portion of their swap books. It is a valuable tool when a borrower has decided to do a swap but is not sure of the timing.
- (c) Swaptions have become useful tools for hedging embedded option which is common in the natural course of many businesses.

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- (d) Swaptions are useful for borrowers targeting an acceptable borrowing rate. By paying an upfront premium, a holder of a payer's swaption can guarantee to pay a maximum fixed rate on a swap, thereby hedging his floating rate borrowings.
 - (e) Swaptions are also useful to those businesses tendering for contracts. A business, would certainly find it useful to bid on a project with full knowledge of the borrowing rate should the contract be won.
- (c) Stock index futures is most popular financial derivatives over stock futures due to following reasons:
1. It adds flexibility to one's investment portfolio. Institutional investors and other large equity holders prefer the most this instrument in terms of portfolio hedging purpose. The stock systems do not provide this flexibility and hedging.
 2. It creates the possibility of speculative gains using leverage. Because a relatively small amount of margin money controls a large amount of capital represented in a stock index contract, a small change in the index level might produce a profitable return on one's investment if one is right about the direction of the market. Speculative gains in stock futures are limited but liabilities are greater.
 3. Stock index futures are the most cost efficient hedging device whereas hedging through individual stock futures is costlier.
 4. Stock index futures cannot be easily manipulated whereas individual stock price can be exploited more easily.
 5. Since, stock index futures consists of many securities, so being an average stock, is much less volatile than individual stock price. Further, it implies much lower capital adequacy and margin requirements in comparison of individual stock futures. Risk diversification is possible under stock index future than in stock futures.
 6. One can sell contracts as readily as one buys them and the amount of margin required is the same.
 7. In case of individual stocks the outstanding positions are settled normally against physical delivery of shares. In case of stock index futures they are settled in cash all over the world on the premise that index value is safely accepted as the settlement price.
 8. It is also seen that regulatory complexity is much less in the case of stock index futures in comparison to stock futures.
 9. It provides hedging or insurance protection for a stock portfolio in a falling market.

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Question No. 1 is compulsory.

Attempt any five questions from the remaining six questions.

Working notes should form part of the answer.

Question 1

(a) A Company passes through three stages: growth, transition and maturity stage. The growth stage is expected to last for 2 years, while the transition stage lasts for 3 years. During the transition stage the growth rate of dividends changes from 18% to 9%. What would be the rate of dividend at the end of the first year of the transition stage?

(b) M/s X Ltd. has paid a dividend of ₹ 2.5 per share on a face value of ₹ 10 in the financial year ending on 31st March, 2009. The details are as follows:

Current market price of share ₹ 60

Growth rate of earnings and dividends 10%

Beta of share 0.75

Average market return 15%

Risk free rate of return 9%

Calculate the intrinsic value of the share.

(c) If the market price of the bond is ₹ 95; years to maturity = 6 yrs: coupon rate = 13% p.a (paid annually) and issue price is ₹ 100. What is the yield to maturity?

(d) A convertible bond with a face value of ₹ 1,000 is issued at ₹ 1,350 with a coupon rate of 10.5%. The conversion rate is 14 shares per bond. The current market price of bond and share is ₹ 1,475 and ₹ 80 respectively. What is the premium over conversion value?

(4 × 5 = 20 Marks)

Answer

$$\begin{aligned} \text{(a)} &= 18\% - \frac{18\% \times 0.75}{1.09} \\ &= 18\% - 0.79\% = 17.21\% \end{aligned}$$

$$\text{(b) Intrinsic Value } P_0 = \frac{D_1}{k - g}$$

Using CAPM

$$k = R_f + b (R_m - R_f)$$

R_f = Risk Free Rate

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b = Beta of Security

R_m = Market Return

$$= 9\% + 0.75 (15\% - 9\%) = 13.5\%$$

$$P = \frac{2.5 \times 1.1}{0.135 - 0.10} = \frac{2.75}{0.035} = \text{Rs. } 78.57$$

(c)
$$YTM = \frac{C + \frac{(F - P)}{n}}{\frac{F + P}{2}}$$
 C= Coupon Rate; F= Face Value (Issue Price) ; P= Market Price
of Bond

$$YTM = \frac{13 + \frac{(100 - 95)}{6}}{\frac{100 + 95}{2}}$$
$$= 0.1418 \text{ or } 14.18\%$$

(d) Conversion rate is 14 shares per bond. Market price of share Rs. 80

Conversion Value 14 x Rs. 80 = Rs. 1120

Market price of bond = Rs. 1475

$$\text{Premium over Conversion Value (Rs. 1475 - Rs. 1120)} = \frac{355}{1120} \times 100 = 31.7\%$$

Question 2

(a) P Ltd. is considering take-over of R Ltd. by the exchange of four new shares in P Ltd. for every five shares in R Ltd. The relevant financial details of the two companies prior to merger announcement are as follows:

	P Ltd	R Ltd
Profit before Tax (₹ Crore)	15	13.50
No. of Shares (Crore)	25	15
P/E Ratio	12	9

Corporate Tax Rate 30%

You are required to determine:

- Market value of both the company.
- Value of original shareholders.
- Price per share after merger.

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(iv) Effect on share price of both the company if the Directors of P Ltd. expect their own pre-merger P/E ratio to be applied to the combined earnings. (10 Marks)

(b) Red Ltd. is considering a project with the following Cash flows:

<u>Years</u>	<u>Cost of Plant</u>	<u>Recurring Cost</u>	<u>Savings</u>
0	10,000		
1		4,000	12,000
2		5,000	14,000

The cost of capital is 9%. Measure the sensitivity of the project to changes in the levels of plant value, running cost and savings (considering each factor at a time) such that the NPV becomes zero. The P.V. factor at 9% are as under:

<u>Year</u>	<u>Factor</u>
0	1
1	0.917
2	0.842

Which factor is the most sensitive to affect the acceptability of the project? (6 Marks)

Answer

(a)

	P Ltd.	R Ltd.
Profit before Tax (Rs. in crore)	15	13.50
Tax 30% (Rs. in crore)	4.50	4.05
Profit after Tax (Rs. in crore)	10.50	9.45
Earning per Share (Rs.)	$\frac{10.50}{25} = \text{Rs. } 0.42$	$\frac{9.45}{15} = \text{Rs. } 0.63$
Price of Share before Merger (EPS x P/E Ratio)	$0.42 \times \text{Rs. } 12 = \text{Rs. } 5.04$	$0.63 \times \text{Rs. } 9 = \text{Rs. } 5.67$

(i) \ Market Value of company

P Ltd. = Rs. 5.04 x 25 Crore = Rs. 126 crore

R Ltd. = Rs. 5.67 x 15 Crore = Rs. 85.05 crore

Combined = Rs. 126 + Rs. 85.05 = Rs. 211.05 Crores

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After Merger

	P Ltd.	R Ltd.
No. of Shares	25 crores	$15 \times \frac{4}{5} = 12$ crores
Combined	37 crores	
% of Combined Equity Owned	$\frac{25}{37} \times 100 = 67.57\%$	$\frac{12}{37} \times 100 = 32.43\%$

(ii) \ Value of Original Shareholders

P Ltd.	R Ltd.
Rs. 211.05 crore x 67.57%	Rs. 211.05 crore x 32.43%
= Rs. 142.61	= Rs. 68.44

(iii) \ Price per Share after Merger

$$\text{EPS} = \frac{\text{Rs. 19.95 crore}}{37 \text{ crore}} = \text{Rs. 0.539 per share}$$

$$\text{P/E Ratio} = 12$$

$$\text{Market Value Per Share} = \text{Rs. 0.539} \times 12 = \text{Rs. 6.47}$$

$$\text{Total Market Value} = \text{Rs. 6.47} \times 37 \text{ crore} = \text{Rs. 239.40 crore}$$

$$\text{Price of Share} = \frac{\text{Market Value}}{\text{Number of Shares}} = \frac{239.40 \text{ crore}}{37 \text{ crore}} = \text{Rs. 6.47}$$

(iv) Effect on Share Price

P Ltd.

$$\text{Gain/loss (-) per share} = \text{Rs. 6.47} - \text{Rs. 5.04} = \text{Rs. 1.43}$$

$$\text{i.e. } \frac{6.47 - 5.04}{5.04} \times 100 = 0.284 \text{ or } 28.4\%$$

\ Share price would rise by 28.4%

R Ltd.

$$6.47 \times \frac{4}{5} = \text{Rs. 5.18}$$

$$\text{Gain/loss (-) per share} = \text{Rs. 5.18} - \text{Rs. 5.67} = (-\text{Rs. 0.49})$$

$$\text{i.e. } \frac{5.18 - 5.67}{5.67} \times 100 (-) 0.0864 \text{ or } (-) 8.64\%$$

\ Share Price would decrease by 8.64%.

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(b) P.V. of Cash Flows

Year 1	Running Cost	Rs. 4000 x 0.917	= (Rs. 3,668)
	Savings	Rs. 12000 x 0.917	= Rs. 11,004
Year 2	Running Cost	Rs. 5000 x 0.842	= (Rs. 4,210)
	Savings	Rs. 14000 x 0.842	= <u>Rs. 11,788</u>
			Rs. 14,914
Year 0	Less: P.V. of Cash Outflow	Rs. 10000 x 1	Rs. <u>10,000</u>
		NPV	<u>Rs. 4,914</u>

Sensitivity Analysis

(i) Increase of Plant Value by Rs. 4,914

$$\backslash \frac{4,914}{10,000} \times 100 = 49.14\%$$

(ii) Increase of Running Cost by Rs. 4,914

$$\frac{4,914}{3668 + 4210} = \frac{4914}{7878} \times 100 = 62.38\%$$

(iii) Fall in Saving by Rs. 4,914

$$\frac{4,914}{11004 + 11788} = \frac{4914}{22792} \times 100 = 21.56\%$$

Hence, savings factor is the most sensitive to affect the acceptability of the project.

Alternative Solution

P.V. of Cash Flows

Year 1	Running Cost	Rs. 4000 x 0.917	= (Rs. 3,668)
	Savings	Rs. 12000 x 0.917	= Rs. 11,004
Year 2	Running Cost	Rs. 5000 x 0.842	= (Rs. 4,210)
	Savings	Rs. 14000 x 0.842	= <u>Rs. 11,788</u>
			Rs. 14,914
Year 0	Less: P.V. of Cash Outflow	Rs. 10000 x 1	Rs. <u>10,000</u>
		NPV	<u>Rs. 4,914</u>

Sensitivity Analysis

(i) If the initial project cost is varied adversely by say 10%*.

$$\text{NPV (Revised)} (\text{Rs. 4,914} - \text{Rs. 1,000}) = \text{Rs. 3,914}$$

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$$\text{Change in NPV} = \frac{(\text{Rs. } 4,914 - \text{Rs. } 3,914)}{\text{Rs. } 4,914} = 20.35\%$$

- (ii) If Annual Running Cost is varied by say 10%*.

$$\begin{aligned} \text{NPV (Revised)} &= (\text{Rs. } 4,914 - \text{Rs. } 400 \times 0.917 - \text{Rs. } 500 \times 0.843) \\ &= \text{Rs. } 4,914 - \text{Rs. } 367 - \text{Rs. } 421 = \text{Rs. } 4,126 \end{aligned}$$

$$\text{Change in NPV} = \frac{(\text{Rs. } 4,914 - \text{Rs. } 4,126)}{\text{Rs. } 4,914} = 16.04\%$$

- (iii) If Saving is varied by say 10%*.

$$\begin{aligned} \text{NPV (Revised)} &= (\text{Rs. } 4,914 - \text{Rs. } 1,200 \times 0.917 - \text{Rs. } 1,400 \times 0.843) \\ &= \text{Rs. } 4,914 - \text{Rs. } 1,100 - \text{Rs. } 1,179 = \text{Rs. } 2,635 \end{aligned}$$

$$\text{Change in NPV} = \frac{(\text{Rs. } 4,914 - \text{Rs. } 2,635)}{\text{Rs. } 4,914} = 46.37\%$$

Hence, savings factor is the most sensitive to affect the acceptability of the project.

* Any percentage of variation other than 10% can also be assumed.

Question 3

- (a) Aeroflot airlines is planning to procure a light commercial aircraft for flying class clients at an investment of ₹ 50 lakhs. The expected cash flow after tax for next three years is as follows:

(₹ in lakh)					
Year 1		Year 2		Year 3	
<u>CFAT</u>	<u>Probability</u>	<u>CFAT</u>	<u>Probability</u>	<u>CFAT</u>	<u>Probability</u>
15	.1	15	.1	18	.2
18	.2	20	.3	22	.5
22	.4	30	.4	35	.2
35	.3	45	.2	50	.1

The company wishes to consider all possible risk factors relating to an airline.

The company wants to know-

- the expected NPV of this proposal assuming independent probability distribution with 6 per cent risk free rate of interest, and
- the possible deviation on expected values

(12 Marks)

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- (b) An importer requests his bank to extend the forward contract for US\$ 20,000 which is due for maturity on 30th October, 2010, for a further period of 3 months. He agrees to pay the required margin money for such extension of the contract.

Contracted Rate – US\$ 1= ₹ 42.32

The US Dollar quoted on 30-10-2010:-

Spot – 41.5000/41.5200

3 months' Premium -0.87% /0.93%

Margin money for buying and selling rate is 0.075% and 0.20% respectively.

Compute:

- (i) The cost to the importer in respect of the extension of the forward contract, and
(ii) The rate of new forward contract. (4 Marks)

Answer

- (a) (i) Determination of expected CFAT

Rs. in lakh								
Year-1			Year-2			Year - 3		
CFAT	P ₁	Cash flow	CFAT	P ₂	Cash flow	CFAT	P ₃	Cash flow
15	0.1	1.5	15	0.1	1.5	18	0.2	3.6
18	0.2	3.6	20	0.3	6	22	0.5	11
22	0.4	8.8	30	0.4	12	35	0.2	7
35	0.3	<u>10.5</u>	45	0.2	<u>9</u>	50	0.1	<u>5</u>
		<u>CF₁ 24.4</u>			<u>CF₂ 28.5</u>			<u>CF₃ 26.6</u>

CFAT (Rs. in lakh)	PV factor @ 6%	Total PV (Rs. in lakh)
24.4	0.943	23.009
28.5	0.890	25.365
26.6	0.840	<u>22.344</u>
		70.718
	Less Cash flow	<u>50.000</u>
	= NPV	<u>20.718</u>

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(ii) Determination of Standard deviation for each year

Year 1

$(CF_1 - \overline{CF_1})^2$	$(CF_1 - \overline{CF_1})^2$	P_1	
$(15-24.4)^2$	88.36	0.1	8.836
$(18-24.4)^2$	40.96	0.2	8.192
$(22-24.4)^2$	5.76	0.4	2.304
$(35-24.4)^2$	112.36	0.3	<u>33.708</u>
			<u>53.04</u>

$$\sigma = \sqrt{53.04} = 7.282$$

Year 2

$(CF_2 - \overline{CF_2})^2$	$(CF_2 - \overline{CF_2})^2$	P_2	
$(15-28.5)^2$	182.25	0.1	18.225
$(20-28.5)^2$	72.25	0.3	21.675
$(30-28.5)^2$	2.25	0.4	0.9
$(45-28.5)^2$	272.25	0.2	<u>54.45</u>
			<u>95.25</u>

$$\sigma = \sqrt{95.25} = 9.76$$

Year -3

$(CF_3 - \overline{CF_3})^2$	$(CF_3 - \overline{CF_3})^2$	P_3	
$(18-26.6)^2$	73.96	0.2	14.792
$(22-26.6)^2$	21.16	0.5	10.58
$(35-26.6)^2$	70.56	0.2	14.112
$(50-26.6)^2$	547.56	0.1	<u>54.756</u>
			<u>94.24</u>

$$\sigma = \sqrt{94.24} = 9.70$$

Standard deviation of the expected Values

$$\sqrt{\sum_{t=1}^n \frac{\sigma_t}{(1+i)^{2t}}}$$

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$$\sigma = \sqrt{\frac{7.282}{(1.06)^2} + \frac{9.76}{(1.06)^4} + \frac{9.7}{(1.06)^6}}$$

$$\sigma = \sqrt{6.48 + 7.73 + 6.84} = \sqrt{21.05} = 4.58$$

- (b) (i) The contract is to be cancelled on 30-10-2010 at the spot buying rate of US\$ 1
= Rs. 41.5000
Less: Margin Money 0.075% = Rs. 0.0311
= Rs. 41.4689 or Rs. 41.47
US\$ 20,000 @ Rs. 41.47 = Rs. 8,29,400
US\$ 20,000 @ Rs. 42.32 = Rs. 8,46,400
The difference in favour of the Bank/Cost to the importer Rs. 17,000
- (ii) The Rate of New Forward Contract
Spot Selling Rate US\$ 1 = Rs. 41.5200
Add: Premium @ 0.93% = Rs. 0.3861
= Rs. 41.9061
Add: Margin Money 0.20% = Rs. 0.0838
= Rs. 41.9899 or Rs. 41.99

Question 4

An investor has decided to invest ₹ 1,00,000 in the shares of two companies, namely, ABC and XYZ. the projections of returns from the shares of the two companies along with their probabilities are as follows:

<u>Probability</u>	<u>ABC(%)</u>	<u>XYZ(%)</u>
.20	12	16
.25	14	10
.25	-7	28
.30	28	-2

You are required to

- Comment on return and risk of investment in individual shares.
- Compare the risk and return of these two shares with a Portfolio of these shares in equal proportions.
- Find out the proportion of each of the above shares to formulate a minimum risk portfolio.

(16 Marks)

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Answer

(i)

Probability	ABC (%)	XYZ (%)	1X2 (%)	1X3 (%)
(1)	(2)	(3)	(4)	(5)
0.20	12	16	2.40	3.2
0.25	14	10	3.50	2.5
0.25	-7	28	-1.75	7.0
0.30	28	-2	<u>8.40</u>	<u>-0.6</u>
Average return			<u>12.55</u>	<u>12.1</u>

Hence the expected return from ABC = 12.55% and XYZ is 12.1%

Probability	(ABC - $\overline{ABC}$)	(ABC - $\overline{ABC}$) ²	1X3	(XYZ - $\overline{XYZ}$)	(XYZ - $\overline{XYZ}$) ²	(1)X(6)
(1)	(2)	(3)	(4)	(5)	(6)	
0.20	-0.55	0.3025	0.06	3.9	15.21	3.04
0.25	1.45	2.1025	0.53	-2.1	4.41	1.10
0.25	-19.55	382.2025	95.55	15.9	252.81	63.20
0.30	-15.45	238.7025	<u>71.61</u>	-14.1	198.81	<u>59.64</u>
			<u>167.75</u>			<u>126.98</u>

$$S^2_{ABC} = 167.75(\%)^2 ; S_{ABC} = 12.95\%$$

$$S^2_{XYZ} = 126.98(\%)^2 ; S_{XYZ} = 11.27\%$$

(ii) In order to find risk of portfolio of two shares, the covariance between the two is necessary here.

Probability	(ABC - $\overline{ABC}$)	(XYZ - $\overline{XYZ}$)	2X3	1X4
(1)	(2)	(3)	(4)	(5)
0.20	-0.55	3.9	-2.145	-0.429
0.25	1.45	-2.1	-3.045	-0.761
0.25	-19.55	15.9	-310.845	-77.71
0.30	15.45	-14.1	-217.845	<u>-65.35</u>
				<u>-144.25</u>

$$S^2_P = (0.5^2 \times 167.75) + (0.5^2 \times 126.98) + 2 \times (-144.25) \times 0.5 \times 0.5$$

$$S^2_P = 41.9375 + 31.745 - 72.125$$

$$S^2_P = 1.5575 \text{ or } 1.56(\%)^2$$

$$S_P = \sqrt{1.56} = 1.25\%$$

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$$E(R_p) = (0.5 \times 12.55) + (0.5 \times 12.1) = 12.325\%$$

Hence, the return is 12.325% with the risk of 1.25% for the portfolio. Thus the portfolio results in the reduction of risk by the combination of two shares.

(iii) For constructing the minimum risk portfolio the condition to be satisfied is

$$X_{ABC} = \frac{\sigma_X^2 - r_{AX}\sigma_A\sigma_X}{\sigma_A^2 + \sigma_X^2 - 2r_{AX}\sigma_A\sigma_X} \text{ or}$$

$$= \frac{\sigma_X^2 - \text{Cov}_{AX}}{\sigma_A^2 + \sigma_X^2 - 2\text{Cov}_{AX}}$$

σ_X = Std. Deviation of XYZ

σ_A = Std. Deviation of ABC

r_{AX} = Coefficient of Correlation between XYZ and ABC

Cov_{AX} = Covariance between XYZ and ABC.

Therefore,

$$\% \text{ ABC} = \frac{126.98 - (-144.25)}{126.98 + 167.75 - (2 \times -144.25)}$$

$$\frac{271.23}{583.23} = 0.46 \text{ or } 46\%$$

$$\% \text{ ABC} = 46\%, \text{ XYZ} = 54\%$$

$$(1 - 0.46) = 0.54$$

Question 5

- (a) A mutual fund company introduces two schemes i.e. Dividend plan (Plan-D) and Bonus plan (Plan-B). The face value of the unit is ₹ 10. On 1-4-2005 Mr. K invested ₹ 2,00,000 each in Plan-D and Plan-B when the NAV was ₹ 38.20 and ₹ 35.60 respectively. Both the plans matured on 31-3-2010.

Particulars of dividend and bonus declared over the period are as follows:

Date	Dividend	Bonus	Net Asset Value(₹)	
	<u>%</u>	<u>Ratio</u>	<u>Plan D</u>	<u>Plan B</u>
30-09-2005	10		39.10	35.60
30-06-2006		1:5	41.15	36.25
31-3-2007	15		44.20	33.10
15-9-2008	13		45.05	37.25
30-10-2008		1:8	42.70	38.30

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27-3-2009	16		44.80	39.10
11-4-2009		1:10	40.25	38.90
31-3-2010			40.40	39.70

What is the effective yield per annum in respect of the above two plans? (10 Marks)

- (b) The earnings per share of a company is ₹ 10 and the rate of capitalisation applicable to it is 10 per cent. The company has three options of paying dividend i.e. (i) 50%, (ii) 75% and (iii) 100%. Calculate the market price of the share as per Walter's model if it can earn a return of (a) 15, (b) 10 and (c) 5 per cent on its retained earnings. (6 Marks)

Answer

- (a) Plan – D

$$\text{Unit acquired} = \frac{2,00,000}{38.20} = 5235.60$$

Date	Units held	Dividend %	Dividend Amount	Reinvestment Rate	New Units	Total Units
01.04.2005						5235.60
30.09.2005	5235.60	10	5235.60	39.10	133.90	5369.50
31.03.2007	5369.50	15	8054.25	44.20	182.22	5551.72
15.09.2008	5551.72	13	7217.24	45.05	160.20	5711.92
27.03.2009	5711.92	16	9139.07	44.80	204	5915.92
31.03.2010	Maturity Value		Rs. 40.40 X 5915.20			Rs. 2,39,003.17
	Less: Cost of Acquisition					<u>Rs. 2,00,000.00</u>
	Total Gain					<u>Rs. 39,003.17</u>

$$\text{Effective Yield} = \frac{\text{Rs. 39,003.17}}{\text{Rs. 2,00,000}} \times \frac{1}{5} \times 100 = 3.90\%$$

Alternatively, it can be computed by using the IRR method as follows:

$$\text{NPV at 4\%} = -2,00,000 + 1,96,443 = -3,557$$

$$\text{NPV at 2\%} = -2,00,000 + 2,16,473 = 16,473$$

$$\text{IRR} = \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} (\text{HR} - \text{LR}) = 2\% + \frac{16473}{16473 - (-3557)} (4\% - 2\%) = 3.645\%$$

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Plan – B

			No. of Units	NAV (Rs.)
1.4.05	Investment	Rs.2,00,000/35.60=	5617.98	35.60
30.6.06	Bonus	5617.98/5 =	<u>1123.60</u>	36.25
			6741.58	
30.10.08	"	6741.58/8 =	<u>842.70</u>	38.30
			7584.28	
11.4.09	"	7584.28/10 =	<u>758.43</u>	38.90
			8342.71	
31.3.10	Maturity Value	8342.71 x Rs. 39.70=		3,31,205.59
	Less: Investment			<u>2,00,000.00</u>
	Gain			<u>1,31,205.59</u>

\ Effective Yield $\frac{1,31,205.59}{2,00,000} \times \frac{1}{5} \times 100 = 13.12\%$

Alternatively, it can be computed by using the IRR method as follows:

NPV at 13% = -2,00,000 + 1,79,765 = -20,235

NPV at 8% = -2,00,000 + 2,25,413 = 25,413

$$IRR = LR + \frac{NPV \text{ at LR}}{NPV \text{ at LR} - NPV \text{ at HR}} (HR - LR) = 8\% + \frac{25413}{25413 - (-20235)} (13\% - 8\%) = 10.78\%$$

(b) $P = \frac{D + \frac{r}{k_e}(E - D)}{k_e}$

Where

P= Price of Share

R= Rate of Earning

Ke = Rate of Capitalisation or Cost of Equity

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	(i) DP ratio 50%	(ii) DP ratio 75%	(iii) DP ratio 100%
(a) Price of Share if $r = 15\%$	$\frac{5 + \frac{15}{100} \times (10 - 5)}{.10}$ $\frac{12.5}{.10}$ Rs. 125	$\frac{7.5 + \frac{15}{100} \times (10 - 7.5)}{.10}$ $\frac{11.25}{.10}$ Rs. 112.5	$\frac{10 + \frac{15}{100} \times (10 - 10)}{.10}$ $\frac{10}{.10}$ Rs. 100
(b) Price of Share if $r = 10\%$	$\frac{5 + \frac{10}{100} \times (10 - 5)}{.10}$ $\frac{10}{.10} = \text{Rs. } 100$	$\frac{7.5 + \frac{10}{100} \times (10 - 7.5)}{.10}$ $\frac{10}{.1} = 100$	$\frac{10 + \frac{10}{100} \times (10 - 10)}{.10}$ $\frac{10}{.1} = \text{Rs. } 100$
(c) Price of Share if $r = 5\%$	$\frac{5 + \frac{5}{100} \times (10 - 5)}{.10}$ $\frac{7.5}{.10} = \text{Rs. } 75$	$\frac{7.5 + \frac{5}{100} \times (10 - 7.5)}{.10}$ $\frac{8.75}{.10} = 87.5$	$\frac{10 + \frac{5}{100} \times (10 - 10)}{.10}$ $\frac{10}{.1} = \text{Rs. } 100$

Question 6

- (a) Sensex futures are traded at a multiple of 50. Consider the following quotations of Sensex futures in the 10 trading days during February, 2009:

<u>Day</u>	<u>High</u>	<u>Low</u>	<u>Closing</u>
4-2-09	3306.4	3290.00	3296.50
5-2-09	3298.00	3262.50	3294.40
6-2-09	3256.20	3227.00	3230.40
7-2-09	3233.00	3201.50	3212.30
10-2-09	3281.50	3256.00	3267.50
11-2-09	3283.50	3260.00	3263.80
12-2-09	3315.00	3286.30	3292.00
14-2-09	3315.00	3257.10	3309.30

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17-2-09	3278.00	3249.50	3257.80
18-2-09	3118.00	3091.40	3102.60

Abshishek bought one sensex futures contract on February, 04 . The average daily absolute change in the value of contract is ₹ 10,000 and standard deviation of these changes is ₹ 2,000. the maintenance margin is 75% of initial margin.

You are required to determine the daily balances in the margin account and payment on margin calls, if any. (8 Marks)

- (b) The share of Galaxy Ltd. of a face ₹ 10 is being quoted at ₹ 24. The company has a plan to make a right issue of one equity share for every four shares currently held at a premium of 40% per share.

You are required to:

- Determine the minimum price that can be expected of share after the issue.
- Calculate the theoretical value of the rights alone.
- Show the effect of the right issue on the wealth of a shareholder who has 1500 shares, if
 - he sells the entire rights, and
 - he ignores the rights.

(8 Marks)

Answer

(a) Initial Margin = $\mu + 3s$

Where μ = Daily Absolute Change
 s = Standard Deviation

Accordingly

Initial Margin = Rs. 10,000 + Rs. 6,000 = Rs. 16,000

Maintenance margin = Rs. 16,000 x 0.75 = Rs. 12,000

Day	Changes in future Values (Rs.)	Margin A/c (Rs.)	Call Money (Rs.)
4/2/09	-	16000	-
5/2/09	50 x (3294.4-3296.5)= -105	15895	-
6/2/09	50 x (3230.4-3294.4)= -3200	12695	-
7/2/09	50 x (3212.30-3230.4)= -905	16000	4210
10/2/09	50x(3267.5-3212.3)= 2760	18760	-
11/2/09	50x(3263.8-3267.5)= -185	18575	-
12/2/09	50x(3292-3263.8) =1410	19985	-
14/2/09	50x(3309.30-3292)=865	20850	-

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17/2/09	50x(3257.80-3309.3)=-2575	18275	-
18/2/09	50x(3102.6-3257.8)=-7760	16000	5485

(b) (i) Expected minimum price

$$P = \frac{M \times N + Sr}{N + r}$$

Where P= Theoretical Post right price per share

M = Market price of share

N = No. of existing shares

S = Subscription price

r = No. of rights

$$\frac{24 \times 4 + 14 \times 1}{N + r}$$

$$\frac{96 + 14}{5} = \text{Rs. } 22$$

(ii) Post right price – Subscription price

$$\text{Rs. } 22 - \text{Rs. } 14 = \text{Rs. } 8$$

$$\text{or } (M - P) \times N$$

$$(\text{Rs. } 24 - \text{Rs. } 22) \times 4 = \text{Rs. } 8$$

(iii) (a) Value of 1500 shares before right issue

	1500 x Rs. 24 =	<u>Rs. 36,000</u>
After Rights issue	1500 x Rs. 22 =	Rs. 33,000
Add Sale proceeds of right	375 x Rs. 8 =	<u>Rs. 3,000</u>
		<u>Rs. 36,000</u>

Net effect on wealth is Nil.

(b) Value of 1500 Shares

Before rights	Rs. 36,000
After rights	Rs. <u>33,000</u>
Loss to Shareholder	Rs. <u>(3000)</u>

Question 7

Attempt any **FOUR** of the following:

- What is insider trading practice?
- What are the features of Futures Contract?
- Explain briefly the salient features of Foreign Currency Convertible Bonds.
- What is reverse merger?

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(e) What are the guidelines of Public Investment Board for project appraisal?

(4 × 4 = 16 Marks)

Answer

- (a) The insider is any person who accesses the price sensitive information of a company before it is published to the general public. Insider includes corporate officers, directors, owners of firm etc. who have substantial interest in the company. Even, persons who have access to non-public information due to their relationship with the company. An outsider may be held an insider by virtue of his engaging himself in this practice on the basis of inside information.

Insider trading practice is the act of buying or selling or dealing in securities by as a person having unpublished inside information with the intention of making abnormal profit's and avoiding losses. This inside information includes dividend declaration, issue or buy back of securities, amalgamation, mergers or take over, major expansion plans etc.

Insider trading practices are lawfully prohibited. The regulatory bodies in general are imposing different fines and penalties for those who indulge in such practices. Based on the recommendation of Sachar Committee and Patel Committee, SEBI has framed various regulations and implemented the same to prevent the insider trading practices. Recently SEBI has made several changes to strengthen the existing insider Trading Regulation, 1992 and new Regulation as SEBI (Prohibition of Insider Trading) Regulations, 2002 has been introduced.

- (b) Future contracts can be characterized by:-

- (a) These are traded on organized exchanges.
- (b) Standardised contract terms like the underlying assets, the time of maturity and the manner of maturity etc.
- (c) Associated with clearing house to ensure smooth functioning of the market.
- (d) Margin requirements and daily settlement to act as further safeguard i.e., marked to market.
- (e) Existence of regulatory authority.
- (f) Every day the transactions are marked to market till they are re-wound or matured.

Future contracts being traded on organisatized exchanges, impart liquidity to a transaction. The clearing house being the counter party to both sides or a transaction, provides a mechanism that guarantees the honouring of the contract and ensuring very low level of default.

- (c) FCCBs are important source of raising funds from abroad. Their salient features are –

- 1. FCCB is a bond denominated in a foreign currency issued by an Indian company which can be converted into shares of the Indian Company denominated in Indian Rupees.
- 2. Prior permission of the Department of Economic Affairs, Government of India, Ministry of Finance is required for their issue

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3. There will be a domestic and a foreign custodian bank involved in the issue
 4. FCCB shall be issued subject to all applicable Laws relating to issue of capital by a company.
 5. Tax on FCCB shall be as per provisions of Indian Taxation Laws and Tax will be deducted at source.
 6. Conversion of bond to FCCB will not give rise to any capital gains tax in India.
- (d) A merger is considered to be the fusion of two Companies. The two Companies which have merged into another Company in the same industry, normally the market share of the company would increase. In addition to normal merger (where smaller companies merge into larger Company), vertical merger (where two companies of different industry merge together), there is one more kind of merger, known as Reverse Merger.
- In this, two Companies are normally of the same industry but here bigger company merges into smaller company that's why it is called reverse merger. In order to avail benefit of carry forward of losses which are available as per tax laws, the profit making Company is merged with companies having accumulated losses. Following three things are very important for reverse merger.
1. The assets of transfer company are greater than the transferee company.
 2. Equity Capital to be issued by the transferee company pursuant to the merger exceeds to original capital.
 3. There is a change in control in the transferee company through the introduction of a minority group or new group of shareholders.
- (e) In public sector, the projects beyond the specified limit come under the purview of Central Government and the same is decided by the Public Investment Board (PIB). The PIB is an organ of the Central Government with persons from the Deptt. Of Economic Affairs, Deptt. of Industrial Development, Planning Commission and from Administrative Ministry.
- PIB has formulated guidelines for project appraisal which includes, inter alia –
1. The project should be in conformity with plan priorities.
 2. There should be a feasibility of undertaking project in public or joint sector.
 3. Wherein the IRR is expected to be adequate.
 4. The analysis of social cost benefit is undertaken.
 5. Wherein the project is expected to contribute to Foreign Exchange earnings.
 6. There is a provision of funds in budgetary allocation.
 7. Logical sequence of project schedule has been arranged.
 8. Adequacy of safety and anti pollution measures have been ensured.
- There may be some other guidelines also in view of the PPP models also.