

PAPER – 2 : MANAGEMENT ACCOUNTING AND FINANCIAL ANALYSIS

Answer all Questions.

Question 1

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 machines 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 materials cost, inclusive of wastage is 60 per cent of revenues.
- (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 per cent of the original cost of the machine, afterwards discounted by 10 per cent.
- (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 per cent 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 per cent 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 per cent 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)

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
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 laying off 34 workers (Rs.921000 tax advantage @ .35 i.e. to Rs.3,22,350)	5,98,650
Incremental cash outflows	<u>2,76,54,650</u>

Working Notes

1. Tax on profit on sale of existing machine:

Sale proceeds of existing machine:	96,00,000
(8 × 12,00,000)	
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

2. Saving in Maintenance cost: (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. Incremental Depreciation:

(Rs. in Lakhs)

Years	1 – 2	3 – 5
Depreciation (with new machine)	54.00	54.00
(Rs.100 lakh × 3 – 10 × 3) / 5 years		
Depreciation (with old machine)	28.80	-
(Rs.18 lakh × 8/5 years)		
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

Question 2

- (a) 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)	<u>10,00,000</u>	<u>5,00,000</u>
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	<u>7,00,000</u>	<u>4,00,000</u>
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	1,98,000
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?
- (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. (12 Marks)
- (b) 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		NAV	
		Ratio	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)

Answer

- (a) 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***)	

(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

MPS Accretion = 2.84

(b) X : Plan A

$$\text{Unit acquired} = \frac{500,000}{42.18} = 11,854$$

Date	Units held	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
	Less: STT 0.2 %					<u>1,390</u>
						693,597
	Less: Short-term capital gains					-
	Net proceeds					693,597
	Less: Cost of acquisition					<u>500,000</u>
	Total Gain				Rs.	<u>193,597</u>

CVAF

r, 8	6.936
Annual Return	27.67%

Y : Plan B

$$\text{Unit acquired} = \frac{500,000}{35.02} = 14,278$$

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		-
Net proceeds		<u>753,737</u>
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 3

- (a) 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 per cent 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 per cent 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.

Advise the company whether the offer from the foreign branch should be accepted.

(6 Marks)

- (b) 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 risk and 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 invested in B and D both;
- 75 percent of the fund in B and the rest 25 percent in D;
- 25 percent of the fund in B and the rest 75 percent in D; and
- 100 percent investment in D only.

Also indicate that which portfolio is the best for him from risk as well as return point of view? (6 Marks)

(c) Write short notes on the following :

(i) Global Depository Receipts

(ii) Interest Rate Swaps.

(4×2=8 Marks)

Answer

(a) 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.,

$$\text{Rs.}1000 \times [1.045]^2 = \text{Rs.}1092.03$$

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
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.

(b) We have $E_p = W_1E_1 + W_3E_3 + \dots W_nE_n$

$$\text{and for standard deviation } \bar{\sigma}_p = \left[\sum_{i=1}^n \sum_{j=1}^n x_i \times x_j \rho_{ij} \hat{\sigma}_i \hat{\sigma}_j \right]^{1/2}$$

Substituting the respective values we get,

- a. All funds invested in B
 $E_p = 12\%$
 $\bar{\sigma}_p = 10\%$
- 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.

(c) Short Notes:

- (i) Global Depository Receipts (GDR) : A depository receipts in basically a negotiable certificate denominated in US dollars, that represents a non-US company publicity – traded local currency (INR) equity shares. Depository Receipts are created when the local currency shares of an Indian company are delivered to the depository's local custodian bank against which the depository bank issues depository receipts in US dollars. These depository receipts are called as Global Depository Receipts.
- (ii) Euro Convertible Bonds : A convertible bond is a debt instrument which gives the holders an option to convert the bond to a pre-determined number of equity shares of the company. In case of Euro-convertible bond, the payment of interest and on the redemption of the bonds will be made by the issuer company in US dollars.
- (iii) Currency Futures Contract : A currency futures contract is a standardised agreement that calls for delivery of a currency at some specific future date.

Contracts are traded on exchange and the clearing house interact between buyers and sellers.

- (iv) Interest Rate Swaps : An interest rate swap is a contract which commits two counter parties to exchange, over an agreed period, two streams of interest payments each calculated using a different rate index, but applied to a common notional amount.

Question 4

- (a) XYZ Ltd. requires an equipment costing Rs.10,00,000; the same will be utilised 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 per cent per annum; the loan being repayable in 5 equal year end instalments; 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 per cent on Written Down Value (WDV) basis, income tax rate is 35 per cent and discount rate is 12 per cent.

Advise the XYZ Ltd. that which of the financing options is to be exercised and why.

(8 Marks)

- (b) ABC Ltd. has been maintaining a growth rate of 10 per cent in dividends. The company has paid dividend @ Rs.3 per share. The rate of return on market portfolio is 12 per cent and the risk free rate of return in the market has been observed as 8 per cent. 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)

- (c) What do you mean by 'Financial Engineering'? State its significance in the present regime of globalisation. (6 Marks)

Answer

- (a) Option A

Year	Interest 13%	Depreciation 15% WDV	Interest + Dep.	Tax Shield 03 × 35%	Repayment	Net 01 + 05 – 04 =	PV 12%
	01	02	03	04	05	06	
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.

(b) 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.

- (c) **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 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 5

- (a) 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)

- (b) 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 per cent 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 per cent commission. The factor will pay advance on receivables to the company at an interest rate of 18 per cent per annum after withholding 10 per cent as reserve.

You are required to calculate effective cost of factoring to the company. (8 Marks)

- (c) Discuss the main features of green-field privatisation. (6 Marks)

Answer

(a) 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

(b)

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.

(c) **GREENFIELD PRIVATISATION:** It is the process of reforming PSEs and aims at reducing involvement of the state of 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 Privatization has made considerable progress since the introduction of the new economic policy (NEP) in 1991. The process of the 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.

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 privatize the two national air carriers. It would appear that the initiatives on selling off state owned enterprises have come to 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" components of the state sector has been organized as companies, including the Central and State Public Sector Enterprise (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 unbundled their electricity boards.

Privatization 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 en-cash 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 6

- (a) 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 per cent and the expected annual dividend yield is 25 per cent per annum payable before expiry. Also examine arbitrage opportunities. (5 Marks)
- (b) 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)

(c) Discuss the Capital Asset Pricing Model (CAPM) and its relevant assumptions. (5 Marks)

(d) Distinguish between Forward and Futures contract. (5 Marks)

Answer

(a) Future's Price = Spot + cost of carry – Dividend

$$F = 220 + 220 \times 0.15 \times 0.25 - 0.025^{**} \times 10$$

$$= 225.75$$

** 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
	= 232.5 – 228.25
	= 4.25

(b) 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,

$$YTM = 14.23\%$$

- (c) **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:

$$\text{Expected return on security} = R_f + \text{Beta} (R_m - R_f)$$

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 the graph paper is known as the Security Market 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.

(d) 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.