

REVISION TEST PAPER : MAY, 2005
FINAL COURSE - GROUP - I

PAPER – 2 : MANAGEMENT ACCOUNTING AND FINANCIAL ANALYSIS

QUESTIONS

1. Best of Luck Ltd, London will have to make a payment of \$3,64,897 in six month's time. It is currently 1st October. The company is considering the various choices it has in order to hedge its transaction exposure.

Exchange rates:

Spot rate	\$1.5617 – 1.5773
Six-month forward rate	\$1.5455 – 1.5609

Money market rates:

	Borrow(%)	Deposit(%)
US	6	4.5
UK	7	5.5

Foreign currency option prices (1 unit is £12,500):

<i>Exercise price</i>	<i>Call option (March)</i>	<i>Put option (March)</i>
\$1.70	\$0.037	\$0.096

By making the appropriate calculations and ignoring time value of money (in case of Premia) decide which of the following hedging alternatives is the most attractive to Best of Luck Ltd:

- (a) Forward market
 - (b) Cash (Money) market;
 - (c) Currency options.
2. Companies A and B face the following interest rates:

	<i>A</i>	<i>B</i>
U.S. dollars (floating rate)	LIBOR + 0.5%	LIBOR + 1.0%
Canadian (fixed rate)	5.0%	6.5%

Assume that A wants to borrow U.S. dollars at a floating rate of interest and B wants to borrow Canadian dollars at a fixed rate of interest. A financial institution is planning to arrange a swap and requires a 50 basis point spread. If the swap is equally attractive to A and B, what rates of interest will A and B end up paying?

3. Following cash flow details are available for project A and B. Having an initial outlay of Rs.5.4crs. and 4.7crores respectively.

<i>Years</i>	<i>Project A (Rs. in lacs)</i>			<i>Project B (Rs in lacs)</i>		
	<i>PAT</i>	<i>Depn</i>	<i>Interest</i>	<i>PAT</i>	<i>Depn.</i>	<i>Interest</i>
0	(540)	-	-	(470)	-	-
1	185	50	60	100	45	50
2	110	50	50	105	45	40
3	195	50	40	135	45	30
4	225	50	30	125	45	20
5	175	50	20	175	45	10

Tax rate = 30% cost of capital = 20% only one of the two project can be chosen. Identify which is to be chosen based on (a) NPV, (b) IRR, (c) PI / (benefit cost ratio).

4. The Golden Pond Company operates in Orlando, Florida. The firm is considering building an additional amusement park that will have a wild-water wave pool, buildings, and restaurants. Since all the firm's sales are for cash, the cash inflow from sales and gross revenue are identical. The firm's variable costs amount to 50% of its revenue, with 60% of these cost paid in cash and

40% paid for on credit for one year. The new investment is Rs.200 million (Rs.100 million in equipment and Rs.100 million in buildings), plus Rs.10 million investment in net working capital (mainly cash). Golden Pond will depreciate the equipment by the accelerated method (by which relatively high proportions of the asset's values are depreciated in early years) over four years, and the buildings will be depreciated over 31.5 years. The buildings will be placed in service in January. The annual depreciation percentages are as follows:

Year	1	2	3	4
Equipment (%)	33.33	44.45	14.81	7.41
Buildings (%)	3.042	3.175	3.175	3.175

Golden Pond estimates annual sales at Rs.400 million for each of the next four years. As a result of the new project, the after-tax cash flows from the firm's other amusement parks will decline by Rs.20 million a year. The firm has already paid Rs.25 million on an after-tax basis for research and development of the new project. The value of buildings in the Orlando area is expected to increase to an estimated Rs.110 million after four years of operation. The value of equipment after four years of use will be zero. Assume that the after-tax cost of capital is 15%, and the corporate tax rate is 34%. The firm uses vacant land for the new attraction, and it has no alternative use for the land for the next four years. Should the company proceed with the project?

5. Better luck Ltd. has been enjoying a substantial net cash inflow, and until the surplus funds are needed to meet tax and dividend payments, and to finance further capital expenditure in several months time, they have been invested in a small portfolio of short-term equity investments.

Details of the portfolio, which consists of shares in four UK listed companies, are as follows.

Company	Number of shares held	Beta equity co-efficient	Market price per share	Latest Dividend Yield %	Expected return on equity in the next year %
D Ltd.	60000	1.16	Rs.4.29	6.10	19.50
E Ltd.	80000	2.28	Rs.2.92	3.40	24.00
F Ltd.	100000	0.90	Rs.2.17	5.70	17.50
G Ltd.	125000	1.50	Rs.3.14	3.30	23.00

The current market return is 19% a year and the Riskfree rate is 11% a year.

Required:

- On the basis of the data given, calculate the risk of Better luck Ltd.'s short-term investment portfolio relative to that of the market.
 - Recommend, with reasons, whether Better luck Ltd. should change the composition of its portfolio.
6. A put and a call option each have an expiration date 6 months hence and an exercise price of Rs.10. The interest rate for the 6-month period is 3 percent.
- If the put has a market price of Rs.2 and share is worth Rs.9 per share, what is the value of the call?
 - If the put has a market price of Rs.1 and the call Rs.4, what is the value of the share per share?
 - If the call has a market value of Rs.5 and market price of the share is Rs.12 per share, what is the value of the put?

7. A portfolio manager owns 3 stocks:

<i>Stock</i>	<i>Shares owned</i>	<i>Stock Price (Rs.)</i>	<i>beta</i>
1	1 lakh	400	1.1
2	2 lakhs	300	1.2
3	3 lakhs	100	1.3

The spot Nifty Index is at 1350 and futures price is 1352 to use stock index futures to (a) decrease the portfolio beta to .8 and (b) increase the portfolio beta to 1.5. Assume the index factor is Rs.100. Find out the number of contracts to be bought or sold of stock index futures.

8. Following information is available regarding four mutual funds:

<i>Mutual Fund</i>	<i>Return</i>	<i>Risk σ</i>	<i>β (Beta)</i>	<i>Risk free rate R_f</i>
P	13	16	.90	9
Q	17	23	.86	9
R	23	39	1.20	9
S	15	25	1.38	9

Evaluate performance of these mutual funds using Sharp Ratio and Treynor's Ratio. Comment on the evaluation after ranking the funds.

9. Brain Ltd. is considering whether to set up a division in order to manufacture a new product, the Agni. The following statement has been prepared, showing the projected "profitability" per unit of the new product:

	<i>Rs.</i>	<i>Rs.</i>
Selling Price		22.00
Material (3Kg @ Rs.1.50 per Kg)	4.50	
Labour (2 hours @ Rs.2.50 per hour)	5.00	
Overheads	11.50	21.00
Profit per unit		1.00

A feasibility study, recently undertaken at a cost of Rs.50000, suggests that a selling price of Rs.22 per unit should be set. At this price, it is expected that 10000 units would be sold each year. Demand for the product is expected to cease after 5 years. Direct Labour and materials costs would be incurred only for the duration of the product life.

Overheads per unit have been calculated as follows:

	<i>Rs.</i>
Variable overheads	2.50
Rent (see note a below)	0.80
Managers' Salary (See note b)	0.70
Depreciation (See note c)	5.00
Head Office cost (see note d)	2.50
	11.50

Notes:

- a) Agni would be manufactured in a factory rented specially for the purpose. Annual rental would be Rs.8000 payable only for as long as the factory was occupied.
- b) A manager would be employed to supervise production of Agnis at a salary of Rs.7000 per annum. The manager is at present employed by the company but is due to retire in the near future on an annual pension of Rs.2000. If he continued to be employed his pension would not be paid during the period of employment. His subsequent pension rights would not be affected.
- c) Manufacture of the Agni would require a specialized machine costing Rs.250000. The machine would be capable of producing Agni for an indefinite period, although due to its specialized nature it would not have any resale or scrap value when the production of Agni ceased. It is the policy of Brain Ltd. to provide depreciation on all fixed assets using the straight line method. The annual charge of Rs.50000 for the new machine is based on a life of 5 years, equal to the period during which Agnis are expected to be produced.
- d) Brain Ltd. allocates its head office fixed costs to all products at the rate of Rs.1.25 per direct labour hour. Total head office fixed costs would not be affected by the introduction of the Agni to the company's range of products.

The required return of Brain Ltd. for all new projects is estimated at 5% per annum in real terms, and you may assume that all costs and prices given above will remain constant in real terms. All cash flows would arise at the end of each year, with exception of the cost of the machine would be payable of all the estimates given above, with the exception of those relating to product life, annual sales volume and material cost per Agni.

Required:

- (a) Prepare NPV calculations, based on the estimates provided, to show whether Brain Ltd. should proceed with manufacture of the Agni.
 - (b) Prepare a statement showing how sensitive the NPV of manufacturing Agnis is to errors of estimation in each of the three factors: Product Life, annual sales volume and material cost per Agni.
10. You are given three call options on a stock at exercise price of Rs. 30, Rs. 35 and Rs. 40 with expiration date in three months and the premium of Rs. 4, Rs. 2 and Re. 1 respectively. Show how the option can be used to create a butterfly spread. Construct a table with different market prices and show how profit changes with stock prices ranging from Rs. 20 to 50 for the butterfly spread.
11. AB Ltd. has a machine having an additional life of 5 years, which costs Rs. 10,00,000 and has a book value of Rs. 4,00,000. A new machine costing Rs. 20,00,000 is available, though its capacity is the same as that of old machine, it will mean a saving in variable costs to the extent of Rs. 7,00,000 per annum. "The life of machine will be 5 years at the end of which it will have a scrap value of Rs. 2,00,000. The rate of income tax is 50% and AB Ltd. policy is not to make an investment if yield is less than 12% per annum. The old machine, if sold today, will realise Rs. 1,00,000. It will have no salvage value if sold at the end of 5th year.
- Advise AB Ltd. whether or not the old machine should be replaced (Present value of Re. 1 received annually for 5 years at 12% = 3.605. Present value of Re. 1 receivable at the end of 5 years at 12% per annum is 0.565). Ignore Income tax savings on depreciation as well as on loss due to sale of existing machine.
12. Your Company has to make a US \$1 million payment in three months' time. The dollars are available now. You decide to invest them for three months and you are given the following information.
- (i) The US deposit rate is 8% per annum
 - (ii) The sterling deposit rate is 10% per annum
 - (iii) The spot exchange rate is \$1.80 / pound

- (iv) The three month forward rate is \$1.78 / pound.
- Where should your company invest for better results?
 - Assuming that the interest rates and the spot exchange rate remain as above, what forward rate would yield an equilibrium situation?
 - Assuming that the US interest rate and the spot and forward rates remain as in the original question, where would you invest if the sterling deposit rate were 14% per annum ?
 - With the originally stated spot and forward rates and the same dollar deposit rate, what is the equilibrium sterling deposit rate ?

13. A Company is evaluating three investment situations:

- (1) produce a new line of aluminum skillets, (2) expand its existing cooker line to include several new sizes, and (3) develop a new higher-quality line of cookers. If only the project in question is undertaken, the expected present values and the amounts of investment are as follows:

<i>Project</i>	<i>Investment Required</i>	<i>Present value of Future cash flows</i>
1	Rs.200,000	Rs.290,000
2	115,000	185,000
3	270,000	400,000

If projects 1 and 2 are jointly undertaken, there will be no economies; the investments required and present values will simply be the sum of the parts. With projects 1 and 3, economies are possible in investment because one of the machines acquired can be used in both production processes. The total investment required for projects 1 and 3 combined is Rs.440,000. If projects 2 and 3 are undertaken, there are economies to be achieved in marketing and producing the projects but not in investment. The expected present value of future cash flows for projects 2 and 3 is Rs.620,000. If all three projects are undertaken simultaneously, the economies noted will still hold. However, a Rs.125,000 extension on the plant will be necessary, as space is not available for all three projects. Which project or projects should be chosen?

14. An industrial unit desires to acquire a diesel generating set costing Rs. 20 lacs which has an economic life of ten years at the end of which the asset is not expected to have any residual value. The unit is considering the alternative choices of:

- taking the machinery on lease, or
- purchasing the asset outright by raising a loan.

Lease payments are to be made in advance and the lessor requires the asset to be completely amortised over its useful period and that the asset will yield him a return of 10%.

The cost of debt is worked at 16% per annum. Average rate of income tax is 50%. It is expected that the operative costs would remain the same under either method.

The following factors may also be taken into account:

- The present value of discount factors even stream of cash flows over the number of years are:

<i>Year</i>	Rate of Interest		
	<i>8%</i>	<i>10%</i>	<i>16%</i>
1	0.93	0.91	0.86
2	1.78	1.75	1.60
3	2.58	2.49	2.25
4	3.31	3.17	2.80
5	3.99	3.79	3.27
6	4.62	4.35	3.68
7	5.20	4.87	4.04

8	5.75	5.33	4.34
9	6.25	5.76	4.61
10	6.71	6.14	4.83

(ii) Straight line method of depreciation may be adopted.

As a financial consultant, indicate what your advice will be.

Workings are to form part of your answer.

15. The risk free return is 10% and the risk premium is 5% with beta of a company is 1.6. The company had declared the latest dividend @ Rs.3 (2002) whereas it had declared a dividend of Rs.2.115 in the year 1997. The company's earnings and the dividend experienced constant growth. Find out the intrinsic value of the shares. Take into account the following PV factor table value if useful.

<i>Percentage of Cost of capital</i>	<i>PV Values at the end of 6 years</i>
5%	0.746
6%	0.705
7%	0.666

16. Europium Ltd. has been specially formed to undertake two investment opportunities. The risk and return characteristics of the two projects are shown below:

	A	B
Expected return	12%	20%
Risk	3%	7%

Europium plans to invest 80% of its available funds in Project A and 20% in B. The directors believe that the correlation co-efficient between the returns of the projects is +1.0.

Required:

- Calculate the returns from the proposed portfolio of Projects A and B;
 - Calculate the risk of the portfolio;
 - Suppose the correlation co-efficient between A and B was -1 . How should the company invest its funds in order to obtain zero risk portfolio.
17. Big Limited a chain of restaurants is considering going private limited. The president Rajan Baba believes that with the elimination of Shareholder servicing costs and other costs associated with public ownership, the company could save Rs. 800,000 per annum before taxes. In addition, the company believes management incentives and hence performance will be higher as a private company. As a result, annual profits are expected to be 10% greater than present after-tax profits of Rs 9 million. The effective tax rate is 30%, the price / earnings ratio of the Share is 12, and there are 10 million shares outstanding. What is the present market price per share? What is the maximum Rupees premium above this price that the company could pay in order to take the company into private Limited?
18. The following are the data on Five mutual funds:

<i>FUND</i>	<i>RETURN</i>	<i>STANDARD DEVIATION</i>	<i>BETA</i>
Dhan Raksha	16	8	1.50
Dhan Varsha	12	6	0.90
Dhan Vredhi	14	5	1.40

Dhan Mitra	18	10	0.75
Dhan Laheri	15	7	1.25

What is the reward-to-variability/volatility ratio and the ranking if the risk-free rate is 7 percent?

19. Name of the Scheme	:	Money Plant
Size of the scheme	:	Rs. 100 Lacs
Face Value of the Share	:	Rs. 10
Number of the outstanding shares	:	Rs. 10 Lacs
Market value of the fund's investments	:	Rs. 180 Lacs
Receivables	:	Rs. 1 Lac
Accrued Income	:	Rs. 1 Lac
Liabilities	:	Rs. 50,000
Accrued expenses	:	Rs. 50,000

Find NAV per unit?

20. A Firm has an equity beta of 1.30 and is currently financed by 25% debt and 75% equity. What will be the company's new equity beta if the company changes its financing policy to 33% and 67% equity? Assume corporation tax to stand at 35%.

21. Excellent Ltd. is a frozen food packaging company and is looking to diversify its activities into the electronics business. The project it is considering has a return of 18% and Excellent Ltd. is trying to decide whether the project should be accepted or not. To help it decide it is going to use the CAPM. The company has to find a proxy beta for the project and has the following information on three companies in the electronics business:

- a) Superior Ltd.

Equity beta of 1.33. Financed by 50% debt and 50% equity.

- b) Admirable Ltd.

Admirable Ltd. has an equity beta of 1.30, but it has just taken on a totally unrelated project, accounting for 20% of the company's value, that has an asset beta of 1.4. The company is financed by 40% and 60% equity.

- c) Meritorious Ltd.

Equity beta of 1.05. Financed by 35% debt and 65% equity.

22. The Number One finance company has given an offer of an equipment loan to a customer as per details below:

Cost of the equipment	:	Rs. 10 lakhs
Loan offered	:	Rs. 9 lakhs
Interest	:	10% p.a. on reducing balance
Repayment	:	1/3 of the loan at the end of the each year

The customer, now, wants the equipment on a financial lease instead of availing a loan and buying it.

Assuming straight line depreciation, target return of 6% and an Income tax rate of 40%, calculate the annual lease rent that should be charged by the finance company so that its net yield is the same as per the earlier offer.

Present value factors at 6% for years 1 to 3, respectively, are: 0.943, 0.890, 0.840.

23. A Ltd. is considering the acquisition of T Ltd. with the following projected figures for the next 5 years.

	(Rs. in Lakhs)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Profit before depreciation	150	180	220	250	270
Depreciation	30	32	34	36	38
Interest	30	28	26	24	22
Capital expenditure	20	20	20	20	20
Increase in working capital	30	30	30	30	30

The rate of Income tax applicable to T Ltd. is 30%.

- Calculate the free cash flow for each year from the above projections.
- Calculate the terminal value of the target company using a Price/Earnings (P/E) multiple of 12.
- Assuming a discount rate of 10%, find the total value of the target company under the DCF approach.

Present value factors at 10% for years 1 to 5 are respectively: .909, .826, .751, .683, .621.

24. Company ABC and XYZ have been offered the following rate per annum on a \$200 million five-year loan:

Company		Fixed Rate	Floating Rate
ABC		12.0	LIBOR+ 0.1%
XYZ		13.4	LIBOR + 0.6%

Company ABC requires a floating-rate loan; Company XYZ requires a fixed-rate loan. Design a swap that will net a bank acting as intermediary at 0.1 percent per annum and be equally attractive to both the companies.

25. An investor is concerned with the investment of Rs. 1,00,000. He has two securities, A and B, for this purpose. Data in respect of these securities is as follows:

	A	B
Expected Return	12%	20%
Standard Deviation of return	10%	18%
Co-efficient of correlation, r, between A and B	= 0.15	

The investor has decided to consider only five portfolios of A and B as follows:

- All funds invested in A
- 50% of funds in each of A and B
- 75% of funds in A and 25% in B
- 25% of funds in A and 75% in B
- All funds invested in B.

You are required to calculate:

- The expected return under different portfolios.
- Risk factor associated with these portfolios.
- Which portfolio is best for him from the point of risk, and
- Which portfolio is best for him from the point of view of return.

26. Company Alpha is considering to acquire Company Beta. The financial data of the two companies are given in the following table:

	Company Alpha	Company Beta
Profit After Tax (Rs.)	40,000	8,000
Number of Shares	10,000	4,000
EPS (Rs.)	4	2
Market Value Per Share (Rs.)	60	15
P/E Ratio (Times)	15	7.5
Total Market Capitalisation	6,00,000	60,000

Company Alpha is considering to acquire Company Beta through exchange of shares in proportion of the market value per share.

If the price - earnings ratio is expected to be:

- Pre-merger P/E ratio of Beta i.e. 7.5
- Pre-merger P/E ratio of Alpha i.e. 15
- Weighted average of pre-merger P/E ratio of Alpha and Beta i.e. 13.75

What would be the impact on the wealth of shareholders after merger ?

27. (a) A sold one January Nifty futures contract for Rs. 3,40,000 on January 15, For this he had paid an initial margin of Rs. 34,000 to his broker. Each Nifty futures contract is for the delivery of 200 Nifties. On January 25, the index was closed on 1850. How much profit/loss A has made?
- (b) From the following information compute the net present value (NPVs) of the two projects for each of the possible cash flows, using sensitivity analysis:

	Project X (000' Rs.)	Project Y (000' Rs.)
Initial Cash outflows (t = 0)	30	30
Cash inflows estimates (t = 1 — 10)		
Worst	5	8
Most likely	8	10
Best	15	20
Required Rate of Return	14%	14%
Economic life (years)	10	10

28. What do you mean by
- Small-cap firms
 - Mid-cap companies
 - Large-cap stocks
29. Write a brief note on
- Stock lending scheme
 - Open Interest.
 - Mutual Fund
 - Entry load and an exit load
 - Offshore Funds
 - Index Funds

- (vii) The Benchmark Rate
 - (viii) Note Issuance Facilities
 - (ix) Euro-commercial Paper (CP)
 - (x) Straight Equity issues
 - (xi) Foreign hedge funds
 - (xii) Participating Notes (PNs)
 - (xiii) Modified Internal rate of return
30. Write a short notes on the followings:
- (i) Economic Value Added
 - (ii) Types of Dividend
 - (iii) Gordon Growth Model
 - (iv) Listing of Securities

SUGGESTED ANSWERS/HINTS

1. (A) Forward Market
- (i) Exposure = \$ 364897
 - (ii) Forward Rate 1£ = \$1.5455
 - (iii) Outflow (6 month later) = £ 236103
- (B) Cash (Money Market)
- (i) Maturity in \$ after 6 months = \$364897
 - (ii) Present value of $\{\$364897/(1+(0.045/2))\}$ = \$356867
 - (iii) Borrow at spot to make up \$356867 = £ 228 512
(at 1£ = \$1.5617)
 - (iv) Amount to be discharged including interest £228512 = £ 236510
(1 + 0.07/2)
- (C) Currency options
- (i) Number of contracts 364897/21250 = 17.17 contracts
(can be rounded off to 17 contracts)
 - (ii) Exposure covered through put option 17*21250 = \$361250
 - (iii) Balance to be covered through forward market \$3647
 - (iv) Premia payable in $(17 \times 12,500 \times .096)$ \$20400
 - (v) premia payable in £13063 [use spot Bid]
(\$ 20,400/1.5617)

	<u>Put option</u>	<u>Forward</u>
Exposure covered	\$361250	\$3647
	£	£
Premia	13063	-
17 contract pyt.	212500	-
17* 12500		

Forward pyt.	2360
3647/1.5455	
	225563 2360
Total outflow	£227923

Students may improve upon the above solution with 18 contracts that would result in excess dollars to be sold in the forward. The final answer is £227554.

Strategy: Choose currency option because of lower cash outflow

Note :

- The quote is indirect one.
- the quote is for per pound, expressed in dollars
- one unit of contract is equal to £12500 or \$21250 (12500×1.70)
- Normally under direct quote situations, importing firm would hedge the positions by holding call options whereas UK based importing company would hedge by holding put option.
- [Rationale: Instead of claiming purchase of dollars to settle the supplier, the UK company would sell pounds]
- Similarly importing company used to purchase foreign currency at offer rate [selling price of authorised dealer is the purchase price of importing company]. But in London on account of indirect quote, importers use bid rate.
- Time value of money for the payment of premia is ignored.
- For 18 contracts. The premia would be £13831 $[(13063 \div 17) \times 18]$. For excess dollars realised through put option, the importing company would buy pounds resulting in inflow.
- When the put option lapses, the situation would be more favourable for the company and the maturity spot result in fewer outflows of pounds.

2.	Company	A Company B
Fixed Rate	5%	6.5%
Floating Rate	LIBOR +0.5%	LIBOR +1.0%
Desired	LIBOR +0.5%	6.5%
After Interest Rate Swap	LIBOR +1.0%	5%
(Gain) / Loss	+0.5	(1.5)
Compensating the loss	(0.5)	+0.5
Net position	-	(1.0)
Payable to financial institution (50 basis points)	-	+0.5
Net Income	-	(0.5)
Shared equally	(0.25)	+0.25
Revised position	(0.25)	(0.25)
Desired Position	LIBOR +0.5%	6.5%
Rate applicable after IRS	LIBOR +0.25%	6.25%

3. The cash flows are as follows:

(Rs. in lakhs)

	Project A	Project B
0	-540	-470
1	$185 + 50 + 60 \times 0.7 = 277$	$160 + 45 + 50 \times 0.7 = 240$
2	$110 + 50 + 50 \times 0.7 = 195$	$105 + 45 + 40 \times 0.7 = 178$
3	$195 + 50 + 40 \times 0.7 = 273$	$135 + 45 + 30 \times 0.7 = 201$
4	$225 + 30 + 30 \times 0.7 = 276$	$125 + 45 + 20 \times 0.7 = 184$
5	$175 + 50 + 20 \times 0.7 = 239$	$175 + 45 + 10 \times 0.7 = 227$

(a) NPV Analysis

Year	PV factor @ 20%	Project A		Project B	
		Cash Flows	Discounted Cash flows	Cash Flows	Discounted Cash flows
0	1	(540)	(540)	(470)	(470)
1	0.8333	277	230.82	240	199.92
2	0.6944	195	135.41	178	123.60
3	0.5787	273	157.99	201	116.32
4	0.4823	276	133.11	184	88.74
5	0.4019	239	96.05	227	91.23
			213.38		149.81

As project A gives highest NPV when compared to Project B. Project A should be selected.

(b) The IRR of both the projects is calculated as follows:

Project A

$$\text{IRR} = (-) 540 + 277/(1+r)^1 + 195/(1+r)^2 + 273/(1+r)^3 + 276/(1+r)^4 + 239/(1+r)^5$$

Taking $r = 37\%$, $\text{RHS} = 0.19$

Taking $r = 38\%$, $\text{RHS} = (1-)9.6$

By interpolation, $\text{IRR} = 37\% + (38-37)\% \times 0.19/9.79 = 37.02\%$

Project B

$$\text{IRR} = (-) 470 + 240/(1+r)^1 + 178/(1+r)^2 + 201/(1+r)^3 + 184/(1+r)^4 + 227/(1+r)^5$$

Taking $r = 34\%$, $\text{RHS} = 1.08$

Taking $r = 35\%$, $\text{RHS} = (-)7.01$

By interpolation, $\text{IRR} = 34\% + (35 - 34)\% \times 1.08/8.09 = 34.13\%$

According to the IRR criteria, project A is preferable.

(c) PV of inflows of A = Rs.753.38 lakhs

$$\text{Benefit Cost Ratio} = 753.38 / 540 = 1.39$$

PV of inflows of B = Rs.619.81 lakhs

$$\text{Benefit Cost Ratio} = 619.89 / 470 = 1.32$$

Project A is preferable as it gives a higher Benefit Cost Ratio.

4. Golden Pond will have a capital gain when it sells the buildings. However, it will have to pay taxes on the differences between the revenue from selling the buildings and the depreciated cost of the buildings. The depreciation on the buildings in the first four years is

$$3.042\% + 3.175\% + 3.175\% + 3.175\% = 12.57\%$$

therefore, the net book value of the building at $t = 4$ is

$$\text{Rs.100 million} \times (1 - 0.1257) = \text{Rs.87.43 million}$$

the capital gains tax will be

$$0.34 \times (\text{Rs.110 million} - \text{Rs.87.43 million}) = \text{Rs.7.674 million}$$

the net after-tax cash flow from selling the buildings will be

$$\text{Rs.110 million} - \text{Rs.7.674 million} = \text{Rs.102.326 million}$$

which is Rs.2.326 million more than Golden Pond spent on them.

The side-effect costs of Rs.20 million a year represent the reduction in the after-tax cash flows from the firm's other amusement parks.

<i>Golden Pond's Cash Flows (in Rs. million)</i>						
<i>Year</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Property	(100)				102.326	
Equipment	(100)					
Net working capital	(10)				10	
Sales revenue (in cash)		400	400	400	400	
Variable costs		(120)	(120) + (80)	(120) + (80)	(120) + (80)	(80)
Side effect		(20)	(20)	(20)	(20)	
Taxes (see figures below)		(55.634)	(51.808)	(61.885)	(64.401)	
Project cash flows	(210)	204.366	128.192	118.115	227.925	(80)

<i>Income Figures for Tax Purposes (by Year)</i>				
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Revenue	400	400	400	400
Operating costs	(200)	(200)	(200)	(200)
Depreciation on equipment	(33.330)	(44.450)	(14.810)	(7.410)
Depreciation on property	(3.042)	(3.175)	(3.175)	(3.175)
Income before tax	163.628	152.375	182.015	189.415
Taxes at 34%	(55.634)	(51.808)	(61.885)	(64.401)

Golden Pond recovers net working capital (mainly cash) or Rs.10 million at the end of the fourth year. Since the Rs.25 million paid to the research group is a sunk cost, it is not included in the cash flow calculation. Since the land has zero alternative cost, it is not included in the initial outlay. Finally, the firm pays income taxes. The firm is allowed to depreciate its equipment over four years for tax purposes.

The after-tax cash flows are as follows:

<i>Year</i>						
	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Cash flows (in Rs. million)	-210	204.366	128.192	118.115	227.925	-80

The firm's after-tax cost of capital is 15%. At this discount rate, the project's NPV is

$$\begin{aligned}
 \text{NPV} = & -\text{Rs.210 million} + (0.8696 \times \text{Rs.204.366 million}) \\
 & + (0.7561 \times \text{Rs.128.192 million}) + (0.6575 \times \text{Rs.118.115 million}) \\
 & + (0.5718 \times \text{Rs.227.925 million}) + (0.4972 \times -\text{Rs.80 million}) \cong \text{Rs.232.855 million}
 \end{aligned}$$

Thus, Golden Pond should accept the project.

Note that although the accounting figures generally differ from cash flow figures, we use the accounting rules to calculate the tax payments. For example, the equipment may actually depreciate evenly over the four years, but the tax authority allows the firm to use specific rate of depreciation, which decreases the tax burden. Second, after using the accounting figures to calculate the tax payment, we use the annual cash flow to evaluate the project.

If there were no taxes, we could use the cash flows directly. With taxes, however, we must use the accounting framework to calculate the tax, and only then can we shift to the cash flow framework.

5.

Security	Market Value of investments (Shares x MPS)	Proportion	Beta	Portfolio Beta (Prop x Beta)	SML Eqn. $\{r_f + (r_m - r_f) \times \beta\}$	Evaluation (comparing with expected return)	Strategy
D	2,57,400	0.234	1.16	0.271	20.28	Overpriced	Sell
E	2,33,600	0.212	2.28	0.483	29.24	Overpriced	Sell
F	2,17,000	0.197	0.90	0.177	18.20	Overpriced	Sell
G	3,92,500	0.357	1.50	0.536	20.60	Underpriced	Buy
	11,00,500	1		1.467			

Note:

Maxims :

Strategy

Expected Return	= SML or CML Equation [perfectly priced]	Hold
Expected Return	> SML or CML [under priced or under valued]	Buy
Expected Return	< SML or CML [overpriced or over valued]	Sell

6. (a) By Put-call parity:

$$\begin{aligned}
 \text{Value of a Stock + Put} &= \text{PV of Exercise price + call} \\
 9 + 2 &= 10 \times e^{-0.03 \times (6/12)} + x \\
 \text{Value of the call} &= 1.15
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } x + 1 &= 9.85 + 4 \\
 \text{Value of the share} &= 12.85
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) } 12 + x &= 9.85 + 5 \\
 \text{Value of the put} &= 2.85
 \end{aligned}$$

Pricing of a Call & Put Option under Black Scholes Model :

$$\text{Value of a Call Option} = P \times N(d_1) - (X) \times e^{-rt} \times N(d_2)$$

$$\text{Value of a Put Option} = (X) \times e^{-rt} \times N(-d_2) - P \times N(-d_1)$$

$$\text{Where } d_1 = \frac{\ln(P/X) + (r_f + (\sigma^2/2)) \times t}{\sigma \times \sqrt{t}}$$

P = Spot Price (ex-dividend)
 $d_2 = d_1 - \sigma \times \sqrt{t}$
 $N(d_1) = 0.5 \pm \text{Normal table value of } d_1$
 X = Strike Price (also denoted by K)
 t = Time (in years)
 r_f = Risk free Interest rate
 $N(d_2) = 0.5 \pm \text{Normal table value of } d_2$
 σ = Standard deviation

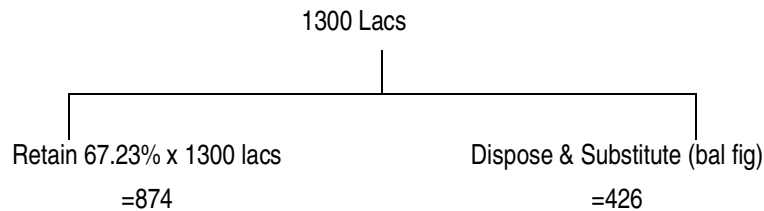
Note: Students are advised to use natural log, e power, normal table values to solve problems on Black Scholes model.

7. Security	MV of security	Proportion	BetaPortfolio	Beta
1	400 Lacs	4/13	1.1	0.34
2	600 Lacs	6/13	1.2	0.55
3	300 Lacs	3/13	1.3	0.3
	<u>1300 Lacs</u>			<u>1.19</u>

Security	Proportion	Beta	Portfolio Beta
Portfolio	P	1.19	$p \times 1.19$
Risk free	$1-p$	0	0
			0.8

$$p = 67.23 \%$$

$$(1-p) = 32.77\%$$



Instead of selling the existing portfolio for 426 lacs for risk free securities the portfolio manager can use stock index futures to hedge the operations.

$$\text{No. of futures contracts to be purchased/sold} = \frac{\text{Total value of portfolio} \times (\beta_2 - \beta_1)}{\text{Value of 1 stock index}}$$

β_1 = Existing Beta index

β_2 = New Beta Index

Instead of changing the composition of the portfolio the portfolio manager shall retain the entire portfolio & should go short for stock index futures

$$\begin{aligned}
 \text{No. of SIF contracts} &= \frac{1300 \text{ lacs} \times (0.8 - 1.19)}{1350 \times 100} \\
 &= (375) \text{ contracts} - \text{Sold}
 \end{aligned}$$

Negative Quantity indicates sale of contracts & Positive Quantity indicates Purchases.

(b) No. of future contract to increase the beta from 1.19 to 1.5 the portfolio manager buy 299 contracts

$$\begin{aligned}
 \text{No. of SIF contracts} &= \frac{1300 \text{ lacs} \times (1.5 - 1.19)}{1352 \times 100} \\
 &= 299 \text{ contract} - \text{Buy}
 \end{aligned}$$

8.			Sharp Ratio	Treynor's Ratio	Ranks as per Sharp Ratio	Ranks as per Treynor's ratio
	Funds	$R_i - R_f$	$\frac{R_i - R_f}{\sigma}$	$\frac{R_i - R_f}{\beta}$		
	P	13 – 9	0.25	4.444	III	III
	Q	17 – 9	0.348	9.302	II	II
	R	23 – 9	0.359	11.667	I	I
	S	15 – 9	0.24	4.348	IV	IV

Ranks obtained as per Sharp Ratio as well as Treynor's Ratio are same. This indicate that all the mutual funds seems to be reasonably well diversified.

9. (i)	Selling price	22
	Material	4.5
	Labour	5.0
	Variable overhead	4.5
	Contribution per unit	<u>12</u> <u>10</u>

No. of units	10,000	
Total Contribution		1,00,000
Fixed Cost:		
Rental	8000	
Managerial Salary	5000	13,000
Profit		87,000

Annuity factor @ 5% for 5 years	=	4.3295
Discounted Cash Inflow	=	3,76,667 [87000 x 4.3295]
Discounted Cash Outflow	=	2,50,000
NPV	=	1,26,667

Strategy : Manufacture Agni

(ii) Sensitivity Analysis: Base factor Product life.

Year	PV factor	Cash Flow	Discounted Cashflow	Cumulative Discounted Cash flow
1	0.9524	87,000	82,859	82,859
2	0.9070	87,000	78,909	1,61,768
3	0.8638	87,000	75,151	2,36,919
4	0.8227	87,000	71,575	3,08,494

Discounted Pay Back through Interpolation = 3years + [(2,50,000 - 2,36,919) / 71575]
= 13081/71575 = 3.18 yrs

Total Life of project = 5 years

Discounted pay back period = 3.18 years

Margin of Safety period = 1.82 yrs

MOS period to total period = 36.4%

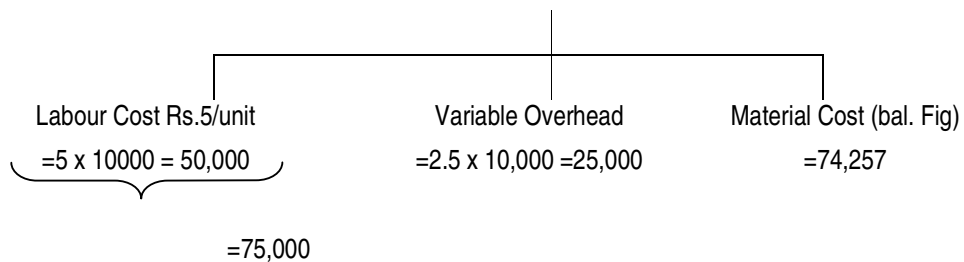
Any wrong estimate in the life of the project to the extent of 36.4% (adverse) will have the acceptance of the project. Beyond this % the project shall stand rejected.

(iii) Sensitivity Analysis: Base factor – Annual Sales volume

Target Net Profit	= Nil
Discount Cash outflow	= 2,50,000
Discount Cash inflow	= 2,50,000
Annuity factor @5% for 5 years	= 4.3295
Cash inflow (Profit)	= 57,743
Fixed Cost	= 13,000
Contribution	= 70,743
Contribution / unit	= Rs.10
Number of units (Break Even units)	= 7,075
MOS (10,000 – 7075)	= 2,925
MOS in %	= 29.26%

(iv) Sensitivity Analysis: Base factor – Material Cost / Agni

Target Net Profit	= Nil
Discount Cash outflow	= 2,50,000
Discount Cash inflow	= 2,50,000
Annuity factor @5% for 5 years	= 4.3295
Cash inflow (Profit)	= 57,743
Fixed Cost	= 13,000
Contribution	= 70,743
Sales	= 2,20,000
Variable Cost	= 1,49,257



Material Cost / unit of Agni	= 7.425
Present material cost / unit	= 4.50
Extra Cost	= 2.925
% increase in Material Cost	= 65%

Alternatively:

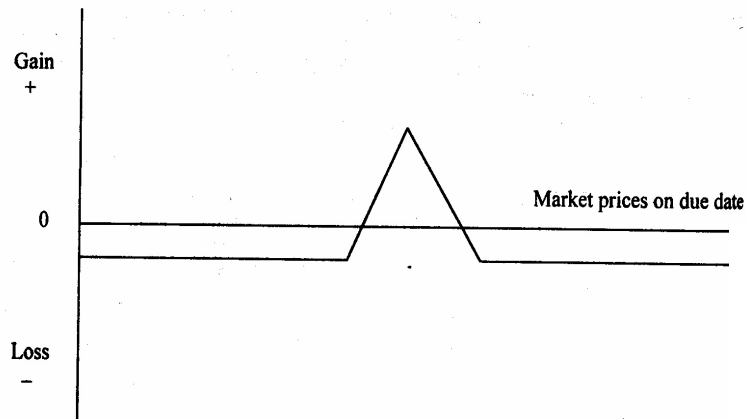
Extra Material Cost = NPV	= 1,26,667
Annuity factor for 5 years at 5%	= 4.3295

Cash outflow	= 29,257
Number of units / annum	= 10,000
Extra Material cost / unit	= 2.93
Present material cost	= 4.50
% increase in Material Cost	= 65%

10. A butterfly spread can be constructed by buying a call option with a relatively low exercise price (Rs. 30) and buying a call with a relatively high strike price (Rs. 40) and also selling two call options with a strike price (Rs. 35/-) in between the high (Rs. 40) and low (Rs. 30). The pattern of pay off can be shown in tabular form as under:

Market Price on due date	Pay off			Net Premium – 4 + (2 × 2) – 1 = – 1	Total
	E = 30, one Contract purchased	E = 35, two Contract sold	E = 40, one Contract purchased		
20	+10	– 30	+ 20	– 1	– 1
22	+ 8	– 26	+ 18	– 1	– 1
24	+ 6	– 22	+ 16	– 1	– 1
26	+ 4	– 18	+ 14	– 1	– 1
28	+ 2	– 14	+ 12	– 1	– 1
30	0	– 10	+ 10	– 1	– 1
32	0	– 6	+ 8	– 1	+ 1
34	0	– 2	+ 6	– 1	+ 3
35	0	0	+ 5	– 1	+ 4
36	0	0	+ 4	– 1	+ 3
38	0	0	+ 2	– 1	+ 1
40	0	0	0	– 1	– 1
42	0	0	0	– 1	– 1
44	0	0	0	– 1	– 1
46	0	0	0	– 1	– 1
48	0	0	0	– 1	– 1
50	0	0	0	– 1	– 1

Diagrammetacally



11.

AB Ltd.

Statement showing the NPV of the new machine

	Rs.	Rs.
<i>Cash outflow :</i>		
Investment in new machine	20,00,000	
Less: Sale value of old machine	1,00,000	
Total cash outflow: (A)		19,00,000
<i>Cash inflow:</i>		
Saving in variable cost in a year (increase in profit)	7,00,000	
Less: Tax @ 50%	3,50,000	
Profit after tax (PAT)	3,50,000	
Less: Depreciation on new machine	3,60,000	
Depreciation on old machine (Rs. 4,00,000/5 years)	80,000	2,80,000
Net profit after tax (PAT)	70,000	
Add: Depreciation		2,80,000
Annual cash inflow		3,50,000
P.V. of annual cash inflows for 5 years at 12%		
(Rs. 3,50,000 X 3.605)		12,61,750
Add: P.V. of salvage value of new machine received at the end of 5 years		
(Rs. 2,00,000 X 0.567)		1,13,400
Total cash inflow: (B)		13,75,150
N.P.V. (B) - (A)		(-) 5,24,850

Advice: Since the net present value of the new machine is negative it is advised that AB Ltd. should not replace the old machine with a new machine.

12. (a) Alternative I

Invest in \$ deposits @ 8% p.a. for three months.

$$\text{Income} = \$ 10,00,000 \times \frac{8}{100} \times \frac{3}{12} = \$ 20,000$$

Alternative II

Convert dollars to pounds at spot rate. Cover forward position and invest @ 10% p.a. for three

months.

Spot exchange rate \$1.80 = £ 1.00

\$ 1 million = £ 555,556

Interest earned on £ 555,556 @ 10% p.a.

$$= £ 555,556 \times \frac{10}{100} \times \frac{3}{12} = £ 13,889$$

$$\begin{array}{rcl} \therefore \text{Amount after 3 months} & & = £ 555,556 \\ \text{Add interest} & & = \underline{£ 13,889} \\ & & \underline{£ 569,445} \end{array}$$

$$\begin{array}{rcl} \therefore \text{Total, in dollars, at 1.78 forward rate} & & \\ & = & £ 569,445 \times 1.78 = \$ 1,013,612 \end{array}$$

So in Alternative I, gain is \$ 20,000

In Alternative II, gain is \$ 13,610

Hence, company should invest in US at 8%.

- (b) For an equilibrium situation, amount at the end of three months should be equal.

Hence,

Amount invested in sterling covered by forward rate = \$ 1,020,000

Let forward rate be \$ x/£

$$\therefore \text{at equilibrium, } £ 569,445 \text{ equals } £ 569,445x = \$ 1,020,000$$

$$\therefore x = \frac{1,020,000}{569,445} = 1.7912$$

$$\therefore \text{Forward rate} = \$ 1.7912 / £$$

- (c) Interest earned in pounds given same spot and forward rates

$$= £ 555,556 \times \frac{14}{100} \times \frac{3}{12} = £ 19,444$$

$$\therefore \text{Total } £ = 575,000$$

$$\text{and total } \$ = 575,000 \times 1.78 = 10,23,500$$

$$\therefore \text{Gain} = \$ 23,500$$

$$\text{Earlier gain} = \$ 20,000$$

Hence at 14%, we should invest in sterling.

- (d) For equilibrium sterling deposit rate, amount invested in sterling equals \$ 1,020,000 after three months.

$$\text{Now } \$ 1,020,000 \text{ converted into } £ \text{ at forward rate} = \frac{1,020,000}{1.78}$$

$$= £ 5,73,034$$

Let sterling rate be x% p.a.

$$\therefore 5,55,556 + \left(555,556 \times \frac{x}{100} \times \frac{3}{12} \right)$$

$$\therefore x = \frac{17,478}{555,556} \times \frac{12}{3} \times 100$$

$$= 12.58\%$$

$\therefore$ Equilibrium sterling deposit rate = 12.58%

13.	Combination	Discounted Cash Outflow (Rs.000s)	Discounted Cash Inflow (Rs.000s)	Net Present Value (Rs.000s)
	1	200	290	90
	2	115	185	70
	3	270	400	130
	1,2	315 (200 + 115)	475 (290+185)	160
	1,3	440 (470 – 30)	690 (290+400)	250
	2,3	385 (115 + 270)	620 (585+35)	235
	1,2,3	680	910	
		(200+115+270-30+125)	(290+185+400+35)	230

From the above table combination Project 1 and 3 should be selected for higher NPV.

14. (a) Taking machinery on lease:

The amount of annual lease payment can be ascertained by finding out the annuity factor. The present value table can be used for this purpose. The annuity factor is $1 + 5.76 = 6.76$. The amount of annual lease payment will therefore be Rs. 20,00,000 / 6.76 = Rs. 2,95,858.

Statement of Cash outflows (Leasing alternative)

End of the Year	Lease Payment (1)	Tax Shield (2)	Cash outflows after Tax (3) = (1) – (2)	P.V. Factor @ 8% (4)	(Rs.) Present Value of Cash outflows after Taxes (5) = (2) × (4)
0	2,95,858	—	2,95,858	1.00	2,95,858
1–9	2,95,858	1,47,929	1,47,929	6.25	9,24,556
10	—	1,47,929	(1,47,929)	0.46	(68,047)
		Total Cash outflows			<u>11,52,367</u>

*The cost of debt is 16% required for making lease payment. The effective cost comes only to 8% after tax at 50%.

(b) Purchasing the asset outright by raising a loan of Rs. 20,00,000 @ 16% p.a.:

Presuming that the loan repayment schedule is of the same duration and pattern as the lease payment schedule, the annual instalments of loan to be repaid may be ascertained from the Present Value Table by calculating the annuity factor. It comes to $1 + 4.61 = 5.61$. The amount of annual instalment is, therefore, Rs. 3,56,506 (i.e. Rs. 20,00,000/5.61).

Statement of debt payments (Loan amount Rs. 20,00,000)

End of Year	Annual payment (Interest plus Principal payment)	Principal Amount outstanding at the end of year	(Rs.) Annual Payment	
			Interest @ 16%	Principal element
0	3,56,506	16,43,494	—	3,56,506
1	3,56,506	15,49,949	2,62,959	93,547

2	3,56,506	14,41,433	2,47,992	1,08,514
3	3,56,506	13,15,556	2,30,629	1,25,877
4	3,56,506	11,69,539	2,10,489	1,46,017
5	3,56,506	10,00,159	1,87,126	1,69,380
6	3,56,506	8,03,678	1,60,025	1,96,481
7	3,56,506	5,75,760	1,28,588	2,27,918
8	3,56,506	3,11,376	92,122	2,64,384
9	<u>3,61,196*</u>	—	<u>49,820</u>	<u>3,11,376</u>
	<u>35,69,750</u>		<u>15,69,750</u>	<u>20,00,000</u>

* It consists of the sum of the principal amount due at the end of the year eight and interest thereon. It is different from annual instalment because of rounding off of the annuity factor used in the computation of annual instalment loan payment two decimal points.

End of the Year	Loan Payment	Interest @ 16%	Depreciation	Tax shield $\{[(2) + (3) + (4)] \times 0.5\}$	Cash Outflows after taxes $(1) - (5)$	Present Value Factor @ 8%	Present Value of Cash Flows $(6) \times (7)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	3,56,506	—	—	—	3,56,506	1.00	3,56,506
1	3,56,506	2,62,959	2,00,000	2,31,480	1,25,026	0.93	1,16,274
2	3,56,506	2,47,992	2,00,000	2,23,996	1,32,510	0.85	1,12,634
3	3,56,506	2,30,629	2,00,000	2,15,315	1,41,191	0.80	1,12,953
4	3,56,506	2,10,489	2,00,000	2,05,245	1,51,261	0.73	1,10,421
5	3,56,506	1,87,126	2,00,000	1,93,563	1,62,943	0.68	1,10,801
6	3,56,506	1,60,025	2,00,000	1,80,013	1,76,493	0.58	1,11,191
7	3,56,506	1,28,583	2,00,000	1,64,000	1,92,212	0.55	1,11,483
8	3,56,506	92,122	2,00,000	1,46,061	2,10,445	0.50	1,15,745
9	3,61,196	49,820	2,00,000	1,24,910	2,38,286	0.46	1,18,143
10	—	—	2,00,000	1,00,000	(1,00,000)		<u>(46,000)</u>
					Total Cash outflows		<u>13,30,151</u>

Advice: Since the cash outflow is less in leasing option as compared with borrowing option, the industrial unit is advised to obtain diesel generating set on lease only.

15. Growth rate ascertainment

$$d_{96} = 2.115$$

$$d_{02} = 3$$

No. of years lapsed = 6 years

$$MV = PV (1+g)^6$$

$$3 = 2.115 (1+g)^6$$

$$g = 6\%$$

$$d_0 = 3$$

$$D_1 = d_0 (1+g)$$

$$D_1 = 3 \times 1.06 = 3.18$$

$$\begin{aligned}
 r_s = k_e &= r_f + (r_m - r_f) \times \beta \\
 &= 10 + (5 \times 1.6) \\
 &= 18\%
 \end{aligned}$$

$$\begin{aligned}
 P_0 &= \frac{d_1}{K_e - g} \\
 &= \frac{3.18}{0.18 - 0.06} \\
 &= \text{Rs.26.5}
 \end{aligned}$$

16.	Securities	Expected Return (1)	Risk	Proportion (2)	Return from portfolio (3)=(1)x(2)
	A	12	3	0.8	9.6
	B	20	7	0.2	4.0
					<u>13.6</u>

$$\text{Risk of a portfolio} = \sqrt{(P_a^2 \times \sigma_a^2) + (P_b^2 \times \sigma_b^2) + (2P_a \times P_b \times \sigma_a \times \sigma_b) \times \text{Corr}(a, b)}$$

$$\text{Risk (when Corr} = +1) = \sqrt{(3^2 \times 0.8^2) + (7^2 \times 0.2^2) + (2 \times 3 \times 7 \times 0.8 \times 0.2 \times 1)}$$

$$\text{Risk of portfolio} = 3.8$$

$$\text{Alternatively} \quad \sqrt{a^2 + b^2 + 2ab} = \sqrt{(a+b)^2}$$

$$\begin{aligned}
 \text{Risk of Portfolio} &= a+b, \text{ where } a=0.8 \times 3; b=0.2 \times 7 \\
 &= 3.8
 \end{aligned}$$

When Corr = -1 and risk being 0

$$\begin{aligned}
 \text{Risk} &= \sqrt{a^2 + b^2 - 2ab} \\
 &= \sqrt{(a-b)^2}
 \end{aligned}$$

$$\text{Risk} = 0 = a - b$$

$$a = p \times 3$$

$$b = (1-p) \times 7$$

$$3p - 7 + 7p = 0$$

$$P = 70\%$$

17. MPS = EPS x PER

$$\text{Increase in Profit/earnings} = 9,00,000 + 5,60,000$$

$$\text{Benefit on account of Being Pvt. Ltd.} = 5,60,000 \text{ (i.e. 8 lacs} \times 0.7)$$

$$\text{Increase in Profit on account of improved performance (10\% on 90 Lacs)} = 9,00,000$$

$$\text{Total Benefit} = 14,60,000$$

$$\text{No. of Equity Shares} = 100 \text{ Lacs}$$

$$\text{Increase in Earnings per share} = 0.146$$

$$\text{Price earning Ratio} = 12$$

$$\text{Increase in MPS} = 0.146 \times 12 = 1.75$$

Therefore Increase in MPS should be paid to other shareholders to convert into Private Limited Company.

18.	Portfolio	Under Sharpe's Method	Ranking	Under Treynor Method	Ranking
	Dhan Raksha	1.125	3	6	3
	Dhan Varsha	0.833	5	5.55	4
	Dhan Vredhi	1.4	1	5	5
	Dhan Mitra	1.1	4	14.67	1
	Dhan Laheri	1.143	2	6.4	2

19. Net Asset Value = $\frac{\text{Total Assets} + \text{Receivables} - \text{Liabilities}}{\text{No. of shares}}$

$$\text{NAV} = \frac{181 \text{ lacs}}{10 \text{ lacs}} = \text{Rs. } 18.10$$

20. Currently, $\beta_e = 1.30$ $D = 0.25$ $E = 0.75$

$$\text{Hence: } \beta_a = \beta_e \times (E / (E + D(1 - C_T)))$$

$$= 1.30 \times 0.75 / (0.75 + (0.25 \times 0.65))$$

$$= 0.975 / 0.9125 = 1.0685$$

If now $D = 0.33$ and $E = 0.67$ then:

$$\beta_e = \beta_a \times (1 + (D(1 - t) / E)) = 1.0685 \times 1.320 = 1.41$$

the new equity beta is therefore 1.41

21. Superior Ltd:

$$\beta_{\text{unlevered}} (\beta_a) = \beta_{\text{levered}} \times (E / (E + D(1 - t)))$$

$$\beta_g \text{ is } \beta_{\text{levered firm}}$$

$$\beta_a \text{ is } \beta_{\text{unlevered firm}}$$

$$\beta_a = 1.33 \times 0.5 / (0.5 + (0.5 \times 0.65))$$

$$= 0.665 / 0.825 = 0.806$$

Admirable Ltd.:

$$\beta_a = \beta_g \times (E / (E + D(1 - t)))$$

$$\beta_a = 1.30 \times 0.6 / (0.6 + (0.4 \times 0.65))$$

$$= 0.780 / 0.860 = 0.907$$

$$\text{but } \beta_a = 0.907 = (0.8 \times \beta_{a1}) + (0.2 \times \beta_{a2})$$

$$= (0.8 \times \beta_{a1}) + (0.2 \times 1.4)$$

$$\text{Hence } \beta_{a1} = (0.907 - 0.280) / 0.8 = 0.784$$

Meritorious Ltd.

$$\beta_a = \beta_g \times (E / (E + D(1 - t)))$$

$$\beta_a = 1.05 \times 0.65 / (0.65 + (0.35 \times 0.65))$$

$$= 0.6825 / 0.8775 = 0.778$$

Average proxy asset beta:

$$(0.806 + 0.784 + 0.778) / 3 = 2.368 / 3 = 0.789$$

Regearing :

$$\beta_g = \beta_a \times (1 + (D(a - t) / E))$$

$$=0.789 \times (1 + ((0.3 \times 0.65)/0.7))$$

$$=0.789 + 1.2786 = 1.01$$

$$E(R_i) = R_f + \beta_g (R_m - R_f) = 10 + (1.01 \times (14 - 10)) = 14 \text{ percent}$$

Since the expected return of the project of 18 percent is greater than the calculated required rate of return, the project should be accepted.

22. Present value of net realization under the loan option:

Interest	Year 1	$90,000 \times 0.6 \times 0.943$	50,922
	Year 2	$60,000 \times 0.6 \times 0.890$	32,040
	Year 3	$30,000 \times 0.6 \times 0.840$	<u>15,120</u>
			98,082

Principal repayment:

Year 1 – 3	$3,00,000 \times 2.673$	<u>8,01,900</u>
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Total	<u>8,99,982</u>
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If the annual lease rent (payable at the end of the year) is X, then post tax recovery will be 0.6X.

Assuming straight line depreciation, the tax shelter due to depreciation will be:

$$(3,33,000 \times 0.4) \times 2.673 = 3,56,044$$

The lease rentals should recover present value of

Rs. 5,43,938 (i.e. 8,99,982 – 3,56,044)

That is to say:

$$0.6X \times 2.673 = 5,43,938$$

$$X = 3,39,156$$

Annual lease rent to be charged is Rs. 3,39,156.

23. (i) Calculation of free cash flows:

Rs. in lakhs

	Year 1	Year 2	Year 3	Year 4	Year 5
PBIDT	150	180	220	250	270
Less: Depreciation	30	32	34	36	38
Interest	30	28	26	24	22
PBT	90	120	160	190	210
Less: Tax	27	36	48	57	63
PAT	63	84	112	133	147
Add: Depreciation	30	32	34	36	38
Cash flow	93	116	146	169	185
Less: Capex	20	20	20	20	20
W.Cap. Inc.	30	30	30	30	30
Free Cash Flow	43	66	96	119	135

(ii) Terminal Value = Last year earnings $\times$ P/E

$$= 135 \times 12 = \text{Rs. 1,620 lakhs}$$

(iii) Present Value of free cash flow:

Year	Free CF	PVF	PV
1	43	0.909	39.09
2	66	0.826	54.52
3	96	0.751	72.10
4	119	0.683	81.28
5	135	0.621	<u>83.84</u>
			330.83
PV of terminal value $1,620 \times 0.62$			<u>1,006.02</u>
Total value			<u>1,336.85</u> Rs. in lakhs

24. Company ABC has a comparative advantage in fixed-rate market but wants to borrow at floating rate, Company XYZ has a comparative advantage in floating-rate markets but wants to borrow at fixed rate. This provides the basis for the swap.

The interest rate differential between fixed rates offered to the two companies

$$= 13.4 - 12.0$$

$$= 1.4\% \text{ p.a.}$$

The differential between the floating rates offered to the two companies

$$= 0.6 - 0.1$$

$$= 0.5\% \text{ p.a.}$$

Therefore, the total gain to both the companies from the swap

$$= 1.4 - 0.5$$

$$= 0.9\% \text{ p.a.}$$

Since the bank gets 0.1% per annum, therefore each of the companies, ABC and XYZ are 0.4% per annum better off.

This means that the swap arrangement would lead to Company ABC borrowing at:

$$\text{Libor} + 0.1 - 0.4 = \text{Libor} - 0.3\%$$

Similarly, Company XYZ could borrow at:

$$13.4 - 0.4 = 13\%$$

25. (a) Expected Return under different portfolios:

A			B		Expected Return of Portfolio
Portfolio	Probability	Return	Probability	Return	
1	1	0.12	0	0.2	$0.12 + 0 = 12\%$
2	0.5	0.12	0.5	0.2	$0.06 + 0.1 = 16\%$
3	0.75	0.12	0.25	0.2	$0.09 + 0.05 = 14\%$
4	0.25	0.12	0.75	0.2	$0.03 + 0.15 = 18\%$
5	0	0.12	1	0.2	$0 + 0.20 = 20\%$

Therefore, the expected return under different portfolios are 12%, 16%, 14%, 18% and 20% respectively.

(b) Risk factor associated with different portfolios:

Portfolio	A		B		r_{AB}	σ_p^2	σ_p	
	Prob.	σ_A	Prob.	σ_B				
1	1	0.1	0	0.18	0.15	0.01	0.10	= 10%
2	0.5	0.1	0.5	0.18	0.15	0.0119	0.109	= 10.9%
3	0.75	0.1	0.25	0.18	0.15	0.0087	0.094	= 9.4%
4	0.25	0.1	0.75	0.18	0.15	0.0198	0.140	= 14%
5	0	0.1	1	0.18	0.15	0.0324	0.180	= 18%

Therefore, the risk factor associated with different portfolios is 10%, 10.9%, 9.4%, 14% and 18% respectively.

(c) Best Portfolio from the point of view of risk:

The best portfolio from the point of view of risk is the one which has the least risk factor i.e. 9.4%. Portfolio 3 [i.e. 75% of funds invested in A and 25% in B] is the best portfolio from the point of risk.

(d) Best portfolio from the point of return.

Portfolio 5 [i.e. 100% funds invested in the security, B.] is the best from the point of return. This portfolio will earn a return of 20% i.e. 20% of Rs. 1,00,000 = Rs. 20,000 p.a.

26. Exchange of shares in proportion of the market value per share would be:

$$\begin{aligned}
 \text{Exchange ratio} &= \frac{\text{Market Value per share of Beta}}{\text{Market Value per share of Alpha}} \\
 &= \frac{\text{Rs. 15}}{\text{Rs. 60}} \\
 &= 0.25
 \end{aligned}$$

This means, 1 share of Alpha = 4 shares of Beta

Number of shares to be issued by Alpha = Number of shares of Beta $\times$ Exchange ratio

$$= 4,000 \times 0.25 = 1000$$

Total shares Company Beta shareholders will receive in Company Alpha = 1000

Total shares of Alpha [After Merger]

= Number of shares of Alpha + Shares of Alpha to Beta

$$= 10,000 + 1,000 = 11,000 \text{ shares}$$

Total earnings of Alpha [Total PAT]

= PAT of Alpha + PAT of Beta

$$= 40,000 + 8,000$$

$$= \text{Rs. 48,000}$$

EPS [After Merger]

$$= \frac{\text{Total earnings of Alpha}}{\text{Total shares of Alpha}}$$

$$= \frac{48,000}{11,000} = \text{Rs. 4.36}$$

Impact on the Wealth of Shareholders.

If the Company Alpha issues 1000 shares to acquire company Beta, then the total number of shares of Alpha after merger would be 11,000.

The proportional holding of Beta's shareholders in Alpha will be $\frac{1}{11}$, having worth of $\frac{1}{11}$ of Rs. 48,000 = Rs. 4363.6

Alternatively, EPS (After Merger) $\times$ Number of exchanged Shares
 = $4.363 \times 1,000$
 = Rs. 4363.6
 = Rs. 4364

However, the shareholders of Company Alpha would be having claim on $\frac{10}{11}$ of worth of Company Alpha after merger and their worth would be $\frac{10}{11}$ of Rs. 48,000 = Rs. 43,636.0

Comparative Position of Shareholders of Company Beta

	<i>Before Merger</i>	<i>After Merger</i>
Number of Shares	4,000	1,000
E.P.S.	Rs. 2	Rs. 4.3636
Total Earnings	Rs. 8,000	Rs. 4,364

Comparative Position of Shareholders of Company Alpha

	<i>Before Merger</i>	<i>After Merger</i>
Number of Shares	10,000	11,000
E.P.S.	Rs. 4	Rs. 4.364
Total Earnings	Rs. 40,000	Rs. 43,636

Therefore, it is seen that when Company Alpha acquires Company Beta on the basis of exchange of shares in proportion to the market value per share, then the worth of the shareholders of Company Beta decreases by :

$$8,000 - 4,364 = \text{Rs. } 3,636$$

Despite in the increase of EPS from Rs. 2 to Rs. 4.36. the shareholders value decreases.

On the other hand, worth of the shareholders of the Company Alpha increases by:

$$43,636 - 40,000 = \text{Rs. } 3,636 \text{ [After merger].}$$

It may be seen that the entire benefit of merger has gone to the existing shareholders of Company Alpha and the shareholders of Company Beta have seen a decrease in their worth after the merger takes place.

27. (a) A sold one futures contract for Rs. 3,40,000. In a market lot of 200, this works out to be Rs. 1,700 per Nifty future. On the futures expiration day, the futures price converges to the spot price. If the index closed at Rs. 1,850, this must be the futures close price as well. Hence, A has made a profit of $(\text{Rs. } 1,850 - \text{Rs. } 1,700) \times 200 = \text{Rs. } 30,000$.
- (b) The NPV of each project, assuming a 14% required rate of return, can be calculated for each of the possible cash flows. The present value interest factor annuity (PVIFA) of Re. 1 for 10 years at 14 per cent discount is 5.216. Multiplying each possible cash flows by PVIFA, we get the following information.

Determination of NPVs

<i>Expected cash inflows</i>	<i>Project X</i>		<i>Project Y</i>	
	<i>PV</i>	<i>NPV</i>	<i>PV</i>	<i>NPV</i>
	<i>(000' Rs.)</i>		<i>(000' Rs.)</i>	
Worst	26.08	(-3.92)	41.73	11.73
Most likely	41.73	11.73	52.16	22.16
Best	78.24	48.24	104.32	74.32

Conclusion:

The aforesaid table shows that in case of Project X under worst circumstances there is negative NPV whereas in case of most likely and best circumstances there is positive NPV.

However, in case of Project Y there is positive NPV under all the circumstances, at the same time cash inflows are more than project X. Hence, Project Y is more profitable and hence, be accepted.

28. (i) **Small-cap firms:** Small cap firms are little known entities however, they have their own identity. They are the entrepreneurial start-ups that may turn into giants tomorrow.
 - (ii) **Mid-cap companies:** Perhaps the best way to get a handle, on the mid-cap universe is to view it as a collection of the most successful small cap stocks and the least successful large cap stocks. Small Cap companies that grow become mid-cap companies. That type of mid-cap company would still be a rapidly growing firm, but would have less operational risk (in other words, it would be less likely to go bankrupt) than a smaller company. Meanwhile, large cap companies whose stock returns do not keep pace with their peers returns will eventually slip into mid-cap range. That type of mid cap could be a solid company with lackluster returns. Mid-caps could be especially useful for investors who want diversification but who cannot stand the volatility of small company stocks.
 - (iii) **Large-cap stocks:** These are giants and well recognized companies stock like coca cola, IBM etc.
29. (i) **Stock lending scheme:** The SEBI notified a scheme known as stock lending scheme on February 6, 1997, which envisages the individual or institutions, lending shares to borrowers at market determined rates within a broad institutional framework. The scheme provides for creation of institution of approved intermediary (AI) with whom the lender(s) are to deposit the securities and from whom the borrower(s) are to borrow the securities. The clearing houses of stock exchanges and the corporations of stock exchanges are allowed to be intermediaries.
 - (ii) **Open Interest:** Derivatives promise to convey ownership of the underlying asset at a future date. Thus the delivery of the asset takes place only on the expiration date. Till the time the holder of a contract does not exercise the contract or performs a reverse transaction, his position is said to remain open. This entails the obligation remains outstanding on his part. He is said to constitute in the 'open interest' for that asset.
 - (iii) **Mutual Fund:** Mutual Fund is a mechanism for pooling resources by issuing units to investors and investing funds in securities in accordance with objectives as disclosed in the offer document. Investments in securities are spread over a wide section of industries and sectors and thus the risk is reduced. Diversification reduces the risk because all stocks may not move in the same direction or the same proportion at the same time. A mutual fund issues units to the investors in accordance with the quantum of money invested by them. Investors of mutual funds are known as unit holders. A mutual fund formulates different kinds of investment schemes keeping in view the investment requirement of different types of investors, like liquid funds, floating rate funds, debt/equity funds etc. UTI is one of the oldest mutual funds in India.
 - (iv) **Entry load and an exit load:** Some of the Assets Management Companies (AMCs) have sales charges, or loads, on their funds (entry load/or exit load) to compensate for distribution

costs. Funds that can be purchased without a sales charge are known as no-load funds. Entry load is charged at the time a investor purchases the units of a scheme. The entry load percentage is added to the prevailing NAV at the time of allotment of units. Exit load is charged at the time of redeeming (or transferring an investment between schemes). The exit load percentage is deducted from the NAV at the time of redemption (or transfer between schemes). This amount goes to the Asset Management Company and not into the pool of funds of the scheme.

- (v) **Offshore Funds:** Offshore Funds specialize in investing in foreign companies or corporations. These funds have no-residential investors and are regulated by the provisions of the foreign countries where there are registered. These funds are regulated by Reserve Bank of India directions.
- (vi) **Index Funds:** Index schemes attempt to replicate the performance of a particular index such as the BSE Sensex or the NSE – 50. The portfolio of these schemes will consist only those stocks that constitute the Index. The percentage of each stock to the total holding will be identical to the stock index weightage. And hence, the returns from such schemes would be more or less equivalent to those of the index.
- (vii) **The Benchmark Rate:** The benchmark rate of interest for all fixed interest rate debt, including bonds, is the yield on government securities of corresponding maturities. Thus, the benchmark for fixed interest dollar debt is the yield on US Government dollar bonds of parallel maturity; similarly, the benchmark for fixed rate pound debt will be the yield on “gilts” of corresponding maturity.

While the benchmark is the yield on government bonds, the fixed rate borrower pays a premium on this. The premium depends on the borrower’s credit standing and market appetite for his bonds.

For FRNs, the most popular benchmark is the LIBOR, or the rate at which banks in London are willing to offer funds to other banks in market. The actual rate is expressed as a spread over the benchmark, and the applicable rate changes every 3/6 months, depending on how LIBOR has moved.

It is necessary to understand the importance of benchmark rates, as these are at the heart of all interest rate swaps.

- (viii) **Note Issuance Facilities:** Note Issuance Facility (NIF) is a medium-term commitment on the part of underwriting banks which obliges them to purchase any short term notes which the borrower is unable to sell in the market, at an agreed spread over a suitable benchmark (the benchmark could be LIBOR, the T-bill rate, etc.). Once a note issuance facility is in place, the borrower can issue short-term paper and sell it in the capital market. To the extent the borrower can sell notes at a spread lower than that at which the underwriters are committed to buy, this helps in reducing the cost of borrowing. Another major advantage of a note issuance facility is that, since the notes are short-term, this may allow the borrower to access investors who may not be interested in committing medium-term funds but may be quite happy to buy short-term paper.
- (ix) **Euro-commercial Paper (CP):** Like Euronotes under NIFs, CPs are also short-term paper issued by non-bank borrowers. The principal distinguishing feature is that CPs are not underwritten by a bank and the issuer, therefore, is one with very high credentials. The paper is usually issued in higher denominations of the order of \$ 1,00,000 and the market is dominated by large professional investors. Although these can be issued in interest-bearing form, they are usually issued at a discount to face-value and quoted in the secondary market on a yield basis.
- (x) **Straight Equity issues:** Straight equity issues in the international markets are made in the form of depository receipts. Three types of depository receipts are commonly used:
 - American Depository Receipts (or ADRs), are meant to facilitate public issues and trading in the United States.

- International Depositary Receipts (IDRs) are meant to facilitate issues and trading in Europe.
- Global Depositary Receipts (GDRs) are used in the case of issues in the Euromarket combined with private placement in the United States (to professional investors under Rule 144A of the SEC). The primary and secondary market is mainly in London; while issues are formally required to be listed in London/Luxembourg, most of the trading is on an over-the-counter basis.

The depositary receipts (DRs) are issued, not by the company, but an international bank acting as a depository. Each DR represents a given number of the company's shares which are physically held by a custodian appointed by the depository bank in the country of the company which is the ultimate issuer of the shares: in the company's books, the depository bank's name appears as the holder of the shares. The depository gets the dividends from the company (in local currency) and distributes them to the holders of the DRs after converting into dollars at the going rate of exchange. Like Eurobonds, GDRs too are bearer securities and trading/settlements are done by book entries through CEDEL or Euroclear. The DRs are exchangeable with the underlying shares either at any time, or after the lapse of a particular period of time. The exchanged shares could then be traded on the local stock market. The issue price of DRs depends on the market price of the underlying shares at the time of issue. The underwriting fees and commissions typically work out to around 3.75 per cent with the other expenses being similar to those in case of bond issues.

- (xi) **Foreign hedge funds:** Though there is no single accepted definition of a hedge fund, but such funds are generally unregistered private investment partnerships of high networth individuals or funds or investment corporations which are not subjected to the regulatory requirements in their country of origin. The Kelkar Committee has characterized such funds as structures where each customer brings in a minimum of Rs. 10 lakhs of capital, so that the securities regulator ceases to work for investor protection and only focuses on contract enforcement and fraud.

Hedge funds are often criticized for their speculative nature with fears that sudden withdrawals create defaulters in the markets. However, it is felt that this is a mistaken notion and that such funds react more or less in the same manner as other participants in the market do to a given set of information. All hedge funds are not necessarily speculative funds and it is believed that Indian Capital market regulatory framework has sufficient checks and balances "to keep the markets safe from potential abuse and manipulation"

- (xii) **Participating Notes (PNs):** Participatory Notes (PNs) are offshore derivative instruments in the form of contract notes issued by registered Foreign Institutional Investors (FIIs) against underlying securities to overseas investors who wish to stay away from the registration hassles. This makes it possible for such funds to invest even as they stay away from the glare of the regulator.

The Government of India wants the hedge funds to come and invest in the Indian capital market directly and not through the participatory notes.

The Government is likely to ease out norms of investment for foreign hedge funds and a larger play of hedge funds is expected to bring in a huge amount of fresh liquidity into the capital market. So far their aggregate investment in capital market during the current fiscal year (2004-2005) is more than \$ 10 billion. The Government wants hedge funds to register directly with the regulator and not to invest through participatory notes.

- (xiii) **Modified Internal rate of return:** The internal rate of return (IRR) adjusted for negative cash flows. This is accomplished by using a "safe rate" to provide for future negative cash flows.

MIRR better reflects the profitability of a project. IRR assumes the cash flows from the project are reinvested at the IRR, whereas the modified IRR assumes that all cash flows are reinvested at the firm's cost of capital.

This is also known as "financial management rate of return".

30. (i) **Economic Value Added:** The company creates shareholders value only if it generates returns in excess of its cost of capital. The excess of returns over cost of capital is simply termed as Economic Value Added (EVA). EVA measures whether the operating profit is sufficient enough to cover cost of capital.

$$EVA = NOPAT - (TCE \times WACC)$$

Where,

NOPAT = Net Operating Profit

TCE = Total Capital Employed

WACC = Weighted Average Cost of Capital

(ii) **Types of Dividend:**

- (a) *Interim Dividend:* This is declared before the declaration of final dividend.
- (b) *Final Dividend:* The Board of directors, keeping in view the financial strengths and weaknesses of the company recommends to the shareholders at the AGM the dividend to be paid to the shareholders.
- (c) *Dividend on Preference Shares:* Holders of Preference Shares are entitled to receive dividend before any dividend is paid to the equity shareholders as per the terms of issue.

- (iii) **Gordon Growth Model:** The Gordon Growth Model is also known as Dividend Growth Valuation Model which was developed by Gordon. The formula is based on the concept that the dividend of most of the companies is expected to grow and is used for the valuation of shares. The formula is

$$P_E = \left[\frac{d_o (1+g)}{K_e - g} \right]$$

Where,

P_E = Market Price per share (ex-dividend)

d_o = Current year dividend

g = Current annual growth rate of dividends

K_e = cost of equity capital (expected rate of return)

- (iv) **Listing of Securities:** Listing means admission of the securities to dealings on a recognised stock exchange. The securities of public limited company, Central or State Government, quasi governmental and other financial institutions municipalities, etc. are listed on the stock exchange(s).

The objectives of listing are mainly to:

- Provide liquidity to securities;
- mobilize savings for economic development;
- protect interest of investors by ensuring full disclosures.