PAPER – 2 : STRATEGIC FINANCIAL MANAGEMENT

QUESTIONS

Foreign Exchange

1. The current ¥/$ spot rate is 123.00. 6 month European calls with strike 0.0087 and 0.0083 ($/¥) are trading at premia of ¢ 0.015/¥ and ¢ 0.02/$ (cents per yen) respectively. A speculator is expecting a fairly strong appreciation of the yen over the next six months. What option strategy should he adopt to profit from this forecast? What is the breakeven rate? How much is the maximum possible profit? Ignore brokerage fees and interest costs/gains.
2. If the interest rate for the next 6 months for the US$ is 1.5% (annual compounding). The interest rate for the € is 2% (annual compounding). The spot price of the € is US $ 1.665. The forward price is expected to be US$ 1.664. Please determine correct forward price and recommend an arbitrage strategy.
3. TTC plc has been growing at a rate of 20 % ($g_{supernormal}$) in recent years. This same growth rate is expected to last for another 2 years. If D_0 = £1.60, k= 10%, and g_{normal} = 6% what is TTC's stock worth today? What are its expected dividend yield and capital gains yield at this time?

Yield to Maturity

4. It is now January 1, 2009, and Mr. X is considering the purchase of an outstanding Municipal Corporation bond that was issued on January 1, 2007, the Municipal bond has a 9.5 percent annual coupon and a 30-year original maturity (it matures on December 31, 2037). Interest rates have declined since the bond was issued, and the bond now is selling at 116.575 % of par, or Rs.1,165.75. Determine the yield to maturity (YTM) of this bond for Mr. X.

Capital Budgeting with Risk

5. The staff of Heman Manufacturing has estimated the following net cash flows and probabilities for a new manufacturing process:

Net Cash Flows			
Year	Pr = 0.2	Pr = 0.6	Pr = 0.2
0	€(100,000)	€(100,000)	€(100,000)
1	€20,000	€30,000	€40,000
2	€20,000	€30,000	€40,000
3	€20,000	€30,000	€40,000
4	€20,000	€30,000	€40,000
5	€20,000	€30,000	€40,000
5*	0	€20,000	€30,000

5* indicates the estimated salvage values. Heman's required rate of return for an average-risk project is 10 %.

(a) Assume that the project has average risk. Find the project's expected NPV.

(b) Find the best-case and worst-case NPVs. What is the probability of occurrence of the worst case if the cash flows are perfectly dependent (perfectly positively correlated) over time? If they are independent over time?

(c) Assume that all the cash flows are perfectly positively correlated; that is, there are only three possible cash flow streams over time: (1) the worst, (2) the most likely, or base, case, and (3) the best case, with probabilities of 0.2, 0.6, and 0.2, respectively. Find the expected NPV, its standard deviation, and its coefficient of variation.

(d) The coefficient of variation of Heman's average project is in the range of 0.8 to 1.0. If the coefficient of variation of a project being evaluated is greater than 1.0, 2 percentage points are added to the firm's required rate of return. Similarly, if the coefficient of variation is less than 0.8,1 percentage point is deducted from the required rate of return. What is the project's required rate of return? Should Heman accept or reject the project?

Alternative Dividend Policies

6. CMC plc has an all-common-equity capital structure. If has 200,000 share of £2 par value equity shares outstanding. When CMC's founder, who was also its research director and most successful inventor, retired unexpectedly to the South Pacific in late 2005, CMC was left suddenly and permanently with materially lower growth expectations and relatively few attractive new investment opportunities. Unfortunately, there was no way to replace the founder's contributions to the firm. Previously, CMC found it necessary to plough back most of its earnings to finance growth, which averaged 12% per year. Future growth at a 5% rate is considered realistic; but that level would call for an increase in the dividend payout. Further, it now appears that new investment projects with at least the 14 % rate of return required by CMC's shareholders (k_e = 14%) would amount to only £800,000 for 2006 in comparison to a projected £2,000,000 of net income. If the existing 20 % dividend payout were continued, retained earnings would be £16,00,000 in 2006, but, as noted, investments that yield the 14 % cost of capital would amount to only £800,000.

   The one encouraging thing is that the high earnings from existing assets are expected to continue, and net income of £20,00,000 is still expected for 2006. Given the dramatically changed circumstances. CMC's board is reviewing the firm's dividend policy.

   (a) Assuming that the acceptable 2006 investment projects would be financed entirely by earnings retained during the year, calculate DPS in 2006, assuming that CMC uses the residual payment policy.

   (b) What payout ratio does your answer to part a imply for 2006?

(c) If a 60 % payout ratio is adopted and maintained for the foreseeable future, what is your estimate of the present market price of the equity share? How does this compare with the market price that should have prevailed under the assumptions existing just before the news about the founder's retirement? If the two values of P_0 are different. Comment on why?

(d) What would happen to the price of the share if the old 20% payout were continued? Assume that if this payout is maintained, the average rate of return on the retained earnings will fall to 7.5% and the new growth rate will be

G = (1.0- Payout ratio) × (ROE)

= (1.0 – 0.2) (7.5%) = (0.8) (7.5%) = 6.0%

Economic Value Added (EVA)

7. Consider the following operating information gathered from 3 companies that are identical except for their capital structures:

	P Ltd.	Q Ltd.	R Ltd.
Total invested capital	€100,000	€100,000	€100,000
Debt/assets ratio	0.80	0.50	0.20
Shares outstanding	6,100	8,300	10,000
Before-tax cost of debt	14%	12%	10%
Cost of equity	26%	22%	20%
Operating income, (EBIT)	€25,000	€25,000	€25,000
Net Income	€8,970	€12,350	€14,950
Tax rate	35%	35%	35%

(a) Compute the weighted average cost of capital, WACC, for each firm.

(b) Compute the Economic Value Added, EVA, for each firm.

(c) Based on the results of your computations in part b, which firm would be considered the best investment? Why?

(d) Assume the industry P/E ratio generally is 15 ×. Using the industry norm, estimate the price for each share.

(e) What factors would cause you to adjust the P/E ratio value used in part d so that it is more appropriate?

8. Associated Advertising Agency (AAA) just announced that the current financial year's income statement reports its net income to be Rs.12,00,000. AAA's marginal tax rate is 40 percent, and its interest expense for the year was Rs.15,00,000. The company has Rs.80,00,000 of invested capital, of which 60 percent is debt. In addition, AAA tries to maintain a weighted average cost of capital (WACC) near 12 percent.

(a) Compute the operating income, or EBIT, AAA earned in the current year.

(b) What is AAA's Economic Value Added (EVA) for the current year?

(c) AAA has 5,00,000 equity share outstanding. According to the EVA value you computed in part b, how much can AAA pay in dividends per share before the value of the firm would start to decrease? If AAA does not pay any dividends, what would you expect to happen to the value of the firm?

Options

9. Following information is available for X Company's shares and Call option:

Current share price	Rs.185
Option exercise price	Rs.170
Risk free interest rate	7%
Time of the expiry of option	3 years
Standard deviation	0.18

Calculate the value of option using Black-Scholes formula.

10. Mr. X established the following spread on the Delta Corporation's stock :

(i) Purchased one 3-month call option with a premium of Rs.30 and an exercise price of Rs.550.

(ii) Purchased one 3-month put option with a premium of Rs.5 and an exercise price of Rs.450.

Delta Corporation's stock is currently selling at Rs.500. Determine profit or loss, if the price of Delta Corporation's :

(i) remains at Rs.500 after 3 months.

(ii) falls at Rs.350 after 3 months.

(iii) rises to Rs.600.

Assume the size option is 100 shares of Delta Corporation.

Foreign Exchange Management

11. (a) An exporter is a UK based company. Invoice amount is $3,50,000. Credit period is three months. Exchange rates in London are :

Spot Rate	($/£) 1.5865 – 1.5905
3-month Forward Rate	($/£) 1.6100 – 1.6140

Rates of interest in Money Market :

	Deposit	Loan
$	7%	9%
£	5%	8%

Compute and show how a money market hedge can be put in place. Compare and contrast the outcome with a forward contract.

(b) An Indian exporting firm, Rohit and Bros., would be cover itself against a likely depreciation of pound sterling. The following data is given :

Receivables of Rohit and Bros.	: £500,000
Spot rate	: Rs.56.00/£
Payment date	: 3-months
3 months interest rate	: India : 12 per cent per annum
	: UK : 5 per cent per annum

What should the exporter do ?

12. (i) The rate of inflation in USA is likely to be 3% per annum and in India it is likely to be 6.5%. The current spot rate of US $ in India is Rs.43.40. Find the expected rate of US $ in India after one year and 3 years from now using purchasing power parity theory.

(ii) On April 1, 3 months interest rate in the UK £ and US $ are 7.5% and 3.5% per annum respectively. The UK £/US $ spot rate is 0.7570. What would be the forward rate for US $ for delivery on 30th June?

Swap

13. Suppose a dealer quotes 'All-in-cost' for a generic swap at 8% against six month LIBOR flat. If the notional principal amount of swap is Rs.5,00,000,

(i) Calculate semi-annual fixed payment.

(ii) Find the first floating rate payment for (i) above if the six month period from the effective date of swap to the settlement date comprises 181 days and that the corresponding LIBOR was 6% on the effective date of swap.

(iii) In (ii) above, if the settlement is on 'Net' basis, how much the fixed rate payer would pay to the floating rate payer?

Generic swap is based on 30/360 days basis.

Bond Valuation

14. The following is the Yield structure of AAA rated debenture:

Period	Yield (%)
3 months	8.5%
6 months	9.25
1 year	10.50
2 years	11.25
3 years and above	12.00

(i) Based on the expectation theory calculate the implicit one-year forward rates in year 2 and year 3.

(ii) If the interest rate increases by 50 basis points, what will be the percentage change in the price of the bond having a maturity of 5 years? Assume that the bond is fairly priced at the moment at Rs.1,000.

15. XL Ispat Ltd. has made an issue of 14 per cent non-convertible debentures on January 1, 2007. These debentures have a face value of Rs.100 and is currently traded in the market at a price of Rs.90.

Interest on these NCDs will be paid through post-dated cheques dated June 30 and December 31. Interest payments for the first 3 years will be paid in advance through post-dated cheques while for the last 2 years post-dated cheques will be issued at the third year. The bond is redeemable at par on December 31, 2011 at the end of 5 years.

Required :

(i) Estimate the current yield at the YTM of the bond.

(ii) Calculate the duration of the NCD.

(iii) Assuming that intermediate coupon payments are, not available for reinvestment calculate the realised yield on the NCD.

Dividend Policy

16. RST Ltd. has a capital of Rs.10,00,000 in equity shares of Rs.100 each. The shares are currently quoted at par. The company proposes to declare a dividend of Rs.10 per share at the end of the current financial year. The capitalization rate for the risk class of which the company belongs is 12%. What will be the market price of the share at the end of the year, if

(i) a dividend is not cleared ?

(ii) a dividend is declared ?

Assuming that the company pays the dividend and has net profits of Rs.5,00,000 and makes new investments of Rs.10,00,000 during the period, how many new shares must be issued? Use the MM model.

Merger and Acquisition

17. K. Ltd. is considering acquiring N. Ltd., the following information is available:

Company	Profit after tax	Number of Equity shares	Market value per share
K. Ltd.	50,00,000	10,00,000	200.00
N. Ltd.	15,00,000	2,50,000	160.00

Exchange of equity shares for acquisition is based on current market value as above. There is no synergy advantage available:

I. Find the earning per share for company K. Ltd. after merger.

II. Find the exchange ratio so that shareholders of N. Ltd. would not be at a loss.

18. Fuller Plc. is intending to acquire Felicy Plc. by merger and the following information is available in respect of the companies:

	Fuller Plc.	Felicy Plc.
Number of equity shares	1,00,000	60,000
Earnings after tax (£)	5,00,000	1,80,000
Market value per share (£)	42	28

Required:

(i) What is the present EPS of both the companies?

(ii) If the proposed merger takes place, what would be the new earning per share for Fuller Plc.? Assume that the merger takes place by exchange of equity shares and the exchange ratio is based on the current market price.

(iii) What should be exchange ratio, if Felicy Plc. wants to ensure the earnings to members are as before the merger takes place?

Lease viability

19. ABC Ltd., presently leasing computers on a yearly basis rental amounting Rs.10,00,000 per year. These computers can also be purchased by the company for Rs.50,00,000. This purchase can be financed by 16% loan repayable in 4 equal annual instalments.

The economic life of the computer is that of 4 years. It is estimated that the computers would be sold for Rs.20,00,000 at the end of 4 years. The company uses the straight line method of depreciation. Corporate tax rate is 50%.

(a) Whether computer should be acquired or leased?

(b) Analyse the financial viability from the point of view of lessor, assuming 14% cost of capital.

(c) Determine the minimum rent which will yield an IRR of 16% to the lessor.

Portfolio Management

20. (a) Consider the following information on two stocks, A and B :

Year	Return on A (%)	Return on B (%)
2006	10	12
2007	16	18

You are required to determine:

(i) The expected return on a portfolio containing A and B in the proportion of 40% and 60% respectively.

(ii) The Standard deviation of return from each of the two stocks.

(iii) The covariance of returns from the two stocks.

(iv) Correlation coefficient between the returns of the two stocks.

(v) The risk of a portfolio containing A and B in the proportion of 40% and 60%.

(b) The following data are available to you as a portfolio manager.

Security	Expected Return	Beta	Standard Deviation
O	0.32	1.70	0.50
P	0.30	1.40	0.35
Q	0.25	1.10	0.40
R	0.22	0.95	0.24
S	0.20	1.05	0.28
T	0.14	0.70	0.18
Composite Index	0.12	1.000	0.20
T-bills	0.08	0.00	0.00

(i) In terms of a security market line (SML) , which of the securities listed above are undervalued? Why?

(ii) Assume that a portfolio is constructed using equal portions of the six stocks listed above.

(a) Why is the expected return of such a portfolio?

(b) What would the expected return if this portfolio was increased by 40% through borrowed funds with the cost of borrowing at 12%?

21. Mr. Nirmal Kumar has categorized all the available stock in the market into the following types:

(i) Small cap growth stocks

(ii) Small cap value stocks

(iii) Large cap growth stocks

(iv) Large cap value stocks

Mr. Nirmal Kumar also estimated the weights of the above categories of stocks in the market index. Further more, the sensitivity of returns on these categories of stocks to the three important factor are estimated to be:

Category of Stocks	Weight in the Market Index	Factor I (Beta)	Factor II (Price Book)	Factor III (Inflation)
Small cap growth	25%	0.80	1.39	1.35
Small cap value	10%	0.90	0.75	1.25
Large cap growth	50%	1.165	2.75	8.65
Large cap value	15%	0.85	2.05	6.75
Risk Premium		6.85%	-3.5%	0.65%

The rate of return on treasury bonds is 4.5%

Required:

(a) Using Arbitrage Pricing Theory, determine the expected return on the market index.

(b) Using Capital Asset Pricing Model (CAPM), determine the expected return on the market index.

(c) Mr. Nirmal Kumar wants to construct a portfolio constituting only the 'small cap value' and 'large cap growth' stocks. If the target beta for the desired portfolio is 1, determine the composition of his portfolio.

Mutual Fund

22. Consider the following information about the return on Classic Mutual Fund, the market return and the T-bill returns:

Year	Classic Mutual Fund	Market Index	T-bills
1994	17.1	10.8	5.4
1995	-14.6	-8.5	6.7
1996	1.7	3.5	6.5
1997	8.0	14.1	4.3
1998	11.5	18.7	4.1
1999	-5.8	-14.5	7.0
2000	-15.6	-26.0	7.9
2001	38.5	36.9	5.8
2002	33.2	23.6	5.0
2003	-7.0	-7.2	5.3
2004	2.9	7.4	6.2
2005	27.4	18.2	10.0
2006	23.0	31.5	11.4
2007	-0.6	-4.9	14.1
2008	21.4	20.4	10.7

The following additional information is available regarding the comparative performance of five mutual funds:

	Return (%)	Standard Deviation (%)	Beta	
Alpha	1.95	20.03	0.983	0.819
Beta	11.57	18.33	0.971	0.881
Gama	8.41	22.92	1.169	0.816
Rho	9.05	24.04	1.226	0.816
Theta	7.86	15.46	0.666	0.582

From the above information, calculate all the inputs required for determining the Sharpe's Ratio, Treynor's ratio and Jensen's ratio.

Business Valuation

23. PQR Ltd. is a management consultancy firm in the industry for the last 10 year. It got listed its equity share 4 years ago at a Recognized Stock Exchange. The company has pursued a policy of aggressive growth and specializes in providing services to the entities in high technology and high growth sectors. The company has no leverage element in their capital structure and financed by equity shares of Rs.50 Crores of Rs.2 per share (par value).

    The company's result for the year ending 31 March 2009, have just announced. Profit before tax were Rs.12.66 Crores. As per Chairman cum Managing Director's statement (included in the forecast column of company's Annual Report for the year ending 31 March 2009) earnings might be expected to rise by 4% which is lower than annual rate than in the recent years. This is due to global recession especially in US Economy.

    XYZ Ltd. is another company, in the same business but has been established much longer. It sources more to traditional business sectors and its earning track record has been erratic. In most of the daily newspaper poor management have been blamed for poor performance of company and due to this stock of the company in market had lost its value for sometimes. The current earning forecast of XYZ Ltd is also 4% for the foreseeable future. The capital structure of the company consists of Rs.18 crores equity share capital of Rs.1 (par value). The Profit before tax of the company for the year ending 31 March 2009 is Rs.11.25 Crores.

    PQR Ltd. has recently approached the shareholders of XYZ Ltd with a bid of five new share in PQR Ltd for every six shares in XYZ Ltd. Otherwise shareholders can accept a cash payment @Rs.3.45 per share.

    Following the announcement of this bid, the market price of PQR Ltd. shares fell by 10% whereas the price of Shares of XYZ Ltd. rose up by 14%. The P/E ratio and dividend yield of these two companies and other two companies in same industry immediately prior to bid announcement is as follows.

Company	Share Price (Rs.)		P/E Ratio	Dividend yield (%)
	High	Low		
PQR Ltd	4.25	3.25	11	2.4
XYZ Ltd	3.50	2.85	7	3.1
LMN Ltd.	1.87	1.22	9	5.2
DEF Ltd.	2.30	1.59	16	2.4

The Corporate Tax Rate is 30%. PQR Ltd is post tax cost of equity is 13% and XYZ Ltd's cost of equity is 11%.

Evaluate, whether the proposed share-for-share offer's likely to be beneficial to shareholders in both PQR Ltd and XYZ Ltd. Please use the information and merger terms available above.

You may make appropriate assumption to forecast post merger values.

24. Write a detailed note on the Forward Rate Agreement (FRA).

25. Write Short Notes on

(i) Drawbacks of investments in Mutual Funds

(ii) ESOS and ESPS

(iii) Factoring and Bill discounting

SUGGESTED ANSWERS/HINTS

1. A limited risk speculative strategy would be the bullish call spread i.e. buy the call with strike \$0.0083 or 0.83 cents per yen and sell the call with strike \$0.0087 or 0.87cent per yen.

The initial investment would be (0.02-0.015) = 0.005 cent per yen. The breakeven spot rate would be 0.83+0.005 = 0.8350 cent per yen.

Maximum profit potential would be (0.87-0.83) – (0.02-0.015) = 0.035 cent per yen.

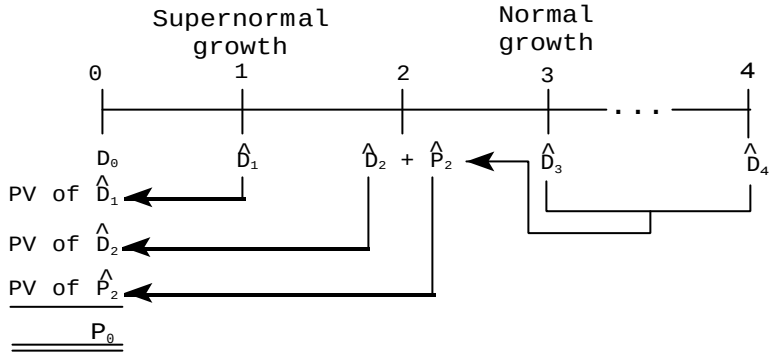
2. The correct forward price is given by

$$F(0,T) = S_0 \frac{(1+r_{US\$})^T}{(1+r_{Euro})^T} = 1.665(1.015)/(1.02) = 1.6568$$

Because the forward price is higher than the model price, we will sell the forward contract. If transaction costs could be covered, we would buy the € in the spot market at \$1.665 and sell it in the forward market at \$1.664. We would earn interest at the foreign interest rate of 2 percent. By selling it forward, we could then convert back to dollars at

the rate of \$1.664. In other words, \$1.665 would be used to buy 1 unit of the €, which would grow to 1.02 units (the 2 percent € rate). Then 1.02 € would be converted back to 1.02(\$1.664) = \$1.69728. This would be a return of \$1.69728/\$1.665 – 1 = 0.019387 or 1.94 percent, which is better than the US rate.

3. Graphical representation of the problem:



$\hat{D}_1 = D_0(1 + g_s) = £1.60(1.20) = £1.92$

$\hat{D}_2 = D_0(1 + g_s)^2 = £1.60(1.20)^2 = £2.304$

$$\hat{P}_2 = \frac{\hat{D}_3}{k_s - g_{normal}} = \frac{£2.304(1.06)}{0.10 - 0.06} = 61.06$$

$$\hat{P}_0 = PV(\hat{D}_1) + PV(\hat{D}_2) + PV(\hat{P}_2) = \frac{\hat{D}_1}{(1+k_s)^1} + \frac{\hat{D}_2 + \hat{P}_2}{(1+k_s)^2}$$

= £1.92(0.90910) + £2.304(0.82645) + £61.06(0.82645) = £54.11

Expected dividend yield: $\hat{D}_1/P_0$ = £1.92/£54.11 = 3.55%.

Capital gains yield: First, find $\hat{P}_1$, which equals the sum of the present values of $\hat{D}_2$ and $\hat{P}_2$, discounted for one year.

$$P_1 = D_2(PVIF_{10\%,1}) + \hat{P}_2(PVIF_{10\%,1})$$

$$= \frac{\$2.304 + \$61.06}{(1.10)^1} = \$57.60$$

Second, find the capital gains yield:

$$\frac{P_1 - P_0}{P_0} = \frac{\$57.60 - \$54.11}{\$54.11} = 0.0645 = 6.45\%$$

Dividend yield = 3.55%

Capital gains yield = 6.45 %

10.00% = k_s.

4. (a) M = Rs.1,000 INT = 0.095(Rs.1,000) = Rs.95N = 28 years in 2037

V_d = Rs.1,165.75

Use Equation to find the approximate yield to maturity:

$$\begin{pmatrix}\text{Approximat e}\\ \text{yield to}\\ \text{maturity}\end{pmatrix} = \frac{\text{INT} + \left(\frac{M - V_d}{N}\right)}{\left[\frac{V_d + M}{2}\right]}$$

$$= \frac{\text{Rs. } 95 + \left(\frac{\text{Rs.1,000} - \text{Rs. } 1,165.75}{28}\right)}{\left[\frac{\text{Rs .1,165 .75} + \text{Rs .1,000}}{2}\right]}$$

$$= \frac{\text{Rs. } 89.08}{\text{Rs. } 1,082.875} = 0.0822 = 8.22\%$$

5. (a) First, find the expected cash flows:

Year	Expected Cash Flows			
0	0.2(-€100,000)+	0.6(-€100,000)	+0.2(-€100,000)	=(€100,000)
1	0.2*€20,000	+0.6*€30,000	+0.2*€40,000	=€30,0000
2	0.2*€20,000	+0.6*€30,000	+0.2*€40,000	=€30,0000
3	0.2*€20,000	+0.6*€30,000	+0.2*€40,000	=€30,0000
4	0.2*€20,000	+0.6*€30,000	+0.2*€40,000	=€30,0000
5	0.2*€20,000	+0.6*€30,000	+0.2*€40,000	=€30,0000
5 (Salvage Value)	0.2(€0)	+0.6*€20,000	+0.2*€30,000	=€18,000

Next, determine the NPV based on the expected cash flows:

$$NPV = -100,000 + \frac{30,000}{(1.10)^1} + \frac{30,000}{(1.10)^2} + \frac{30,000}{(1.10)^3} + \frac{30,000}{(1.10)^4} + \frac{48,000}{(1.10)^5} = 24,900.$$

(b) For the worst case, the cash flow values from the cash flow column farthest on the left are used to calculate NPV:

$$NPV = -100{,}000 + \frac{20{,}000}{(1.10)^1} + \frac{20{,}000}{(1.10)^2} + \frac{20{,}000}{(1.10)^3} + \frac{20{,}000}{(1.10)^4} + \frac{20{,}000}{(1.10)^5} = -24{,}184$$

Here the NPV is - €24,184.

Similarly, for the best case, use the values from the column farthest on the right

$$NPV = -100{,}000 + \frac{40{,}000}{(1.10)^1} + \frac{40{,}000}{(1.10)^2} + \frac{40{,}000}{(1.10)^3} + \frac{40{,}000}{(1.10)^4} + \frac{70{,}000}{(1.10)^5} = 70{,}259$$

Here the NPV is €70,259.

If the cash flows are perfectly dependent, then the low cash flow in the first year will mean a low cash flow in every year. Thus, the probability of the worst case occurring is the probability of getting the $20,000 net cash flow in Year 1, or 20 percent. If the cash flows are independent, the cash flow in each year can be low, high, or average, and the probability of getting all low cash flows will be

$(0.2)(0.2)(0.2)(0.2)(0.2) = 0.2^5 = 0.00032 = 0.032\%$

(c) The base cash NPV is found using the most likely cash flows and is equal to $26,142. This value differs from the expected NPV of $24,900 because the Year 5 Cash flows are not symmetric. Under these conditions, the NPV distribution is a follows:

Probabilities (P)	NPV (€)	P X NPV (€)
0.2	(24,184)	(4,837)
0.6	26,142	15,685
0.2	70,259	14,052
		24,900

Thus, the expected NPV is 0.2(-€24,184) + 0.6(€26,142) + 0.2(€70,259)= €24,900. As is generally the case, the expected NPV is the same as the NPV of the expected cash flows found in Part a.

The standard deviation

Probabilities (P)	NPV (€)	NPV - Expected NPV (€)	(NPV - Expected NPV)^2 (€)	(NPV - Expected NPV)^2 P (€)
0.2	(24,184)	-49,084	2,409,239,056	481,847,811
0.6	26,142	1,242	1,542,564	925,538
0.2	70,259	45,359	2,057,438,881	411,487,776
				894,261,126

σ^2_{NPV} = €894,261,126

σ_{NPV} = $\sqrt{894,261,126}$ = €29,904

The standard deviation is €29,904:

The coefficient of variation, CV, is €29,904/€24,900=1.20.

(d) Because the project's coefficient of variation is 1.20, the project is riskier than average, and hence the project's risk-adjusted cost of capital is 10% +2% = 12% . The Project now should be evaluated by finding the NPV of the expected cash flows, as in Part a, but using a 12 percent discount rate.

$$NPV = -100,000 + \frac{30,000}{(1.12)^1} + \frac{30,000}{(1.12)^2} + \frac{30,000}{(1.12)^3} + \frac{30,000}{(1.12)^4} + \frac{48,000}{(1.12)^5} = 18,357$$

The risk-adjusted NPV is €18,357, and therefore the project should be accepted.

6. (a)

Projected net income	£2,000,000
Less projected capital investments	(800,000)
Available residual	£1,200,000
Shares outstanding	200,000

DPS =£1,200,000/200,000 shares =£6 = D_1

(b) EPS = £2,000,000/200,000 shares = £10

Payout ratio = DPS/EPS = £6/£10 = 60% or

Total dividends/NI = £1,200,000/£2,000,000 = 60%

(c) Currently, $P_0 = \frac{D_1}{K_e - g} = \frac{£6}{0.14 - 0.05} = \frac{£6}{0.09} = £66.67$

Under the former circumstances, D_1 would be based on a 20% payout on £10 EPS, or £2. With K_S = 14% and g=12%, we solve for P_0:

$$P_0 = \frac{D_1}{K_e - g} = \frac{£2}{0.14 - 0.12} = \frac{£2}{0.02} = £100$$

Although CMC has suffered a server setback, its existing assets will continue to provide a good income stream. More of these earnings should now be passed on to the shareholders, as the slowed internal growth has reduced the need for funds. However, the net result is a 33 % decrease in the value of the shares.

(d) If the payout ratio were continued at 20%, even after internal investment opportunities had declined, the price of the stock would drop to £2/(0.14-0.06) =£25 rather than to £66.67. Thus, an increase in the dividend payout is consistent with maximizing shareholder wealth.

Because of the downward-sloping IOS curve, the greater the firm's level of investment, the lower the average ROE. Thus, the more money CMC retains and invests, the lower its average ROE will be. We can determine the average ROE under different conditions as follows.

Old situation (with founder active and 20% payout):

g = (1.0-Payout ratio)(Average ROE)

12%= (1.0-0.2) (Average ROE)

Average ROE = 12%/0.8 = 15% > k_e = 14%

Note that the average ROE is 15 %, whereas the marginal ROE is presumably equal to 14 %.

New situation (with founder retired and a 60 % payout)

g = 6 %=(1.0-0.6) (ROE)

ROE=6%/0.4=15% > k_s=14%

This suggests that the new payout is appropriate and that the firm is taking on investments down to the point at which marginal returns are equal to the cost of capital.

7. (a) $WACC_P$ = [14.0%(1 - 0.35)](0.80) + 26.0%(0.20) = 12.48%

$WACC_Q$ = [12.0%(1 - 0.35)](0.50) + 22.0%(0.50) = 14.90%

$WACC_R$ = [10.0%(1 - 0.35)](0.20) + 20.0%(0.80) = 17.30%

(b) EVA = EBIT(1 - T) - (WACC x Invested capital)

EVA_P = €25,000(1 - 0.35) - (0.1248 x €100,000)

= €16,250 - €12,480

= €3,770

EVA_Q = €25,000(1 - 0.35) - (0.1490 x €100,000)

= €16,250 - €14,900

= €1,350

EVA_R = €25,000(1 - 0.35) - (0.1730 x €100,000)

= €16,250 - €17,300

= -€1,050

(c) $EVA_P > EVA_Q > EVA_R$; Thus, P Ltd. would be considered the best investment. The result should have been obvious, given that the firms have the same EBIT, but $WACC_P < WACC_Q < WACC_R$.

(d)

	P Ltd.	Q Ltd.	R Ltd.
EBIT	€25,000	€25,000	€25,000
Interest[a]	(11,200)	(6,000)	(2,000)
Taxable income	13,800	19,000	23,000
Tax (35%)	(4,830)	(6,650)	(8,050)
Net income	€ 8,970	€12,350	€14,950
Shares	6,100	8,300	10,000
EPS	€1.470	€1.488	€1.495
Stock price: P/E = 15x	€22.05	€22.32	€22.43

[a] $Interest_P$ = €100,000(0.80) x 0.14 = €11,200

$Interest_Q$ = €100,000(0.50) x 0.12 = € 6,000

$Interest_R$ = €100,000(0.20) x 0.10 = € 2,000

(e) Given the three firms have substantially different capital structures, we would expect that they also have different degrees of financial risk. Therefore, we might want to adjust the P/E ratios to account for the risk differences.

8. (a) Taxable income = Net income / (1 - 0.40)

Taxable income = (Rs.12,00,000)/(1 - 0.40) = Rs.20,00,000 = EBIT - Interest

EBIT = Taxable income + Interest

= Rs.20,00,000 + Rs.15,00,000

= Rs.35,00,000

(b) EVA = EBIT(1 - T) - (WACC X Invested capital)

= Rs.35,00,000(1 - 0.40) - (0.12 X Rs.80,00,000)

= Rs.21,00,000 - Rs.9,60,000

= Rs.11,40,000

(c) EVA dividend = (Rs.11,40,000)/500,000 = Rs.2.28.

If AAA does not pay a dividend, we would expect the value of the firm to increase because it will achieve higher growth, hence a higher level of EBIT. If EBIT is higher, then, all else equal, the value of the firm will increase. (This assumes the firm has positive NPV projects in which to invest.)

9. $d_1 = \dfrac{l_n (S/E) + (r + \dfrac{\sigma^2}{2})t}{\sigma\sqrt{t}}$

$= \dfrac{l_n (185/170) + (0.07 + \dfrac{0.18^2}{2}) 3}{0.18\sqrt{3}}$

$= \dfrac{\ln 1.0882 + (0.07 + 0.0162) 3}{0.18\sqrt{3}}$

$= \dfrac{0.08455 + 0.2586}{0.18\sqrt{3}}$

$= \dfrac{0.34315}{0.31177}$

$d_1 = 1.1006$

$d_2 = d_1 - \sigma\sqrt{t}$

$= 1.1006 – 0.31177 = 0.7888$

$N(d_1) = 0.8770$ (from table)

$N(d_2) = 0.7848$

Value of option = $V_s N(d_1) – \dfrac{E}{e^{rt}} N(d_2)$

$= 185 (0.8770) - \dfrac{170}{e^{0.21}} (0.7848)$

$= 162.245 - \dfrac{170}{1.2336} \times 0.7848$

$= 162.245 – 108.151$ = Rs.54.094

10. Total premium paid on purchasing a call and put option

= (Rs.30 per share × 100) + (Rs.5 per share × 100).

= Rs.3,000 + Rs. 500 = Rs.3,500

(i) In this case, X exercises neither the call option nor the put option

As both will result in a loss for him.

Ending value = - Rs.3,500 + zero gain

= - Rs.3,500

i.e Net loss = Rs.3,500

(ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

Total premium paid = Rs.3,500

Ending value = Rs.3,500 + Rs.[(450 – 350) × 100]

= Rs.3,500 + Rs.10,000 = Rs.6,500

Net gain = Rs.6,500

(iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

Total premium paid = Rs.3,500

Ending value = -3,500 +[(600 – 550) × 100]

Net Gain = -3,500 + 5,000 = Rs.1,500

11. (a) Steps involved in Money Market Hedge

Identify: Foreign currency is an asset. Amount $ 3,50,000.

Create: $ Liability.

Borrow: In $. The borrowing rate is 9% per annum or 2.25% per quarter.

Amount to be borrowed: 3,50,000 / 1.0225 = $ 3,42,298.29

Convert: Sell $ and buy £. The relevant rate is the Ask rate, namely, 1.5905 per £,

(Note: This is an indirect quote). Amount of £s received on conversion is £2,15,214.27 ($3,42,298.29 / $1.5905).

Invest: £ 2,15,214.27 will be invested at 5% for 3 months to get £ 2,17,904.45

Settle: The liability of $3,42,298.29 at interest of 2.25 per cent quarter matures to $3,50,000 receivable from customer.

Using forward rate, amount receivable is = $ 3,50,000 / $1.6140 = £2,16,852.54

Amount received through money market hedge = £2,17,904.45

Gain = £2,17,904.45 – £2,16,852.54 = £1,051.91

So, money market hedge is beneficial for the exporter

(b) The only thing lefts Rohit and Bros to cover the risk in the money market. The following steps are required to be taken:

(i) Borrow pound sterling for 3- months. The borrowing has to be such that at the end of three months, the amount becomes £ 500,000. Amount to be borrowed is £5,00,000/(1.0125) = £493,827

(ii) Convert the borrowed sum into rupees at the spot rate. This will give: Rs.493,827 × 56 = Rs.27,654,312

(iii) The sum thus obtained is placed in the money market at 12 per cent to obtain at the end of 3- months:

S = 27,654,312 × (1.03) = Rs.28,483,941

(iv) The sum of £500,000 received from the client at the end of 3- months is used to refund the loan taken earlier.

Suppose if £ depreciated to Rs. 55/£, then gain resulted from the money market operation will be Rs.9,83,941 (28,483,941 – 5,00,000 × 55).

If pound sterling has depreciated further in the meantime. The gain would be even bigger

12. (i) According to Purchasing Power Parity forward rate is

$$\text{Spot rate} \left[\frac{1+r_H}{1+r_F}\right]^t$$

So spot rate after one year

$$43.40 \left[\frac{1+0.065}{1+\ 0.03}\right]^1$$

= 43.40 (1.03399)

= 44.8751

After 3 years

$$43.40 \left[\frac{1+0.065}{1+0.03}\right]^3$$

= 43.40 $(1.03398)^3$

= 43.40 (1.10544)

= Rs.47.9762

(ii) As per interest rate parity

$$S_1 = S_0 \left[\frac{1+\text{in A}}{1+\text{in B}}\right]$$

$S_1 = 0.7570 \left[\frac{1+(0.075)\times 3/12}{1+(0.035)\times 3/12} \right]$

$= 0.7570 \left[\frac{1.01875}{1.00875} \right]$

$= 0.7570 \times 1.0099 = 0.7645$

S_1 = UK £0.7645 / US$

13. (i) Semi-annual fixed payment = (N) (A/c) (Period)

Where N = Notional Principal amount = Rs.5,00,000

A/c = All-in-cost = 8% = 0.08

$= 5,00,000 \times 0.08 \left(\frac{180}{360} \right)$

$= 5,00,000 \times 0.08 (0.5)$

$= 5,00,000 \times 0.04$

= Rs.20,000/-

(ii) Floating Rate Payment

$= N (LIBOR) \left(\frac{dt}{360} \right)$

$= 5,00,000 \times 0.06 \times \frac{181}{360}$

= 5,00,000 × 0.06 (0.503) or 5,00,000 × 0.06 (0.502777)

= 5,00,000 × 0.03018 or 0.30166

= Rs.15,090 or 15,083

(iii) Net Amount

= (i) – (ii)

= Rs.20,000 – Rs. 15,090 =Rs. 4,910

or = Rs.20,000 – Rs. 15,083 = Rs. 4,917

14. (i) Implicit rates for year 2 and year 3

For year 2 $f_2 = \frac{(1+r_2)^2}{1+r_1} - 1$

$$= \frac{(1.1125)^2}{(1.1050)} - 1 = 12\%$$

For year 3 $f_3 = \frac{(1+r_3)^3}{(1+r_1)(1+r_2)} - 1$

$= \frac{(1.12)^3}{(1.1050)(1.12)} - 1 = \frac{1.404928}{1.2376} - 1 = 13.52\%$

(ii) If fairly priced at Rs.1000 and rate of interest increases to 12.5% the percentage charge will be as follows:

$$\text{Price} = \frac{\text{Rs.1,000}(1.12)^5}{(1.125)^5} = \frac{\text{Rs.1762.34168}}{1.8020}$$

= 977.97 or Rs. 987

$$\% \text{ charge} = \frac{\text{Rs.1000} - \text{Rs.978}}{\text{Rs.1000}} \times 100 = \frac{\text{Rs.22}}{\text{Rs.1000}} \times 100$$

= 2.2%

15. (i) Current yield = $\frac{14}{90}$ = 0.1555 or 15.55%

YTM can be determined from the following equation

14 × PVIFA (YTM, 5) + 100 × PVIF (YTM, 5) = 90

YTM = 17.14%

(ii) The duration can be calculated as follows:

Year	Cash Flow	PV at 17.14%	Proportion of NCD value	Proportion of NCD value × time
1	14	11.952	0.1328	0.1328
2	14	10.203	0.1134	0.2268
3	14	8.710	0.0968	0.2904
4	14	7.435	0.0826	0.3304
5	114	51.685	0.5744	2.8720
		89.985		3.8524

Duration = 3.8524 years.

(iii) Realized Yield can be calculated as follows:

$$\frac{(14\times 5)+100}{(1+R)^5}=90$$

$$(1+R)^5 = \frac{170}{90}$$

$$R = \left(\frac{170}{90}\right)^{1/5} - 1 = 0.1356 \text{ or } 13.56\%$$

16. As per MM model, the current market price of equity share is:

$$P_0 = \frac{1}{1+k_e}\times(D_1+P_1)$$

(i) If the dividend is not declared :

$$100 = \frac{1}{1+0.12}(0+P_1)$$

$$100 = \frac{P_1}{1.12}\ P_1 = \text{Rs.}112$$

The Market price of the equity share at the end of the year would be Rs.112.

(ii) If the dividend is declared :

$$100 = \frac{1}{1+0.12}\times(10+P_1)$$

$$100 = \frac{10+P_1}{1.12}$$

$112 = 10 + P_1$

$P_1 = 112 - 10 = \text{Rs.}102$

The market price of the equity share at the end of the year would be Rs.102.

(iii) In case the firm pays dividend of Rs.10 per share out of total profits of Rs.5,00,000 and plans to make new investment of Rs.10,00,000, the number of shares to be issued may be found as follows:

	Rs.
Total Earnings	5,00,000
- Dividends paid	1,00,000
Retained earnings	4,00,000
Total funds required	10,00,000

Fresh funds to be raised	6,00,000
Market price of the share	102
Number of shares to be issued (Rs.6,00,000 / Rs.102)	5,882.35

or, the firm would issue 5,883 shares at the rate of Rs.102

17. Earning per share for company K. Ltd. after Merger :

Exchange Ratio 160 : 200 = 4: 5

That is 4 shares of K. Ltd. for every 5 shares of N. Ltd.

∴ Total number of shares to be issued =

$\frac{4}{5} \times 2,50,000 = 2,00,000$ shares

∴ Total number of shares of K. Ltd. and N .Ltd.

=	10,00,000	K. Ltd.
	+ 2,00,000	N. Ltd
	12,00,000	

Total profit after Tax = Rs. 50,00,000 K. Ltd.

Rs. 15,00,000 N Ltd.

Rs. 65,00,000

∴ E.P.S. (Earning per share) of K. Ltd. after Merger

$$= \text{Rs. } \frac{65,00,000}{12,00,000} = \text{Rs.5.42 Per Share}$$

(ii) To find the Exchange Ratio so that shareholders of N. Ltd. would not be at a loss:

Present Earnings per share for company K. Ltd.

$$= \frac{\text{Rs.50,00,000}}{\text{Rs.10,00,000}} = \text{Rs.5.00}$$

Present Earnings Per share for company N. Ltd.

$$= \frac{\text{Rs.15,00,000}}{\text{Rs.2,50,000}} = \text{Rs.6.00}$$

∴ Exchange Ratio should be 6 shares of K. Ltd. for every 5 shares of N Ltd.

∴ Shares to be issued to N. Ltd.

$$= \frac{2,50,000 \times 6}{5} = 3,00,000 \text{ Shares}$$

∴ Total No. of Shares of K.Ltd. and N. Ltd.

10,00,000 K. Ltd.

+ 3,00,000 N. Ltd

13,00,000

∴ E.P.S. After Merger $\frac{\text{Rs.65,00,000}}{\text{13,00,000}}$ = Rs.5.00 Per Share

Total Earnings Available to Shareholders of N. Ltd. after Merger

= Rs.3,00,000 × Rs.5.00 = Rs.15,00,000

This is equal to Earnings prior Merger for N. Ltd.

∴ Exchange Ratio on the Basis of Earnings per Share is recommended.

18. (i) Earnings per share = Earnings after tax /No. of equity shares

Fuller Plc. = £ 5,00,000/1,00,000 = £ 5

Felicy Plc. = £ 1,80,000 / 60,000 = £ 3

(ii) Number of Shares Felicy Plc.'s shareholders will get in Fuller Plc. based on market value per share = £ 28/ 42 × 60,000 = 40,000 shares

Total number of equity shares of Fuller Plc. after merger = 1,00,000 + 40,000 = 1,40,000 shares

Earnings per share after merger = £ 5,00,000 + 1,80,000 / 1,40,000 = £ 4.86

(iii) Calculation of exchange ratio to ensure shareholders of Felicy Plc. to earn the same as was before merger:

Shares to be exchanged based on EPS = (£ 3/£ 5) × 60,000 = 36,000 shares

EPS after merger = (£ 5,00,000 + 1,80,000)/1,36,000 = £ 5

Total earnings in Fuller Plc. available to shareholders of Felicy Plc. = 36,000 × £ 5 = £ 1,80,000.

Exchange ratio based on market price is beneficial to shareholders of Felicy Plc. because of higher Earnings available to them i.e. (40,000 shares × £ 4.86 = £ 194,400).

19. (i) PV of cash outflows under leasing alternative.

Year	After Tax Lease Payment	PVAF (14%, 4)	Total PV
1 – 4	Rs.5,00,000	2.913	Rs.14,56,500

(ii) Calculation of instalment payable under Buying option.

Present Value Annuity Factor at 16% for 4 years. 2.798

Value of Instalment = $\frac{\text{Rs.}50,00,000}{2.798} = \text{Rs.}17,86,990$

(iii) Calculation of Interest component in Installments and tax benefit on interest component.

(Amount in Rs.)

Period	Loan in Beginning	Loan installment	Interest @ 16%	Principal Repayment	Principal outstanding
1	50,00,000	17,86,990	8,00,000	9,86,990	40,13,010
2	40,13,010	17,86,990	6,42,082	11,44,908	28,68,102
3	28,68,102	17,86,990	4,58,896	13,28,094	15,40,008
4	15,40,008	17,86,990	2,46,982	15,40,008	Nil
			(Balancing Figure)		

(iv) Calculation of Tax benefits on interest and Depreciation.

Period	Interest	Depreciation	Total	Tax Benefit
1	8,00,000	7,50,000	15,50,000	7,75,000
2	6,42,082	7,50,000	13,92,082	6,96,041
3	4,58,896	7,50,000	12,08,896	6,04,448
4	2,46,982	7,50,000	9,96,982	4,98,491

Present value of Cash Outflow under buying alternatives

Year	Loan instalment	Tax Savings on Interest and Depreciation	Net outflow	Salvage Value	PVF (14%)	Present value
1	17,86,990	7,75,000	10,11,990	-	0.877	8,87,515
2	17,86,990	6,96,041	10,90,949	-	0.769	8,38,940
3	17,86,990	6,04,448	11,82,542	-	0.675	7,98,216
4	17,86,990	4,98,491	12,88,499	-	0.592	7,62,791
4		-	-	(20,00,000)	0.592	(11,84,000)
						21,03,462

Recommendation: The lease option is financially better.

(b) (i) Determination of Cash Flow after tax

	Rs.
Lease Rent receivable	10,00,000
Less: Depreciation	7,50,000
EBIT	2,50,000
Less: Tax @ 50%	1,25,000
EAT	1,25,000
Add: Depreciation	7,50,000
	8,75,000

(ii) Determination of NPV

Particulars	Year	Cash Flows	PVF @ 14%	Prevent Value
Purchase of computer	0	(50,00,000)	1.00	(50,00,000)
Annual Cash Inflow	1-4	8,75,000	2.914	25,49,750
Salvage Value	4	20,00,000	0.592	11,84,000
				(12,66,250)

Recommendation: The proposal is not financially viable.

(c) Let desired CFAT to earn a return of 16% is X, then

$$\text{Rs.}50,00,000 = \sum_{t=1}^{4} \frac{X}{(1+0.16)} + \frac{\text{Rs.}20,00,000}{(1+0.16)^4}$$

Rs.50,00,000 = X (2.798) + Rs.20,00,000 (0.552)

Rs.50,00,000 = 2.798 X +11,04,582

Rs.38,95,418 = 2.798 X

X = Rs.13,92,215

Thus, lease rent for IRR of 16% should be Rs.13,92,423.

20. (a) Expected return of the portfolio A and B

(i) Expected return of the portfolio A and B

E (A) = (10 + 16) / 2 = 13%

E (B) = (12 + 18) / 2 = 15%

$$Rp = \sum_{i-l}^{N} X_i R_i = 0.4(13) + 0.6(15) = 14.2\%$$

(ii) Stock A:
Variance = $0.5 (10 – 13)^2 + 0.5 (16 – 13)^2 = 9$
Standard deviation = $\sqrt{9}$ = 3%
Stock B:
Variance = $0.5 (12 – 15)^2 + 0.5 (18 – 15)^2 = 9$
Standard deviation = 3%

(iii) Covariance of stocks A and B
$Cov_{AB} = 0.5 (10 – 13) (12 – 15) + 0.5 (16 – 13) (18 – 15) = 9$

(iv) Correlation of coefficient

$$r_{AB} = \frac{Cov_{AB}}{\sigma_A \sigma_B} = \frac{9}{3 \times 3} = 1$$

(v) Portfolio Risk

$$\sigma_P = \sqrt{X^2{}_A \sigma^2{}_A + X^2{}_B \sigma^2{}_B + 2X_A X_B (\sigma_A \sigma_B \sigma_{AB})}$$

$$= \sqrt{(0.4)^2 (3)^2 + (0.6)^2 (3)^2 + 2 (0.4) (0.6) (3) (3) (1)}$$

$$= \sqrt{1.44 + 3.24 + 4.32} = 3\%$$

(b) (i)

Security	Expected Return	Beta (β)	Required Return =0.08 + 0.04β	Under Valued Security
O	0.32	1.70	0.148	UVS
P	0.30	1.40	0.136	UVS
Q	0.25	1.10	0.124	UVS
R	0.22	0.95	0.118	UVS
S	0.20	1.05	0.122	UVS
T	0.14	0.70	0.108	UVS

U

UVS = Under Valued Security

All the securities listed above are undervalued because their expected returns plot above the SML.

(ii) (a) Expected return on the portfolio

$$= \frac{1}{6} (0.32 + 0.30 + 0.25 + 0.22 + 0.20 + 0.14) = 0.2383$$

(b) Expected return on the portfolio

$R_P = XR_M – (X – 1) R_P$

$= (1.4) (0.2383) – (0.4) (0.12) = 0.33362 – 0.048 = 0.28562$

21. (a) Method I

Portfolio's return

Small cap growth = 4.5 + 0.80 x 6.85 + 1.39 x (-3.5) + 1.35 x 0.65 = 5.9925%

Small cap value = 4.5 + 0.90 x 6.85 + 0.75 x (-3.5) + 1.25 x 0.65 = 8.8525%

Large cap growth = 4.5 + 1.165 x 6.85 + 2.75 x (-3.5) + 8.65 x 0.65 = 8.478%

Large cap value = 4.5 + 0.85 x 6.85 + 2.05 x (-3.5) + 6.75 x 0.65 = 7.535%

Expected return on market index

0.10 x 8.8525 + 0.25 x 5.9925 + 0.15 x 7.535 + 0.50 x 8.478 = 7.7526%

Method II

Expected return on the market index

= 4.5% + [0.1x0.9 + 0.25x0.8 + 0.15x0.85 + 0.50x1.165] x 6.85 + [(0.75 x 0.10 + 1.39 x 0.25 + 2.05 x 0.15 + 2.75 x 0.5)] x (-3.5) + [{1.25 x 0.10 + 1.35 x 0.25 + 6.75 x 0.15 + 8.65 x 0.50)] x 0.65

= 4.5 + 6.85 + (-7.3675) + 3.77 = 7.7525%.

(a) Using CAPM,

Small cap growth = 4.5 + 6.85 x 0.80 = 9.98%

Small cap value = 4.5 + 6.85 x 0.90 = 10.665%

Large cap growth = 4.5 + 6.85 x 1.165 = 12.48%

Large cap value = 4.5 + 6.85 x 0.85 = 10.3225%

Expected return on market index

= 0.10 x 10.665 + 0.25 x 9.98 + 0.15 x 10.3225 + 0.50 x 12.45 = 11.33%

(b) Let us assume that Mr. Nirmal will invest X_1% in small cap value stock and X_2% in large cap growth stock

$X_1 + X_2 = 1$

$0.90 X_1 + 1.165 X_2 = 1$

$0.90 X_1 + 1.165(1 – X_1) = 1$

$0.90 X_1 + 1.165 – 1.165 X_1 = 1$

$0.165 = 0.265 X_1$

$\frac{0.165}{0.265} = X_1$

$0.623 = X_1$ $X_2 = 0.377$

62.3% in small cap value

37.7% in large cap growth.

22.

Classic (R_i)	Market Index (R_m)	T-bills (R_p)	$R_i - R_p$	$R_m - R_p$
17.1	10.8	5.4	11.70	5.4
-14.6	-8.5	6.7	-21.30	-15.20
1.7	3.5	6.5	-4.8	-3.00
8.0	14.1	4.3	3.7	9.8
11.5	18.7	4.1	7.4	14.6
-5.8	-14.5	7.0	-12.8	-21.5
-15.6	-26.0	7.9	-23.5	-33.9
38.5	36.9	5.8	32.7	31.1
33.2	23.6	5.0	28.2	18.6
-7.0	-7.2	5.3	-12.3	-12.5
2.9	7.4	6.2	-3.3	1.2
27.4	18.2	10.0	17.4	8.2
23.0	31.5	11.4	11.6	20.1
-0.6	-4.9	14.1	-14.7	-19.0
21.4	20.4	10.7	10.7	9.7
Average 9.406	Average 8.267	Average 7.36		
Standard Deviation 16.40	Standard Deviation 17.126	Standard Deviation 2.815		

Sharpe's measure index

$S = (R_p - R_p)/\sigma_p$

Where,

R_p = Average Return on portfolio

R_f = Risk-free rate of return

σ_p = Standard deviation of portfolio

Classic Mutual Fund- $S_p = R_p - R_f/\sigma_p = 9.407 - 7.360/16.4 = 0.125$

Market Index- $S_p = R_m - R_f/\sigma_m = 8.267 - 7.360/17.126 = 0.053$

Classic Mutual Fund is better on the basis of the Sharpe's measure.

Treynor's measure

$T = (R_p - R_f)/\beta_p$

β_p = Beta value of portfolio.

Using regression technique to fine Beta

$$b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n\bar{x}^2}$$

After making calculation by taking Market Index as (x) and Classic Mutual Fund as (y) the values are

Market Index (x)	$(x)^2$	Classic (y)	$(y)^2$	(xy)
10.8	116.64	17.1	292.41	184.68
-8.5	72.25	-14.6	213.16	124.1
3.5	12.25	1.7	2.89	5.95
14.1	198.81	8.0	64.00	112.8
18.7	349.69	11.5	132.25	215.05
-14.5	210.25	-5.8	33.64	84.1
-26.0	676.00	-15.6	243.36	405.6
36.9	1361.61	38.5	1482.25	1420.65
23.6	556.96	33.2	1102.24	783.52
-7.2	51.84	-7.0	49.00	50.4
7.4	54.76	2.9	8.41	21.46
18.2	331.24	27.4	750.76	498.68
31.5	992.25	23.0	529.00	724.5
-4.9	24.01	-0.6	0.36	2.94
20.4	416.16	21.4	457.96	436.56

$\Sigma x^2 = 5424.72$	$\bar{y} = 9.406$
$\Sigma y = 141.1$	$\bar{x} = 8.267$
$\Sigma y^2 = 5361.69$	n=15
$\Sigma xy = 5070.99.$	

Substituting values in the above equation

$$b = \frac{5070.99 - 15X9.406X8.267}{5424.72 - 15X(8.267)^2} = \frac{3904.59}{4399.57} = 0.88$$

$a = \bar{y} - b\bar{x} = 9.406 - 0.88 \times 8.267 = 2.13.$

From above calculation Beta value of security = 0.88

Treynor's measure of Classic Mutual Fund - $T_1 = 9.407 - 7.360/0.88 = 2.32$

Treynor's measure of Market Index- $T_m = 8.267 - 7.360/1.00 = 0.907$

Jensen's performance measure

$$\bar{R}_{jt} - R_{ij} = \alpha_j + \beta_j (\bar{R}_{mt} - R_{ft})$$

Where,

$\bar{R}_{jt}$ = Average return on portfolio j for period t

R_{ft} = Risk less rate of interest for period t

α_j = Intercept that measures the forecasting ability of the portfolio manager

βj = A measure of systematic risk

$\overline{R}_{mt}$ = Average return of a market portfolio for period t.

Substituting values in the above equation = 9.406 – 7.360 = α_j + 0.88 (8.267 – 7.360)

α_i = 2.046 – 0.798 = 1.248

23. Working Notes:

	PQR Ltd.	XYZ Ltd	Total
Profit before tax (Rs.crore)	12.66	11.25	23.91
Tax @ 30%	3.80	3.38	7.18
Profit After tax	8.86	7.87	16.73
No. of Shares (Crores)	25	18	40
Earning Per share (Rs.)	0.3544	0.437	0.4183
PE Ratio before Bid	11	7	
Pre Bid Price of share (Rs.)	3.90	3.06	
Market value of company (Rs. Crore)	97.50	55.08	152.058
No. of new shares (Post Bid) (Crores)	25	15	40
% of Combined Entity owned (%)	62.50	37.50	100
Value of original shareholders	95.36	57.22	152.58
Price Per share/Post Bid Price announcement	3.81	3.18	
	(95.36/25)	(57.22/18)	

Thus from above it can be said that in absence of any synergy benefit arising from such merger there will be a transfer of wealth from PQR Ltd. to XYZ Ltd. based on the terms of this offers.

In reality, the price of XYZ Ltd 5 shares is likely to be influenced by the value of cash alternative and the price that will be observed in the market is likely to be below Rs.3.45 per share.

The major question here is what will be P/E Ratio after the merger. If director of PQR Ltd. expect there own pre-bid P/E ratio to be applied to the combind earnings. In such case the market value and share price would be.

Market Value. Rs. 16.73Crores × 11 = Rs. 184.03 Crores.

$$\text{SharePrice} = \frac{\text{Rs.184.03 Crores}}{\text{40 crores}} = \text{Rs.4.60 Per share}$$

Calculation of Gain/Loss

(a) As PQR Ltd. Shareholder's have exactly the same number of shares as they did before the merger. There share would have rise by 18% as calculated below.

$$\frac{\text{RS. 4.60} - \text{Rs. 3.90}}{\text{Rs. 3.90}} \times 100$$

(b) XYZ Ltd's shareholders have five-sixth the number of their old shares. Their share value might therefore be expected to rise by 25% as calculated below.

$$\frac{\text{Rs. 3.83}^{*} - \text{Rs. 3.06}}{\text{Rs. 3.06}} \times 100$$

$$^{*} 4.60 \times \frac{5}{6}$$

The shareholders of XYZ Ltd are taking more gain from merger in share exchange because cash alternative is lower and unlikely to be accepted, although it is an assured amount. The cash offer the premium only to 12.7% calculated as follows.

$$\left(\frac{\text{Rs. 3.45} - \text{Rs. 3.06}}{\text{Rs. 3.06}} \right) \times 100 = 12.7\%$$

Alternative Method.

We can also use the Dividend Valuation Model by using Gordon's Model the price of Share of PQR Ltd. will be

$$= \frac{\text{EPS}}{\text{Ke - g}} = \frac{0.3544 \times 1.04}{13\% - 4\%} = \text{Rs. 4.09}$$

Using the same assumption the value of XYZ Ltd. would be:

$$= \frac{\text{EPS}}{\text{Ke} - \text{g}} = \frac{0.437 \times 1.04}{11\% - 4\%} = \text{Rs.6.49}$$

On the basis of above alternative model share of PQR Ltd is under valued slightly. Whereas the share of XYZ Ltd is substantially undervalued, may be market is doubtful about growth prospects due to previous disappointments. If we believe PQR Ltd.'s

forecast the PQR Ltd. are getting XYZ Ltd's share cheap and especially so if any XYZ's share holders accept the cash offer Rs. 3.45 per share

24. A forward rate agreement (FRA) is an over-the-counter version of a short interest rate future. Primarily used as an inter-bank hedging instrument in the early 1980s, its use has since spread to a number of corporates as well. Although, as an over-the-counter, off-balance-sheet instrument, volume figures can only be guessed at, the FRA is very popular method of hedging interest rate risk, and volume in various currencies must run to many billions of US dollars annually.

    A forward rate agreement is an agreement between two parties to protect themselves against future movements in interest rates. Under the contract, the two parties agree to an interest rate that applies to a notional loan or deposit of an agreed amount, which is to be drawn or placed on an agreed future date for a specified term.

    In a forward rate agreement, the bank quoting prices agrees to pay its customer (a corporate or another bank) the difference resulting from a change in LIBOR (or another reference rate) in a specified direction compared with the agreed FRA rate, based on a notional principal amount loaned for a notional period of time. Note that this can involve LIBOR either rising or falling, as the bank will quote a two-way price to cater for either requirement. If LIBOR should move the other ways the customer must pay the bank. The payment to be made in either case is the present value of the difference in the two interest rates. It is unfortunately rather confusing that a hedger who buys a future is, in theory, agreeing to lend cash at the specified rate, whereas if he buys an FRA he is agreeing (in effect) to borrow cash at the specified rate.

    Under an FRA

    - The buyer (borrower) is the party seeking to protect itself against a rise in interest rates.
    - The seller (lender) is the party seeking to protect itself against a fall in interest rates.

    In August 1985, the British Bankers Association issued standard terms and conditions which now form the usual basis for deals in US dollars, sterling, Deutschemarks, Swiss francs and yen. The Australian Bankers Association has also produced a separate set of terms and conditions for domestic Australian FRAs reflecting the dominance of bank bills (a discount instrument) as the prevailing funding arrangement in their market.

    By convention, FRA rates are quoted in terms of the time to the start and the time to the end of the notional laon period, as of now.

    The main features of the FRA as follows:

    - An FRA is a simple agreement between two parties, with details confirmed directly between themselves.
    - An FRA achieves approximately the same result as futures or forward contracts, but offers much greater flexibility. Start dates, interest periods and notional principal amount are agreed by the two parties to the contract. An FRA can therefore be exactly tailored to suit a customer's specific requirements.

- The customer agrees a future rate with a bank and at the beginning of the specific period (value date), receives or pays a cash sum representing the interest differential between the agreed rate and LIBOR. No initial or variation margins are involved.
- If the customer's view of the market changes, he can close out his FRA by taking out a reversing FRA (an equal and opposite FRA at a new price). The price of the reversing FRA will reflect the market rate for the period at the time of closing the hedge.

FRAs are widely used by corporates, especially in historically high and volatile interest rate countries, such as the UK and Australia, where FRAs are commonly used to hedge against the risk of rising interest rates by a company with a borrowing. In general, FRAs are used by corporates for the following broad purposes:

- To lock in the cost of borrowing on an existing floating-rate loan.
- To guarantee the rate of interest a company has to pay on future draw downs.
- To guarantee the interest rate earned on surplus funds for any period.

FRAs are available in any amount, generally from £500,000 or the equivalent upwards, and are now available in a broad range of currencies, including US dollars, sterling, Swiss Francs, Deutschemarks, French francs, yen, guilders and Australian dollars.

FRAs are widely quoted out to two years in Europe and US. Customers can transact for any period over one month, including 'broken' or non-standard dates. However, a customer may have to pay a wider spread for a broken-date FRA (such as 11/2 on 41/2).

Users of FRAs

1. FRAs are far more widely used than futures by corporates. Usually, this is becauses corporates, being less interest-rate sensitive on the whole than financial institutions, do not place such a high value on the facility futures offer of being in and out of the market in minutes. The forward rate agreement provides corporate treasurers with approximately the same hedging benefits of futures, but with none of the technical and administrative difficulties.
2. Banks are also heavy users of the FRA market. The most common use of FRAs by banks is to iron out mismatches in the short-term structure of their assets and liabilities. For example, let's suppose a bank found that it has £100m of lending at six months (say at an average of 14%) versus £100m of three-months deposits (say at an average of 12%). That bank would be running the risk that its healthy 2% profit margin on the first three months might be eroded over the second three by a general rise in interest rates, which would force it to rollover its borrowing at a higher rate. It might therefore consider it prudent to match its exposures but would not wish (or be able) to do so by actually restructuring its loans and deposits. Instead, it could buy a three-on-six FRA which would lock in the return it would receive over the second three months, and synthetically create a more precise match of maturities.

Bank quoting FRA prices all use the futures market to hedge themselves, calculating what proportions of the nearby and succeeding contracts to buy or sell to match their FRA positions. There is, as a result, a very close link between the futures and FRA markets.

25. (i) Drawbacks of investment in mutual funds

(a) There is no guarantee of return as some Mutual Funds may under perform and Mutual Fund Investment may depreciate in value which may even effect erosion / Depletion of principal amount

(b) Diversification may minimize risk but does not guarantee higher return.

(c) Mutual funds performance is judged on the basis of past performance record of various companies. But this can not take care of or guarantee future performance.

(d) Mutual Fund cost is involved like entry load, exit load, fees paid to Asset Management Company etc.

(e) There may be unethical Practices e.g. diversion of Mutual Fund amounts by Mutual Fund /s to their sister concerns for making gains for them.

(f) MFs, systems do not maintain the kind of transparency, they should maintain

(g) Many MF scheme are, at times, subject to lock in period, therefore, deny the market drawn benefits

(h) At times, the investments are subject to different kind of hidden costs.

(i) Redressal of grievances, if any , is not easy

(ii) ESOS and ESPS

	ESOS	ESPS
1.	Meaning	
	Employee Stock Option Scheme means a scheme under which the company grants option to employees.	Employee Stock Purchase Scheme means a scheme under which the company offers shares to employees as a part of public issue.
2.	Auditors' Certificate	
	Auditors' Certificate to be placed at each AGM stating that the scheme has been implemented as per the guidelines and in accordance with the special resolution passed.	No such Certificate is required.
3.	Transferability	
	It is not transferable.	It is transferable after lock in period.

4.	Consequences of failure	
	The amount payable may be forfeited. If the option are not vested due to non-fulfillment of condition relating to vesting of option then the amount may be refunded to the employees.	Not applicable.
5.	Lock in period	
	Minimum period of 1 year shall be there between the grant and vesting of options. Company is free to specify the lock in period for the shares issued pursuant to exercise of option.	One year from the date of allotment. If the ESPS is part of public issue and the shares are issued to employees at the same price as in the public issue, the shares issued to employees pursuant to ESPS shall not be subject to any lock in.

(iii) Factoring and Bill discounting: The main differences between Factoring and Bill discounting are:

(1) While factoring is management of book-debts, bill discounting is a sort of borrowing from commercial banks.

(2) In factoring no grace period is given, whereas in bill discounting grace period is 3 days.

(3) For factoring there is no Specific Act, whereas in case of bill discounting Negotiable Instruments Act applies.

(4) Factoring is a portfolio of complementary financial services whereas bill discounting is usually on case to case basis.

(5) In factoring the basis of financing is turnover. Whereas in bill discounting it is the security provision as well as the requirement of finance which determine the amount of financing.

(6) In factoring the risk of bad debts is passed on to the factor, whereas in bill discounting it is still retained by the business.