PAPER – 2
ADVANCED FINANCIAL MANAGEMENT

QUESTIONS

Risk Management

1. Mr. B is a rational risk taker. He takes his position in a single stock for 4 days in a week. He does not take a position on Friday to avoid weekend effect and takes position only for four days in a week i.e. Monday to Thursday. He transfers the amount on Monday morning and withdraws the balance on Friday morning. He desires to take a maximum exposure in the single stock (not the portfolio) where Value at Risk (VAR) should not exceed the balance lying in his bank account. The position by his manager, as per standing instructions, is taken on the free balance lying in the bank account in the morning on each Monday.

On Monday morning (before opening of the capital market) he has transferred an amount of ₹ 11 Crore to his bank account. A fixed deposit also matured on this Monday. The maturity amount of ₹ 63,42,560 was also credited to his account by the bank in the morning of the Monday. However, Mr. B received the intimation of the same in the evening. The bank needs a minimum balance of ₹ 1,000 all the time.

The other information with respect to stocks X and Y, which are under consideration for this week, is as under:

X		Y	
Return	Probability	Return	Probability
6	0.10	4	0.10
7	0.25	6	0.20
8	0.30	8	0.40

9	0.25	10	0.20
10	0.10	12	0.10

Based on above information, answer the following questions:

I. Available amount which can be used by Mr. B for potential exposure for 4 days on Monday morning shall be……………

   (a) ₹ 11,00,00,000

   (b) ₹ 11,63,41,560

   (c) ₹ 11,00,01,000

   (d) ₹ 11,63,42,560

II. The Z-score at a 99% confidence level for Mr. B's Value at Risk (VaR) is ……..

   (a) 1.64

   (b) 1.96

   (c) 2.33

   (d) 2.58

III. The expected return for the stocks X is ………………

   (a) 7%

   (b) 8%

   (c) 9%

   (d) 10%

IV. The expected return for the stocks Y is …………………

   (a) 7%

   (b) 8%

   (c) 9%

   (d) 10%

V. In which stock should Mr. B invest in to maximize his returns while maintaining his Value at Risk (VaR) within acceptable limits?

    (a) Stock X

    (b) Stock Y

    (c) Both stocks are equally good

    (d) Neither stock is suitable

Interest Rate Risk Management

2. P Ltd. is planning to borrow an amount of ₹ 60 crores for a period of 3 months in the coming 6 month's time from now. The current rate of interest is 9% p.a., but it is likely to go up in 6 month's time. The company wants to hedge itself against the likely increase in interest rate.

You as CFO has been asked to suggest both traditional as well as modern methods to hedge interest rate risk.

Suppose the banker of P Ltd. has quoted the following Forward Rate Agreement (FRA) rates:

3 x 6	9.10%	9.15%
6 x 9	9.20%	9.30%
9 x 12	9.35%	9.45%

Based on the above information answer the following questions:

I. Suppose if P Ltd. agrees to adopt FRA method to hedge interest rate risk then the interest rate........... shall be applicable for the same agreement.

    (a) 9.10% p.a.

    (b) 9.30% p.a.

    (c) 9.35% p.a.

    (d) 9.45% p.a.

II. Suppose if the actual rate of interest after 6 months happens to be 9.60%, then the settlement amount approximately ....

    (a) ₹ 733,855 shall be paid by P Ltd. to its Banker.

(b)   ₹ 439,453 shall be paid by P Ltd. to its Banker.

(c)   ₹ 439,453 shall be paid by Banker to P Ltd.

(d)   ₹ 733,855 shall be paid by Banker to P Ltd.

III.   Suppose if the actual rate of interest after 6 months happens to be 8.80%, then the settlement amount approximately ....

(a)   ₹ 733,855 shall be paid by P Ltd. to its Banker

(b)   ₹ 439,453 shall be paid by P Ltd. to its Banker.

(c)   ₹ 439,453 shall be paid by Banker to P Ltd.

(d)   ₹ 733,855 shall be paid by Banker to P Ltd.

IV.   Which of the following technique is not the modern technique to hedge the interest rate risk ....

(a)   Interest Rate Futures

(b)   Interest Rate Options

(c)   Interest Rate Swaps

(d)   Forward Rate Agreement

Derivatives Analysis and Valuation

3.   Mr. X, is a Senior Portfolio Manager at ABC Asset Management Company. He expects to purchase a portfolio of shares in 90 days. However, he is worried about the expected price increase in shares in coming day and to hedge against this potential price increase he decides to take a position on a 90-day forward contract on the Index. The index is currently trading at 2290. Assuming that the continuously compounded dividend yield on the same index is 1.75% and risk-free rate of interest is 4.16%, you are required to determine:

(a)   The justified forward price on this contract.

(b)   The position Mr. X should take in forward contract on the Index.

(c)   Gain/ loss on the position taken if after 28 days of the purchase of the contract the Index value stands at 2450.

(d)   Gain/ loss on the position taken if at expiration of 90 days the Index Value is 2470.

Note: Take 365 days in a year and value of $e^{0.005942} = 1.005960$, $e^{0.001849} = 1.001851$.

4. AB Ltd.'s equity shares are presently selling at a price of ₹ 500 each. An investor is interested in purchasing AB Ltd.'s shares. The investor expects that there is a 70% chance that the price will go up to ₹ 650 or a 30% chance that it will go down to ₹ 450, three months from now. There is a call option on the shares of the firm that can be exercised only at the end of three months at an exercise price of ₹ 550.

    Calculate the following:

    (i)   If the investor wants a perfect hedge, what combination of the share and option should he select?

    (ii)   Explain how the investor will be able to maintain identical position regardless of the share price.

    (iii) If the risk-free rate of return is 20% p.a. for the three months period, what is the value of the option at the beginning of the period?

    (iv)   What is the expected rate of return for the option buyer?

Business Valuation

5. ABC, a large business house is planning to sell its wholly owned subsidiary KLM. Another large business entity XYZ has expressed its interest in making a bid for KLM. XYZ expects that after acquisition the annual earning of KLM will increase by 10%.

    Following information, ignoring any potential synergistic benefits arising out of possible acquisitions, are available:

    (i)   Profit after tax for KLM for the financial year which has just ended is estimated to be ₹ 10 crore.

    (ii)   KLM's after-tax profit has an increasing trend of 7% each year and the same is expected to continue.

    (iii) Estimated post tax market return is 10% and risk-free rate is 4%. These rates are expected to continue.

    (iv)   Corporate tax rate is 30%.

	XYZ	ABC	Proxy entity for KLM in the same line of business
No. of shares	100 lakhs	80 lakhs	--
Current share price	₹ 287	₹ 375	--
Dividend pay out	40%	50%	50%
Debt: Equity at market values	1 : 2	1 : 3	1 : 4
P/E ratio	10	13	12
Equity beta	1	1. 1	1.1

Assume that gearing level of KLM to be the same as for ABC and a debt beta is zero.

You are required :

(a) To calculate appropriate cost of equity for KLM based on the data available for the proxy entity.

(b) A range of values for KLM both before and after any potential synergistic benefits to XYZ of the acquisition.

(c) Compute the market value of KLM as a part of ABC.

Note: Round off calculation up to 2 decimal and compute figure in ₹ crores.

Foreign Exchange Exposure and Risk Management

6. M/s Omega Electronics Ltd. exports air conditioners to Germany by importing all the components from Singapore. The company is exporting 2,400 units at a price of Euro 500 per unit. The cost of imported components is S$ 800 per unit. The fixed cost and other variables cost per unit are ₹ 1,000 and ₹ 1,500 respectively. The cash flows in Foreign currencies are due in six months. The current exchange rates are as follows:

₹/Euro	51.50/55
₹/S$	27.20/25

After six months the exchange rates turn out as follows:

₹/Euro	52.00/05
₹/S$	27.70/75

(A) You are required to calculate loss/gain due to transaction exposure.

(B) Based on the following additional information calculate the loss/gain due to transaction and operating exposure if the contracted price of air conditioners is ₹ 25,000 :

    (i) the current exchange rate are as follows:

₹/Euro	51.75/80
₹/S$	27.10/15

    (ii) Price elasticity of demand is estimated to be 1.5

    (iii) Payments and receipts are to be settled at the end of six months.

7. Z Ltd. importing goods worth USD 2 million, requires 90 days to make the payment. The overseas supplier has offered a 60 days interest free credit period and for additional credit for 30 days an interest of 8% per annum.

The bankers of Z Ltd offer a 30 days loan at 10% per annum and their quote for foreign exchange is as follows:

	₹
Spot 1 USD	82.50
60 days forward for 1 USD	83.40
90 days forward for 1 USD	83.90

You are required to evaluate the following options:

(i) Pay the supplier in 60 days, or

(ii) Avail the supplier's offer of 90 days credit.

Note: -

1. Consider 360 day a year.

2.   Round off calculation upto whole number except the applicable rates.

Advanced Capital Budgeting Decisions

8.   A firm has an investment proposal, requiring an outlay of ₹ 12 crore. The investment proposal is expected to have two years economic life with no salvage value. In year 1, there is a 0.7 probability that cash inflow after tax will be ₹ 7.50 crore and 0.3 probability that cash inflow after tax will be ₹ 9 crore. The probability assigned to cash inflow (after tax) for the year 2 corresponding to the year / Cash Inflow is as follows:

(₹ in crore)

The cash inflow year 1	₹ 7.50		₹ 9.00	
The cash inflow year 2	Probability		Probability	
	₹ 3.60	0.10	₹ 6.00	0.50
	₹ 4.80	0.50	₹ 7.50	0.30
	₹ 6.60	0.40	₹ 9.00	0.20

The firm uses a 15% discount rate for this type of investment.

Required:

(i)   Construct a decision tree for the proposed investment project.

(ii)   Calculate the expected net present value (NPV).

(iii) What will be the best outcome and the probability of that occurrence?

(iv)   What net present value will the project yield if worst outcome is realized and What is the probability of occurrence of this NPV?

(v)   Advice whether the project be accepted or not.

Note:

1.   15% discount factor 1 year 0.870; 2 year 0.756.

2.   Carryout all calculations in ₹ crore & round off them upto 2 decimal points.

Portfolio Management

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

Category of Stocks	Weight in the Market Index	Factor I (Beta)	Factor II (Book Price)	Factor III (Inflation)
Small cap growth	15%	0.65	1.95	1.65
Small cap value	20%	1.25	2.23	2.15
Large cap growth	15%	2.25	3.20	8.65
Large cap value	50%	1.325	2.25	9.50
Risk Premium		8.85%	-4.25%	0.80%

The rate of return on treasury bonds is 5.80%

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. Hari Kumar wants to construct a portfolio constituting only the 'small cap growth' and 'large cap value' stocks. If the target beta for the desired portfolio is 1, suggest what should be the composition of the same.

Note: Round off calculations upto 3 decimal points.

Security Valuation

10. Mr. Z will need ₹ 18,00,000 after two years for which he wants to make one-time necessary investment now. He has a choice of two types of bonds. Their details are as below:

	Bond X	Bond Y
Face value	₹ 1,000	₹ 1,000
Coupon	8% payable annually	9% payable annually
Years to maturity	1	4
Current price	₹ 964.44	₹ 909.42
Current yield	12%	12%

Advice Mr. Z whether he should invest all his money in one type of bond or he should buy both the bonds and, if so, in which quantity? Assume that there will not be any call risk or default risk.

Note: -

1. Use PVFs upto 3 decimal points.

2. While the numbers of bonds to be acquired to be rounded off, the remaining calculation shall be rounded off upto 3 decimal points.

11. Capital structure of Sun Ltd., as at 31.3.2023 was as under:

	(₹ in lakhs)
Equity share capital (₹ 100 each)	600
6% Preference share capital	300
9% Debentures	480
Reserves	240

Sun Ltd., earns a profit of ₹ 240 lakhs annually on an average before deduction of income-tax, which works out to 30%, and interest on debentures.

Normal return on equity shares of companies similarly placed is 7.2% provided:

(a) Profit after tax covers fixed interest and fixed dividends at least 3 times.*

(b) Capital gearing ratio is 0.5625.

(c) Yield on equity shares capital is calculated at 50% of profits distributed and at 5% on undistributed profits.

Sun Ltd., has been regularly paying equity dividend of 6%.

Compute the value per equity share of the company assuming that adjustment for risk premium in comparison of similarly placed company shall be made as follows:

(i) 1% for every one time of difference for Interest and Fixed Dividend Coverage.

(ii) 2% for every one time of difference for Capital Gearing Ratio.

$$* \frac{\text{PAT} + \text{Debenture Interest}}{\text{Debenture Interest} + \text{Preference Dividend}}$$

Mergers, Acquisitions and Corporate Restructuring

12. R Ltd. and S Ltd. are companies that operate in the same industry. The financial statements of both the companies for the current financial year are as follows:

Balance Sheet

Particulars	R. Ltd. (₹)	S. Ltd (₹)
Equity & Liabilities		
Shareholders Fund		
Equity Capital (₹ 10 each)	20,00,000	16,00,000
Retained earnings	4,00,000	-
Non-current Liabilities		
16% Long term Debt	10,00,000	6,00,000
Current Liabilities	14,00,000	8,00,000
Total	**48,00,000**	**30,00,000**

Assets		
Non-current Assets	20,00,000	10,00,000
Current Assets	28,00,000	20,00,000
Total	**48,00,000**	**30,00,000**

Income Statement

	Particulars	R. Ltd. (₹)	S. Ltd. (₹)
A.	Net Sales	69,00,000	34,00,000
B.	Cost of Goods sold	55,20,000	27,20,000
C.	**Gross Profit (A-B)**	13,80,000	6,80,00
D.	Operating Expenses	4,00,000	2,00,000
E.	Interest	1,60,000	96,000
F.	**Earnings before taxes [C-(D+E)]**	8,20,000	3,84,000
G.	Taxes @ 35%	2,87,000	1,34,400
H.	Earnings After Tax (EAT)	5,33,000	2,49,600

Additional Information:

No. of equity shares	2,00,000	1,60,000
Dividend payment Ratio (D/P)	20%	30%
Market price per share	₹ 50	₹ 20

Assume that both companies are in the process of negotiating a merger through exchange of Equity shares:

You are required to:

(i) Decompose the share price of both the companies into EPS & P/E components. Also segregate their EPS figures into Return On Equity (ROE) and Book Value/Intrinsic Value per share components.

(ii) Estimate future EPS growth rates for both the companies.

(iii) Based on expected operating synergies, R Ltd. estimated that the intrinsic value of S Ltd. Equity share would be ₹ 25 per share on its acquisition. You are required to develop a range of justifiable

Equity Share Exchange ratios that can be offered by R Ltd. to the shareholders of S Ltd. Based on your analysis on parts (i) and (ii), would you expect the negotiated terms to be closer to the upper or the lower exchange ratio limits and why?

International Financial management

13. A proposed foreign investment involves creation of a plant with an annual output of 1 million units. The entire production will be exported at a selling price of USD 10 per unit. At the current rate of exchange dollar cost of local production equals to USD 6 per unit. Dollar is expected to decline by 10% or 15%. The change in local cost of production and probability from the expected current level will be as follows:

Decline in value of USD (%)	Reduction in local cost of production (USD/ unit)	Probability
0	-	0.40
10	0.30	0.40
15	0.15 Additional Reduction	0.20

The plant at the current rate of exchange will have a depreciation of USD 1 million annually. Assume local Tax rate as 30%.

You are required to find out:

(i) Annual Cash Flow After Tax (CFAT) under all the different scenarios of exchange rate.

(ii) Expected value of CFAT assuming no repatriation of profits.

(iii) Viability of the investment proposal assuming an initial investment of USD 25 million on plant and working capital with a required rate of return of 11% on investment and on the basis of CFAT arrived under option (ii). The CFAT will grow @ 3% per annum in perpetuity.

Theoretical Questions

14. "Securities are created by dividing the cash flows associated with underlying securities into two or more new securities". Explain the instruments & its types.

15. Explain the various technique explicitly does not involve transaction costs and can be used to offset the foreign exchange exposure completely or partially.

✅ SUGGESTED ANSWERS/HINTS

1.   **I**   **(b)**

      II   **(c)**

      III   **(b)**

      IV   **(b)**

      V   **(a)**

2.   **I**   **(b)**

      II   **(c)**

      III   **(a)**

      IV   **(d)**

3.   (a)   The Forward Price shall be = $S_0 e^{n(r-y)}$

           Where S_0 = Spot price   n = period

           r = risk free rate of interest   y = dividend yield

           Accordingly,

           Forward Price = $2290\, e^{90/365(0.0416 - 0.0175)}$

           = $2290\, e^{0.005942}$

           = 2290(1.005960)

           = 2303.65

      (b)   Mr. X shall take long position in the Forward Contract on Index.

      (c)   Gain/loss on Long Position after 28 days

           = $2450 - 2290\, e^{(0.0416 - 0.0175)28/365}$

= 2450 − 2290 $e^{0.001849}$

= 2450 − 2290(1.001851)

= 2450 − 2294.24

= 155.76

(d) Gain/loss on Long Position at maturity

= $S_n − S_0 e^{n(r − y)}$

= 2470.00 − 2303.65

= 166.35

4. (i) To compute perfect hedge we shall compute Hedge Ratio (Δ) as follows:

$$\Delta = \frac{C_1 - C_2}{S_1 - S_2} = \frac{100 - 0}{650 - 450} = \frac{100}{200} = 0.50$$

The investor should purchase 0.50 share for shortening every 1 call option

Or, the investor should purchase 1 share for shortening every 2 Call Option.

(ii) How the investor will be able to maintain his position if he purchase 0.50 share for 1 call option written.

(a) If price of share goes upto ₹ 650 then value of purchased share will be:

Sale Proceeds of Investment (0.50 x ₹ 650)	₹ 325
Loss on account of Short Position (₹ 650 – ₹ 550)	₹ 100
	₹ 225

(b) If price of share comes down to ₹ 450 then value of purchased share will be:

Sale Proceeds of Investment (0.50 x ₹ 450)   ₹ 225

(iii) The Value of Option, say, P at the beginning of the period shall be computed as follows:

(₹ 250 − P) 1.05 = ₹ 225

₹ 262.50 − 1.05P = ₹ 225

₹ 37.5 = 1.05P

P = ₹ 35.71

(iv) Expected Return on the Option

Expected Option Value = (₹ 650 − ₹ 550) × 0.70 + ₹ 0 × 0.30 = ₹ 70

Expected Rate of Return = $\dfrac{70 - 35.71}{35.71} \times 100 = 96.02\%$

5. **(a)** To calculate cost of equity for KLM first we shall calculate β of KLM as follows:

β (equity ungeared for the proxy company) = 1.1 X 4 / [4 + (1 − 0.3)] = 0.94

0.94 = β equity geared X 3/ [3 + (1 - 0.3)]

β equity geared = 1.16

Cost of equity   = 0.04 + 1.16 X (0.10 − 0.04)

= 10.96%

(b) Based on the data available range of valuation can be computed using P/E   and dividend-based valuation approach.

(i) P/E valuation

(Based on earning of ₹ 10 Crore)

	Using proxy entity's P/E	**Using XYZ's P/E**
Pre synergistic value	= 12 X ₹ 10 Crore = ₹ 120 Crore	= 10 X ₹ 10 Crore = ₹ 100 Crore
Post synergistic value	= 12 X ₹ 10 Crore X 1.1 = ₹ 132 Crore	= 10 X ₹ 10 Crore X 1.1 = ₹ 110 Crore

(ii) Divided valuation model

	Based on 50% pay-out	Based on 40% pay-out
Pre synergistic value	$= \frac{0.5 \times 10 \times 1.07}{0.1096 - 0.07}$ = ₹ 135.10 Crore	$= \frac{0.4 \times 10 \times 1.07}{0.1096 - 0.07}$ = ₹ 108.08 Crore
Post synergistic value	$= \frac{0.5 \times 10 \times 1.1 \times 1.07}{0.1096 - 0.07}$ = ₹ 148.61 Crore	$= \frac{0.4 \times 10 \times 1.1 \times 1.07}{0.1096 - 0.07}$ = ₹ 118.89 Crore

Range of valuation

	P/E Based	Dividend Based
Pre synergistic	₹ 100 Crore	₹ 135.10
Post synergistic	₹ 110 Crore	₹ 148.61

(c) Market Price

Although no information is available about the value of KLM, it may be possible to calculate a market value based on proportion of earnings of ABC that is generated by KLM.

Market value of ABC = 80 Lakh Shares X ₹ 375 = ₹ 300 Crore

Post-tax earnings of ABC = ₹ 300 crore/13 = ₹ 23.08 Crore

If market value of ABC is allocated to KLM in the proportion of relative earning of KLM to that of ABC, KLM would have a market value of ₹ 300 crore X [10/23.08] = ₹ 129.98 Crore.

KLM's Post Tax earning = ₹ 10 Crore.

If ABC's P/E ratio is applied to it, the market value of KLM becomes ₹ 10 Crore X 13 = ₹ 130 Crore.

6. (i) Profit at current exchange rates

2400 [€ 500 × ₹ 51.50 – (S$ 800 × ₹ 27.25 + ₹ 1,000 + ₹ 1,500)]

2400 [₹ 25,750 - ₹ 24,300] = ₹ 34,80,000

Profit after change in exchange rates

2400[€500× ₹ 52 – (S$ 800 × ₹ 27.75 + ₹ 1000 + ₹ 1500)]

2400[₹ 26,000 - ₹ 24,700] = ₹ 31,20,000

Loss due to Transaction Exposure

₹ 34,80,000 – ₹ 31,20,000 = ₹ 3,60,000

(ii) Profit based on new spot exchange rates

2400[₹ 25,000 - (800 × ₹ 27.15 + ₹ 1,000 + ₹ 1,500)]

2400[₹ 25,000 - ₹ 24,220] = ₹ 18,72,000

Profit after change in exchange rates at the end of six months

2400 [₹ 25,000 - (800 × ₹ 27.75 + ₹ 1,000 + ₹ 1,500)]

2400 [₹ 25,000 - ₹ 24,700] = ₹ 7,20,000

Decline in profit due to Transaction Exposure

₹ 18,72,000 - ₹ 7,20,000 = ₹ 11,52,000

Current price of each unit in € = $\dfrac{₹\ 25,000}{₹\ 51.50}$ = € 485.44

Price after change in Exch. Rate = $\dfrac{₹\ 25,000}{₹\ 51.75}$ = € 483.09

Change in Price due to change in Exch. Rate

€ 485.44 - € 483.09 = € 2.35 or (-) 0.48%

Price elasticity of demand = 1.5

Increase in demand due to fall in price   0.48 × 1.5 = 0.72%

Size of increased order = 2400 ×1.0072 = 2417 units

Profit = 2417 [₹ 25,000 – (800 × ₹ 27.75 + ₹ 1,000 + ₹ 1,500)]

= 2417 [₹ 25,000 - ₹ 24,700] = ₹ 7,25,100

Therefore, decrease in profit due to Operating Exposure

₹ 18,72,000 – ₹ 7,25,100 = ₹ 11,46,900

Alternatively, if it is assumed that Fixed Cost shall not be changed with change in units then answer will be as follows:

Fixed Cost = 2400[₹ 1,000] = ₹ 24,00,000

Profit = 2417 [₹ 25,000 − (800 × ₹ 27.75 + ₹ 1,500)] − ₹ 24,00,000

= 2417 (₹ 1,300) − ₹ 24,00,000 = ₹ 7,42,100

Therefore, decrease in profit due to operating exposure ₹ 18,72,000 − ₹ 7,42,100 = ₹ 11,29,900

**7. (i) Pay the supplier in 60 days**

If the payment is made to supplier in 60 days, the applicable forward rate for 1 USD	₹ 83.40
Payment Due	USD 2,000,000
Outflow in Rupees (USD 2000000 × ₹ 83.40)	₹ 16,68,00,000
Add: Interest on loan for 30 days@10% p.a.	₹ 13,90,000
Total Outflow in ₹	₹ 16,81,90,000

(ii) Availing supplier's offer of 90 days credit

Amount Payable	USD 2,000,000
Add: Interest on credit period for 30 days @ 8% p.a.	USD 13,333
Total Outflow in USD	USD 2,013,333
Applicable forward rate for 1 USD	₹ 83.90
Total Outflow in ₹ (USD 2,013,333 × ₹ 83.90)	₹16,89,18,639

Advise: Alternative 1 is better as it entails lower cash outflow.

8. (i) The decision tree diagram is presented in the chart, identifying various paths and outcomes, and the computation of various paths/outcomes and NPV of each path are presented in the following tables:
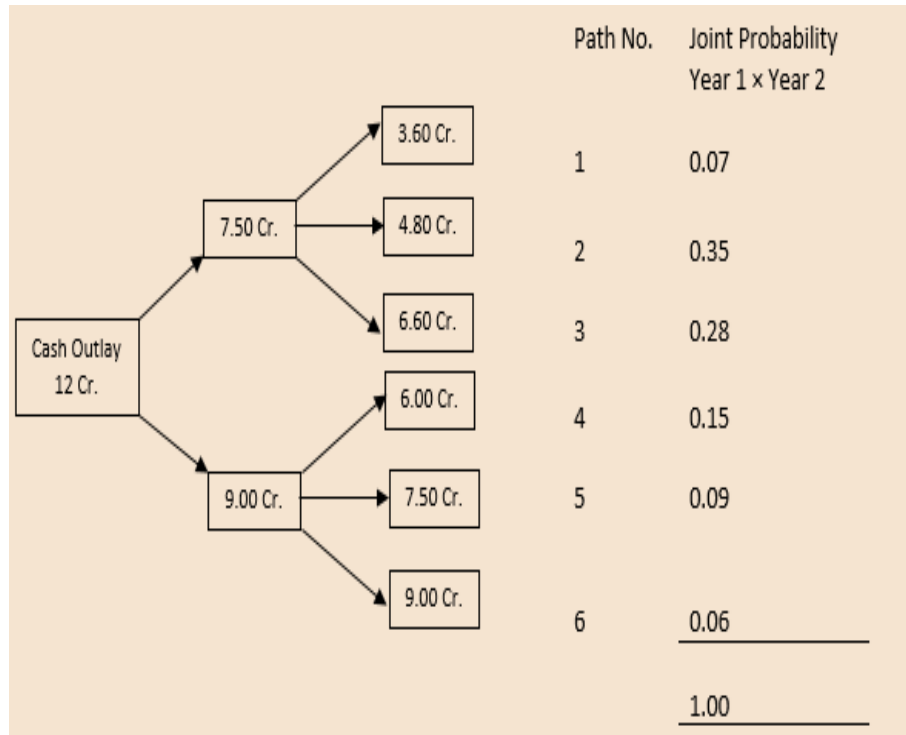
(ii) The Net Present Value (NPV) of each path at 15% discount rate is given below:

(₹ in crore)

Path	Year 1 Cash Flows (₹)	Year 2 Cash Flows (₹)	Total Cash Inflows (PV) (₹)	Cash Outflows (₹)	NPV (₹)
1.	7.50 × 0.870 = 6.53	3.60 × 0.756 = 2.72	9.25	(12)	(-) 2.75
2.	6.53	4.80 × 0.756 = 3.63	10.16	(12)	(-) 1.84
3.	6.53	6.60 × 0.756 = 4.99	11.52	(12)	(-)0.48
4.	9.00 × 0.870 = 7.83	6.00 × 0.756 = 4.54	12.37	(12)	0.37
5.	7.83	7.50 × 0.756 = 5.67	13.50	(12)	1.50
6.	7.83	9.00 × 0.756 = 6.80	14.63	(12)	2.63

Statement showing Expected Net Present Value

(₹ in crore)

Path	NPV (₹)	Joint Probability	Expected NPV (₹)
1	(-) 2.75	0.07	(-) 0.19
2	(-) 1.84	0.35	(-) 0.64
3	(-) 0.48	0.28	(-) 0.13
4	0.37	0.15	0.06
5	1.50	0.09	0.14
6	2.63	0.06	0.16
			(-) 0.60

(iii) The best outcome will be path 6 when the NPV is at ₹ 2.63 crore. The probability of occurrence of this NPV is 6% and hence expected NPV of ₹ 0.16 crore

(iv) If the worst outcome is realized the project will yield NPV of Negative ₹ 2.75 crore. The probability of occurrence of this NPV is 7% and hence Negative NPV of ₹ 0.19 crore (path 1).

(v) The project should not be accepted because the expected NPV is negative ₹ 0.60 crore based on joint probability.

9. **(a)** Stock's return

Small cap growth = 5.80 + 0.65 × 8.85 + 1.95 × (-4.25) + 1.65 × 0.80 = 4.585

Small cap value = 5.80 + 1.25 × 8.85 + 2.23 × (-4.25) + 2.15 × 0.80 = 9.105

Large cap growth = 5.80 + 2.25 × 8.85 + 3.2 × (-4.25) + 8.65 × 0.80 =19.033

Large cap value = 5.80 + 1.325 × 8.85 + 2.25 × (-4.25) + 9.50 × 0.80 =15.564

<u>Expected return on market index</u>

0.15 x 4.585 + 0.20 x 9.105 + 0.15 x 19.033 + 0.50 x 15.564 = 13.145%

Alternatively, it can also be calculated as follows: -

= 5.80 + [0.65 × 0.15 + 1.25 × 0.2 + 2.25 × 0.15 + 1.325 × 0.5] x 8.85 + [1.95 × 0.15 + 2.23 × 0.2 + 3.2 × 0.15 + 2.25 × 0.5] x (-4.25) + [1.65 × 0.15+2.15 × 0.2+8.65 × 0.15 + 9.5 × 0.5] x 0.8

= 5.80 + 11.925 + (-9.960) + 5.38 = 13.145%

(b) Using CAPM,

Small cap growth = 5.80 + 0.65 × 8.85 = 11.553%

Small cap value   = 5.80 + 1.25 × 8.85 = 16.863%

Large cap growth = 5.80 + 2.25 × 8.85 = 25.713%

Large cap value   = 5.80 + 1.325 × 8.85 = 17.526%

Expected return on market index

= 0.15 x 11.553 + 0.20 x 16.863 + 0.15 x 25.713 + 0.50 x 17.526 = 17.726%

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

$X_1 + X_2 = 1$

$0.65 X_1 + 1.325 X_2 = 1$

$0.65 X_1 + 1.325(1 - X_1) = 1$

$0.65 X_1 + 1.325 - 1.325 X_1 = 1$

$0.325 = 0.675 X_1$

$\dfrac{0.325}{0.675} = X_1$

Hence, $0.481 = X_1$ & $X_2 = 0.519$

Accordingly, 48.10% of fund should be invested in small cap growth category of stocks and balance 51.90% of funds should be invested in large cap value stocks.

10. To decide in which bond Mr. Z should invest, we shall compute duration of each bond as follows:

Duration of Bond X

Year	Cash flow	P.V. @ 12%		Proportion of bond value	Proportion of bond value x time (years)
1	1,080	0.893	964.44	1.000	1.000

Duration of the Bond is 1 year.

Duration of Bond Y

Year	Cash flow	P.V. @ 12%		Proportion of bond value	Proportion of bond value x time (years)
1	90	0.893	80.37	0.089	0.089
2	90	0.797	71.73	0.079	0.158
3	90	0.712	64.08	0.070	0.210
4	1,090	0.636	693.24	0.762	3.048
			909.42	1.000	3.505

Thus, duration of the Bond is 3.505 years.

Alternatively, it can also be computed as follows:

Year	Cash Flow	PVF @12%	Present Value (PV)	Year × PV
1	90	0.893	80.37	80.37
2	90	0.797	71.73	143.46
3	90	0.712	64.08	192.24
4	1090	0.636	693.24	2772.96
			909.42	3189.03

Duration $= \dfrac{3189.03}{909.42} = 3.507$

Let x_1 be the investment in Bond X and therefore investment in Bond Y shall be $(1 - x_1)$. Since the required duration is 2 years the proportion of investment in each of these two securities shall be computed as follows:

$2 = x_1 + (1 - x_1)\ 3.505$ or $2 = x_1 + (1 - x_1)\ 3.507$

$x_1 = 0.60$

Accordingly, the proportion of investment shall be 60% in Bond X and 40% in Bond Y respectively.

Amount of investment

Bond X	Bond Y
PV of ₹ 18,00,000 for 2 years @ 12% x 60%	PV of ₹ 18,00,000 for 2 years @ 12% x 40%
= ₹ 18,00,000 (0.797) x 60%	= ₹ 18,00,000 (0.797) x 40%
= ₹ 8,60,760	= ₹ 5,73,840
No. of Bonds to be purchased	No. of Bonds to be purchased
= ₹ 8,60,760 /₹ 964.44 = 892.50 i.e. Thus, 893 bonds	= ₹ 5,73,840 /₹ 909.42 = 631 i.e. Thus, 631 bonds

Note:

(i) The investor has to keep the money invested for two years. Therefore, the investor can invest in both the bonds with the assumption that Bond X will be reinvested for another one year on same returns.

(ii) Further, in the above computation, Modified Duration can also be used instead of   Duration.

11. **(a)** **Calculation of Profit after tax (PAT)**

	₹
Profit before interest and tax (PBIT)	2,40,00,000
Less: Debenture interest (₹ 4,80,00,000 × 9/100)	43,20,000
Profit before tax (PBT)	1,96,80,000
Less: Tax @ 30%	59,04,000
Profit after tax (PAT)	1,37,76,000
Less: Preference Dividend	

(₹ 3,00,00,000 × 6/100)	18,00,000	
Equity Dividend (₹ 6,00,00,000 × 6/100)	<u>36,00,000</u>	<u>54,00,000</u>
Retained earnings (Undistributed profit)		<u>83,76,000</u>

Calculation of Interest and Fixed Dividend Coverage

$$= \frac{PAT + Debenture\ interest}{Debenture\ interest + Preference\ dividend}$$

$$= \frac{1,37,76,000 + 43,20,000}{43,20,000 + 18,00,000}$$

$$= \frac{1,80,96,000}{61,20,000} = 2.96\ times$$

(b) Calculation of Capital Gearing Ratio

$$Capital\ Gearing\ Ratio = \frac{Fixed\ charges\ bearing\ funds}{Equity\ shareholders'\ funds}$$

$$= \frac{Preference\ Share\ Capital + Debentures}{Equity\ Share\ Capital + Reserves} =$$

$$\frac{3,00,00,000 + 4,80,00,000}{6,00,00,000 + 2,40,00,000}$$

$$= \frac{7,80,00,000}{8,40,00,000} = 0.93$$

(c) Calculation of Yield on Equity Shares:

Yield on equity shares is calculated at 50% of profits distributed and 5% on undistributed profits:

	(₹)
50% on distributed profits (₹ 36,00,000 × 50/100)	18,00,000
5% on undistributed profits (₹ 83,76,000 × 5/100)	<u>4,18,800</u>
Yield on equity shares	<u>22,18,800</u>

$$\text{Yield on equity shares \%} = \frac{\text{Yield on shares}}{\text{Equity share capital}} \times 100$$

$$= \frac{22,18,800}{6,00,00,000} \times 100 = 3.70\%$$

Calculation of Expected Yield on Equity shares

(a) Interest and fixed dividend coverage of Sun Ltd. is 2.96 times but the industry average is 3 times. Therefore, risk premium is added to Sun Ltd. Shares @ 1% for every 1 time of difference.

Risk Premium = 3.00 – 2.96 (1%) = 0.04 (1%) = 0.04%

(b) Capital Gearing ratio of Sun Ltd. is 0.93 but the industry average is 0.5625 times. Therefore, risk premium is added to Sun Ltd. shares @ 2% for every 1 time of difference.

Risk Premium = (0.5625 – 0.93) (2%) = 0.37 (2%) = 0.74%

	(%)
Normal return expected	7.20
Add: Risk premium for low interest and fixed dividend coverage	0.04
Add: Risk premium for high interest gearing ratio	0.74
	7.98

Value of Equity Share

$$= \frac{\text{Actual yield}}{\text{Expected yield}} \times \text{Paid-up value of share} = \frac{3.70}{7.98} \times 100 = ₹ 46.37$$

12. (i) Determination of EPS, P/E Ratio, ROE and BVPS of R Ltd. & S Ltd.

	R Ltd.	S Ltd.
EAT (₹)	5,33,000	2,49,600
N	200000	160000
EPS (EAT÷N)	2.665	1.56
Market Price Per Share	50	20
PE Ratio (MPS/EPS)	18.76	12.82

Equity Fund (Equity Value)	2400000	1600000
BVPS (Equity Value ÷ N)	12	10
ROE (EAT÷ EF) or	0.2221	0.156
ROE (EAT ÷ EF) x 100	22.21%	15.60%

(ii)   Determination of Growth Rate of EPS of R Ltd.& S Ltd.

	R Ltd.	S Ltd.
Retention Ratio (1-D/P Ratio)	0.80	0.70
Growth Rate (ROE x Retention Ratio) or	0.1777	0.1092
Growth Rate (ROE x Retention Ratio) x 100	17.77%	10.92%

(iii) Justifiable equity share exchange ratio

(a)   Market Price Based = MPS_S/MPS_R = ₹ 20/ ₹ 50 = 0.40:1 (lower l

(b)   Intrinsic Value Based = ₹ 25/ ₹ 50 = 0.50:1 (max. limit)

Since R Ltd. has higher EPS, PE, ROE and higher growth expectations the negotiated term would be expected to be closer to the lower limit, based on existing share price.

13. (i)   Calculation of Annual CFAT

	Scenario 1	Scenario 2	Scenario 3
Annual Sales (in units) (A)	10,00,000	10,00,000	10,00,000
	US $	US $	US $
Selling price p.u.	10.00	10.00	10.00
Cost p.u.	6.00	5.70	5.55
Profit p.u. (B)	4.00	4.30	4.45
Total Profit (A x B)	40,00,000	43,00,000	44,50,000
Less: Depreciation	10,00,000	9,00,000	8,50,000
PBT	30,00,000	34,00,000	36,00,000

Less: Tax @30%	9,00,000	10,20,000	10,80,000
PAT	21,00,000	23,80,000	25,20,000
Add: Depreciation	10,00,000	9,00,000	8,50,000
Expected CFAT (US$)	31,00,000	32,80,000	33,70,000

(ii)　Expected value of CFAT

= US$ 31,00,000 x 0.4 + US$ 32,80,000 x 0.4 + US$ 33,70,000 x 0.2

= US$ 32,26,000

(iii)　Viability of Proposal:

Expected CFAT　= US $ 32,26,000

Expected Growth Rate = 3%

Expected Value of inflow in perpetuity $= \dfrac{US\$32,26,000(1.03)}{0.11-0.03}$

$= \dfrac{33,22,780}{0.08}$ = US$ 4,15,34,750

	US $
Value of Inflows	4,15,34,750
Less: Initial Outlay	2,50,00,000
NPV of project	1,65,34,750

Since NPV is positive, project is viable.

14.　Stripped Securities are created by dividing the cash flows associated with underlying securities into two or more new securities. Those two securities are as follows:

(i)　Interest Only (IO) Securities

(ii)　Principle Only (PO) Securities

As each investor receives a combination of principal and interest, it can be stripped into two portion of Interest and Principle.

Accordingly, the holder of IO securities receives only interest while PO security holder receives only principal. Being highly volatile in nature these securities are less preferred by investors.

In case yield to maturity in market rises, PO price tends to fall as borrower prefers to postpone the payment on cheaper loans. Whereas if interest rate in market falls, the borrower tends to repay the loans as they prefer to borrow fresh at lower rate of interest.

In contrast, value of IO's securities increases when interest rate goes up in the market as more interest is calculated on borrowings.

However, when interest rate due to prepayments of principals, IO's tends to fall.

Thus, from the above, it is clear that it is mainly perception of investors that determines the prices of IOs and POs

15. Internal Techniques are those techniques explicitly do not involve transaction costs and can be used to completely or partially offset the exposure. These techniques can be further classified as follows:

    (i) **Invoicing in Domestic Currency:** Sellers usually wish to sell in their own currency or the currency in which they incur cost. This avoids foreign exchange exposure but buyers' preferences may be for other currencies. Many markets, such as oil or aluminum, in effect require that sales be made in the same currency as that quoted by major competitors, which may not be the seller's own currency. In a buyer's market, sellers tend increasingly to invoice in the buyer's ideal currency. The closer the seller can approximate the buyer's aims, the greater chance he or she has to make the sale.

    (ii) **Leading and Lagging:** Leading and Lagging refer to adjustments at the time of payments in foreign currencies. Leading is the payment before due date while lagging is delaying payment post the due date. These techniques are aimed at taking advantage of expected devaluation and/or revaluation of relevant currencies. Lead and lag payments are of special importance in the event that forward contracts remain inconclusive. When we take reverse the example-revaluation expectation- it could be attractive for lagging.

    (iii) **Netting:** Netting involves associated companies, which trade with each other. The technique is simple. Group companies merely settle inter affiliate indebtedness for the net amount owing. Gross

intra-group trade, receivables and payables are netted out. The simplest scheme is known as bilateral netting and involves pairs of companies. Each pair of associates nets out their own individual positions with each other and cash flows are reduced by the lower of each company's purchases from or sales to its netting partner. Bilateral netting involves no attempt to bring in the net positions of other group companies.

(iv) **Matching:** Although netting and matching are terms which are frequently used interchangeably, there are distinctions. Netting is a term applied to potential flows within a group of companies whereas matching can be applied to both intra-group and to third-party balancing.

(v) **Price Variation:** Price variation involves increasing selling prices to counter the adverse effects of exchange rate change. This tactic raises the question as to why the company has not already raised prices if it is able to do so. In some countries, price increases are the only legally available tactic of exposure management.

(vi) **Asset and Liability Management:** This technique can be used to manage balance sheet, income statement or cash flow exposures. Concentration on cash flow exposure makes economic sense but emphasis on pure translation exposure is misplaced. Hence, our focus here is on asset liability management as a cash flow exposure management technique.