

## PAPER – 2 : ADVANCED FINANCIAL MANAGEMENT

---

Question No.1 is compulsory.

Candidates are also required to answer any **four** from the remaining **five** questions.

Working notes should form part of the respective answer.

### Question 1

- (a) An investor is holding 1,000 shares of X Ltd., Current Year dividend rate is ₹ 3 per share. Market price of the share is ₹35 each. The investor is concerned about several factors which are likely to change during the next financial year as indicated below:

Particulars	Current Year	Next Financial Year
Dividend paid / anticipated per share (₹)	3.00	3.25
Risk Free Rate	11%	12%
Market Risk Premium	4%	5%
Beta Value	1.5	1.6
Expected growth	8%	10%

Advise the investor to take further action, whether to BUY, HOLD or SELL the shares, based on the above information. **(6 Marks)**

- (b) Mr. Kar has invested in three mutual fund schemes as per details below:

	MFX	MFY	MFZ
Amount of investment (₹)	5,50,000	4,20,000	1,00,000
Dividend received up to 31.03.2023 (₹)	10,000	6,000	Nil
NAV as on 31.03.2023 (₹)	11.50	11.00	9.50
Effective yield p.a. as on 31.03.2023	19.345%	22.59%	-36.50%
Holding period	120 days	100 days	50 days

You are required to calculate Net Asset Value (NAV) at the time of purchase assuming 365 days in a year. **(4 Marks)**

- (c) "The starting point of an organisation is money and the end point of that organization is also money". Explain the statement to clearly understand this interface of strategic management and financial policy. **(4 Marks)**

**Answer**

- (a) On the basis of existing and revised factors, rate of return and price of share is to be calculated.

Existing rate of return

$$= R_f + \text{Beta} (R_m - R_f)$$

$$= 11\% + 1.5 (4\%) = 17.00\%$$

Revised rate of return

$$= 12\% + 1.6 (5\%) = 20.00\%$$

Price of share (original)

$$P_o = \frac{D (1 + g)}{K_e - g} = \frac{3 (1.08)}{0.17 - 0.08} = \frac{3.24}{0.09} = ₹ 36.00$$

Price of share (Revised)

$$P_o = \frac{3.25 (1.10)}{0.20 - 0.10} = \frac{3.575}{0.10} = ₹ 35.75$$

**Advice-** As the existing market price of the share is ₹ 35, Current Equilibrium Price of the share ₹ 36 and Revised Price ₹ 35.75 are almost equal. Under this situation investor should hold the share.

- (b)

	<b>MFX</b>	<b>MFY</b>	<b>MFZ</b>
<b>A.</b> Amt. of Investment	550,000	420,000	1,00,000
<b>B.</b> Effective Yield p.a.	19.345%	22.59%	-36.50%
<b>C.</b> Period of Holding	120 Days	100 Days	50 days
<b>D.</b> Return for Holding Period	34,980	25,993.97	- 5000
<b>E.</b> Dividend Received	10,000	6,000	-

<b>F.</b> Total Gain in NAV( <b>D - E</b> )	24,980	19993.97	-5,000
<b>G.</b> Total NAV at End of Holding Period ( <b>A + F</b> )	5,74,980	4,39,993.97	95,000
<b>H.</b> NAV (p.u.) as on 31.3.23	11.50	11.00	9.50
<b>I.</b> No. of Units ( <b>G/H</b> )	49,998.26	39,999.45	10,000
<b>J.</b> NAV (p.u.) at the time of Purchase ( <b>A/I</b> )	11.00	10.50	10.00

*Alternative Solution*

**MFX**

$$\frac{(11.50 - X) \times \frac{550000}{X} + 10000}{550000} = \frac{0.19345}{365} \times 120$$

$$\text{Or } \frac{6325000}{X} - 550000 + 10000 = 0.0636 \times 550000$$

$$\text{Or } \frac{6325000}{X} = 574980$$

$$\text{Or } X = \frac{6325000}{574980} = 11.00$$

**MFY**

$$\frac{(11.00 - Y) \times \frac{420000}{Y} + 6000}{420000} = \frac{0.2259}{365} \times 100$$

$$\text{Or } \frac{4620000}{Y} - 420000 + 6000 = 0.062 \times 420000$$

$$\text{Or } \frac{4620000}{Y} = 440040$$

$$\text{Or } Y = \frac{4620000}{440040} = 10.50$$

**MFZ**

$$\frac{(9.50 - Z) \times \frac{100000}{Z}}{100000} = \frac{-0.3650}{365} \times 50$$

$$\text{Or } \frac{950000}{Z} - 100000 = -0.05 \times 100000$$

$$\text{Or } \frac{950000}{Z} = 95000$$

$$\text{Or } Z = \frac{950000}{95000} = 10.00$$

- (c) No organization can run an existing business and promote a new expansion project without a suitable internally mobilized financial base or both i.e. internally and externally mobilized financial base.

Sources of finance and capital structure are the most important dimensions of a strategic plan. The need for fund mobilization to support the expansion activity of firm is very vital for any organization. The generation of funds may arise out of ownership capital and or borrowed capital.

Along with the mobilization of funds, policy makers should decide on the capital structure to indicate the desired mix of equity capital and debt capital.

Another important dimension of strategic management and financial policy interface is the investment and fund allocation decisions. A planner has to frame policies for regulating investments in fixed assets and for restraining of current assets. In fact, project evaluation and project selection are the two most important jobs under fund allocation. Planner's task is to make the best possible allocation under resource constraints.

Dividend policy is yet another area for making financial policy decisions affecting the strategic performance of the company. A close interface is needed to frame the policy to be beneficial for all. Dividend policy decision deals with the extent of earnings to be distributed as dividend and the extent of earnings to be retained for future expansion scheme of the firm. Stability of the dividend payment is a desirable consideration that can have a positive impact on share prices.

Thus, the financial policy of a company cannot be worked out in isolation of other functional policies. It has a wider appeal and closer link with the overall organizational performance and direction of growth. These policies being related to external awareness about the firm, especially the awareness of the investors about the firm, in respect of its internal performance. There is always a process of evaluation active in the minds of the current and future stake holders of the company.

### Question 2

- (a) *The Closing values of NSE Nifty from 2<sup>nd</sup> January, 2024 to 12<sup>th</sup>\* January, 2024 were as follows:*

<b>Days</b>	<b>Date</b>	<b>Day</b>	<b>Nifty</b>
1	2	TUE	21,742
2	3	WED	21,665
3	4	THU	21,517
4	5	FRI	21,462
5	6	SAT	No Trading
6	7	SUN	No Trading
7	8	MON	21,238
8	9	TUE	21,182
9	10	WED	20,997
10	11	THU	20,926
11	12	FRI	20,901

**You are required to:**

- (i) *Calculate Exponential Moving Average (EMA) of Nifty during the above period. The previous day exponential moving average of Nifty can be assumed as 21,500, The value of exponent for 31 days EMA is 0.062*
- (ii) *Give brief analysis on the basis of your calculations.* **(6 Marks)**

\* In question paper mistakenly, it got typed as 11<sup>th</sup>.

- (b) *XY Ltd., is interested in expanding its operation and planning to install a unit at US. For the proposed project, it requires a fund of \$ 15 million (net of issue expenses/floatation cost). The estimated floatation cost is 3%. To finance the*

project it proposes to issue GDRs.

You as a financial consultant is required to compute the number of GDRs, to be issued and cost of the GDR with the help of following additional information.

- (i) Expected market price of share at the time of issue of GDR is ₹350 (Face Value ₹100).
- (ii) 3 shares shall underly each GDR and shall be priced at 6% discount to market price.
- (iii) Expected Exchange Rate ₹84/\$.
- (iv) Dividend expected to be paid is 10% with growth rate of 8%.

**(4 Marks)**

(c) Mr. A, has invested in the Growrich Mutual Fund's Scheme. The details of the Mutual Fund Scheme are given below:

Asset Value at the beginning of the month	₹78.50
Annualized Return	16%
Distribution made in the nature of Income and Capital Gain (per unit respectively)	₹0.40 & ₹0.30

**You are required to:**

- (i) Calculate the month end Net Asset Value of the Growrich Mutual Fund Scheme (Round off to 2 decimals)
- (ii) Comment briefly on the Month end NAV.

**(4 Marks)**

**Answer**

(a) (i)

	1	2	3	4	5
Date	Nifty	EMA for Previous Day	1 - 2	3x0.062	EMA 2 ± 4
2	21742	21500.00	242.00	15.00	21515.00
3	21665	21515.00	150.00	9.30	21524.30
4	21517	21524.30	-7.30	-0.45	21523.85

5	21462	21523.85	-61.85	-3.83	21520.02
8	21238	21520.02	-282.02	-17.49	21502.53
9	21182	21502.53	-320.53	-19.87	21482.66
10	20997	21482.66	-485.66	-30.11	21452.55
11	20926	21452.55	-526.55	-32.65	21419.90
12	20901	21419.90	-518.90	-32.17	21387.73

- (ii) *Conclusion* – The market is bearish. The market is likely to remain bearish for short term to medium term if other factors remain the same. On the basis of this indicator (EMA) the investors/brokers can take short position.

(b) Net Issue Size = \$15 million

$$\text{Gross Issue} = \frac{\$15 \text{ Million}}{0.97} = \$ 15.464 \text{ million}$$

Issue Price per GDR in ₹ (350 x 3 x 94%) ₹ 987

Issue Price per GDR in \$ (₹ 987/ ₹ 84) \$ 11.75

Dividend Per GDR ( $D_1$ ) (₹ 10 x 3) ₹ 30

Net Proceeds Per GDR (₹ 987 x 0.97) ₹ 957.39

(i) Number of GDR to be issued  $\frac{\$15.464 \text{ million}}{\$11.75} = 1.316085 \text{ million}$

(ii) Cost of GDR to XY Ltd.  $K_e = \frac{30.00}{957.39} + 0.08 = 11.13\%$

(c) (i) Calculation of NAV at the end of month:

Given Annual Return = 16%

Hence Monthly Return = 1.33% (r)

$$r = \frac{(\text{NAV}_t - \text{NAV}_{t-1}) + I_t + G_t}{\text{NAV}_{t-1}}$$

$$0.0133 = \frac{(\text{NAV}_t - ₹ 78.50) + ₹ 0.40 + ₹ 0.30}{₹ 78.50}$$

$$1.04405 = \text{NAV}_t - ₹ 77.80$$

$$\text{NAV}_t = ₹ 78.84$$

- (ii) COMMENT- Closing NAV is increased by ₹ 0.34 i.e. (₹ 78.84 – ₹ 78.50). So, there is slight change in NAV.

### Question 3

- (a) A manufacturer of electronic components has taken floating interest rate loan of ₹ 2 Crore on 1<sup>st</sup> April, 2023. The rate of interest at the inception of loan is 9% per annum. Interest is to be paid every year on 31<sup>st</sup> March.

In the month of October 2023, the Central Bank of the country releases the following projections about the interest rates likely to prevail in future.

- (i) On 31<sup>st</sup> March, 2024 – 9.25%  
 On 31<sup>st</sup> March, 2025 – 9.50%  
 On 31<sup>st</sup> March, 2026 – 10.00%  
 On 31<sup>st</sup> March, 2027 – 9.00%  
 On 31<sup>st</sup> March, 2028 – 8.25%

You are required to show how the borrower can hedge the risk using Option Cap arising out of expected rise in the rate of interest when he wants to peg his interest cost at 9% per annum.

- (ii) Assume that the premium negotiated by both the parties is 0.80% to be paid at once on 1<sup>st</sup> October, 2023 and the actual rate of interest on the respective due dates happens to be as:

- On 31<sup>st</sup> March, 2024 – 9.50%  
 On 31<sup>st</sup> March, 2025 – 11.00%  
 On 31<sup>st</sup> March, 2026 – 9.25%  
 On 31<sup>st</sup> March, 2027 – 9.00%  
 On 31<sup>st</sup> March, 2028 – 8.50%

You are required to show how the settlement will be executed on the perspective interest due dates.

- (iii) State whether this option is advantageous when compared to Interest Rate Collar option. Explain. **(10 Marks)**



- (b) *Apart from the support from government, there are quite a few other reasons why India became a sustainable environment for start-up to thrive in. What are the other reasons?*

**OR**

- (b) *"Tokenization, to some extent resembles the process of Securitization." Is it True? What are the similarities of Tokenization and Securitization?*

**(4 Marks)**

**Answer**

- (a) (i) As borrower does not want to pay more than 9.00% p.a., on this loan where the rate of interest is likely to rise beyond this, hence, he has to hedge the risk by entering into an agreement to buy interest rate caps with the following parameters:

- Notional Principal: ₹ 200,00,000/-
- Strike rate: 9.00% p.a.
- Reference rate: Rate of interest declared by Central Bank. or the rate of interest applicable to this loan.
- Calculation and settlement date: 31<sup>st</sup> March every year
- Duration of the caps: till 31<sup>st</sup> March 2028
- Premium for caps: Negotiable between both the parties

To purchase the caps this borrower is required to pay the premium upfront at the time of buying caps. The payment of such premium will entitle him with right to receive the compensation from the seller of the caps as soon as the rate of interest on this loan rises above 9.00%. The compensation will be at the rate of the difference between the rate of none of the cases the cost of this loan will rise above 9.00% calculated on ₹ 2,00,00,000. This implies that in none of the cases the cost of this loan will rise above 9.00%. This hedging benefit is received at the respective interest due dates at the cost of premium to be paid only once.

- (ii) The payment of this premium will entitle the buyer of the caps to receive the compensation from the seller of the caps whereas the buyer

will not have obligation. The compensation received by the buyer of caps will be as follows:

Date	Interest Rate	Option	Payment of Interest ₹	Settlement / Compensation Amount ₹	Net Interest ₹
31.03.2024	9.50%	Exercise	19,00,000	1,00,000	18,00,000
31.03.2025	11.00%	Exercise	22,00,000	4,00,000	18,00,000
31.03.2026	9.25%	Exercise	18,50,000	50,000	18,00,000
31.03.2027	9.00%	Lapse*	18,00,000	-----	18,00,000
31.03.2028	8.50%	Lapse*	17,00,000	-----	17,00,000

\* Since actual rate of interest  $\leq$  Strike Rate.

**Conclusion:** From the discussion above it can be said that the overall interest cost for the borrower shall not exceed 9%.

- (iii) Comparing to Interest Rate Collar, Cap Option appears to be better because even though Collar may not involve initial outflow of cash on account of Premium but selling Put Option at 9% can lead to cash outflow if interest rate goes below 9%.
- (b) Apart from the support from government, there are quite a few other reasons why India became such a sustainable environment for start-ups to thrive in. Some of the major reasons are:
- (i) **The Pool of Talent** - Our country has a big pool of talent. There are millions of students graduating from colleges and B-schools every year. Many of these students use their knowledge and skills to begin their own ventures, and that has contributed to the startup growth in India. In the past, much of this talent was attracted to only the big companies, but now that is slowly changing.
- (ii) **Cost Effective Workforce** - India is a young country with over 10 million people joining the workforce every year. The workforce is also cost effective. So, compared to some other countries, the cost of setting up and running a business is comparatively lower.

- (iii) Increasing use of the Internet** - India has the world's second-highest population, and after the introduction of affordable telecom services, the usage of internet has increased significantly. It has even reached the rural areas. India has the second-largest internet user base after China, and companies as well as start-ups are leveraging this easy access to the internet.
- (iv) Technology** - Technology has made the various processes of business very quick, simple and efficient. There have been major developments in software and hardware systems due to which data storage and recording has become an easy task. Indian startups are now increasingly working in areas of artificial intelligence and blockchain technologies which is adding to the growth of business.
- (v) Variety of Funding Options Available** - Earlier there were only some very traditional methods available for acquiring funds for a new business model, which included borrowing from the bank or borrowing from family and friends. However, this concept has now changed. There are numerous options and opportunities available. Start-up owners can approach angel investors, venture capitalists, seed funding stage investors, etc. The easing of Foreign Direct Investment norms and opening up of majority of sectors to 100% automatic route has also opened the floodgates for foreign funding in the Indian start-up ecosystem.

**OR**

- (b)** Yes, to some extent Tokenization resembles the process of Securitization as it is a process of converting tangible and intangible assets into blockchain tokens. Digitally representing anything has recently acquired a lot of traction. It can be effective in conventional industries like real estate, artwork etc.

Following are some similarities between Tokenization and Securitization:

- (i) Liquidity:** - First and foremost both Securitization and Tokenization inject liquidity in the market for the assets which are otherwise illiquid assets.
- (ii) Diversification:** - Both help investors to diversify their portfolio thus managing risk and optimizing returns.

**(iii) Trading:** - Both are tradable hence helps to generate wealth.

**(iv) New Opportunities:** - Both provide opportunities for financial institutions and related agencies to earn income through collection of fees.

#### Question 4

(a) *The market received some information about ABC Ltd's tie up with a Multinational Company. This has induced the market price to move up. If the information is false, the ABC Ltd.'s stock price will probably fall dramatically. To protect from this, an investor has bought the call and put options.*

*He purchased one 3 month's call with a striking price of ₹45 for ₹3 premium and paid ₹2 per share premium for a 3 month's put with a striking price of ₹42.*

*Assume 100 shares for call and put option.*

**You are required:**

- (i) *To determine the investor's position if the tie up offer bids the price of ABC Ltd.'s stock up to ₹44 in 3 months.*
- (ii) *To determine the investor's position of the tie up offer program fails and the price of the stocks falls to ₹34 in 3 months.*
- (iii) *To determine the investor's position if the tie up offer program is successful and the price of the stocks rise up to ₹46 in 3 months.*

**(6 Marks)**

(b) *PQ Ltd., plans to acquire RS Ltd. The relevant financial details of the two firms prior to the merger announcement are:*

	<b>PQ Ltd.,</b>	<b>RS Ltd.,</b>
<i>Market price per share</i>	₹ 100	₹ 50
<i>Number of outstanding shares</i>	20,00,000	10,00,000

*The merger is expected to generate gains, which have a present value of ₹300 lakhs. The exchange ratio agreed to is 0.5.*

*You are required to calculate the true cost of the merger from the point of view of PQ Ltd.*

**(4 Marks)**

- (c) *What do you mean by International Financial Centre (Gift City)? What are the benefits of IFC?* **(4 Marks)**

**Answer**

- (a) Total premium paid on purchasing a call and put option

$$= (\text{₹ } 3 \text{ per share} \times 100) + (\text{₹ } 2 \text{ per share} \times 100).$$

$$= \text{₹ } 300 + \text{₹ } 200 = \text{₹ } 500$$

- (i) In this case, investor exercises neither the call option nor the put option as both will result in a loss for him.

$$\text{Ending value} = - \text{₹ } 500 + \text{zero gain} = - \text{₹ } 500$$

$$\text{i.e. Net loss} = \text{₹ } 500$$

- (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.

$$\text{Total premium paid} = \text{₹ } 500$$

$$\text{Ending value} = - \text{₹ } 500 + \text{₹ } [(42 - 34) \times 100] = - \text{₹ } 500 + \text{₹ } 800 = \text{₹ } 300$$

$$\text{i.e. Net gain} = \text{₹ } 300$$

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

$$\text{Total premium paid} = \text{₹ } 500$$

$$\text{Ending value} = - 500 + [(46 - 45) \times 100] = - 500 + 100 = - \text{₹ } 400$$

$$\text{i.e. Net Loss} = \text{₹ } 400$$

- (b) Shareholders of RS Ltd. will get 5 lakh share of PQ Ltd., so they will get:

$$= \frac{5 \text{ lakh}}{20 \text{ lakh} + 5 \text{ lakh}} = 20\% \text{ of shares PQ Ltd.}$$

The value of PQ Ltd. after merger will be:

$$= \text{₹ } 100 \times 20 \text{ lakh} + \text{₹ } 50 \times 10 \text{ lakh} + \text{₹ } 300 \text{ lakh}$$

$$= \text{₹ } 2000 \text{ lakh} + \text{₹ } 500 \text{ lakh} + \text{₹ } 300 \text{ lakh} = \text{₹ } 2800 \text{ lakh}$$

True Cost of Merger will be:

$$(\text{₹ } 2800 \times 20\%) \text{ ₹ } 560 \text{ lakhs} - \text{₹ } 500 \text{ lakhs} = \text{₹ } 60 \text{ lakh}$$

- (c) International Financial Centre (IFC) is the financial center that caters to the needs of the customers outside their own jurisdiction. Broadly, speaking IFC is a hub that deals with flow of funds, financial products and financial services even though in own land but with different set of regulations and laws.

Thus, these centers provide flexibility in currency trading, insurance, banking and other financial services. This flexible regime attracts foreign investors which is of potential benefit not only to the stakeholders but as well as for the country hosting IFC itself.

There are numberless direct and indirect benefits of setting up IFC but some major benefits emanating from establishing IFC are as follows:

- (i) Opportunity for qualified professionals working outside India come here and practice their profession.
- (ii) A platform for qualified and talented professionals to pursue global opportunities without leaving their homeland.
- (iii) Stops Brain Drain from India.
- (iv) Bringing back those financial services transactions presently carried out abroad by overseas financial institutions/entities or branches or subsidiaries of Indian Financial Market.
- (v) Trading of complicated financial derivative can be started from India.

#### Question 5

- (a) An investor has decided to invest Rs. 1,00,000 in the shares of X Ltd. and Y Ltd. The desired returns from the shares of the two companies along with their probabilities are as follows:

Probability	X Ltd (%)	Y Ltd (%)
0.20	-5	15
0.50	10	25
0.30	15	-10

**You are required to:**

- (i) Calculate the risk and return of investment in individual shares.
- (ii) Compare the risk and return of these two shares with a portfolio of these shares in equal proportions.

(iii) Find out the proportion of each of the above shares to formulate a minimum risk portfolio. **(8 Marks)**

(b) XY Ltd., paid a dividend of ₹ 3 for the current year. The dividend is expected to grow at 30% for the next 5 years and at 15% per annum thereafter. The return on 182 days T-bills is 12% per annum and the market return is expected to be around 16% with a variance of 24%.

The Co-Variance of XY's return with that of the market return\* is 30%.

**You are required to:**

- (i) Calculate the Required Rate of Return
- (ii) Calculate the Intrinsic Value of the Stock

The PVF at 17% is given below:

Year	1	2	3	4	5
<b>PVF (17%)</b>	0.855	0.731	0.624	0.534	0.456

**(6 Marks)**

\* In question paper mistakenly, return got typed as value.

**Answer**

(a) (i)

Probability	X Ltd. (%)	Y Ltd. (%)	1X2 (%)	1X3 (%)
(1)	(2)	(3)	(4)	(5)
0.20	-5	15	- 1.00	3.00
0.50	10	25	5.00	12.50
0.30	15	-10	<u>4.50</u>	<u>- 3.00</u>
Average return			<u>8.50</u>	<u>12.50</u>

Hence the expected return from X Ltd. = 8.50% and Y Ltd. is 12.50%

Probability	(X - $\bar{X}$ )	(X - $\bar{X}$ ) <sup>2</sup>	1X3	(Y - $\bar{Y}$ )	(Y - $\bar{Y}$ ) <sup>2</sup>	(1)X(6)
(1)	(2)	(3)	(4)	(5)	(6)	
0.20	-13.50	182.25	36.45	2.50	6.25	1.25
0.50	1.50	2.25	1.125	12.50	156.25	78.125

0.30	6.50	42.25	<u>12.675</u>	-22.50	506.25	<u>151.875</u>
			<u>50.25</u>			<u>231.25</u>

$$\sigma^2_x = 50.25(\%)^2 ; \sigma_x = 7.09\%$$

$$\sigma^2_y = 231.25(\%)^2 ; \sigma_y = 15.21\%$$

- (ii) In order to find risk of portfolio of two shares, the covariance between the two is necessary here.

<b>Probability</b>	<b>(X-<math>\bar{X}</math>)</b>	<b>(Y-<math>\bar{Y}</math>)</b>	<b>2X3</b>	<b>1X4</b>
(1)	(2)	(3)	(4)	(5)
0.20	-13.50	2.50	-33.75	-6.75
0.50	1.50	12.50	18.75	9.375
0.30	6.50	-22.50	-146.25	<u>-43.875</u>
				<u>-41.25</u>

$$\sigma^2_p = (0.5^2 \times 50.25) + (0.5^2 \times 231.25) + 2 \times (-41.25) \times 0.5 \times 0.5$$

$$\sigma^2_p = 12.563 + 57.813 - 20.625$$

$$\sigma^2_p = 49.751 \text{ or } 49.75(\%)$$

$$\sigma_p = \sqrt{49.75} = 7.053\% \text{ or } 7.05\%$$

$$E(R_p) = (0.5 \times 8.50) + (0.5 \times 12.50) = 10.50\%$$

	<b>Return</b>	<b>Risk</b>	<b>Return to Risk Ratio of CV</b>	<b>Ranking</b>
X Ltd.	8.50%	7.09	1.20	2
Y Ltd.	12.50%	15.21	0.82	3
Portfolio	10.50%	7.05	1.48	1

Risk of the portfolio is reduced by combining two shares.

- (iii) For constructing the minimum risk portfolio the condition to be satisfied is

$$Y = \frac{\sigma_X^2 - r_{XY}\sigma_X\sigma_Y}{\sigma_X^2 + \sigma_Y^2 - 2r_{XY}\sigma_X\sigma_Y} \text{ or } = \frac{\sigma_X^2 - \text{Cov}_{XY}}{\sigma_X^2 + \sigma_Y^2 - 2\text{Cov}_{XY}}$$

$\sigma_x$  = Std. Deviation of X Ltd.

$\sigma_y$  = Std. Deviation of Y Ltd.



$r_{XY}$  = Coefficient of Correlation between X Ltd. and Y Ltd.

$\text{Cov.}_{XY}$  = Covariance between X Ltd. and Y Ltd.

Therefore,

$$\% \text{ Y Ltd.} = \frac{50.25 - (-41.25)}{50.25 + 231.25 - [2 \times (-41.25)]} = \frac{91.50}{364} = 0.2514 \text{ or } 25.14\% \text{ or } 25\%$$

Y Ltd. = 25.14% or 25%

X Ltd. = 74.86% or 75%

*Alternatively, it can also be computed as follows:*

For constructing the minimum risk portfolio the condition to be satisfied is

$$X = \frac{\sigma_Y^2 - r_{XY}\sigma_X\sigma_Y}{\sigma_X^2 + \sigma_Y^2 - 2r_{XY}\sigma_X\sigma_Y} \text{ or } = \frac{\sigma_Y^2 - \text{Cov}_{XY}}{\sigma_X^2 + \sigma_Y^2 - 2\text{Cov}_{XY}}$$

$\sigma_X$  = Std. Deviation of X Ltd.

$\sigma_Y$  = Std. Deviation of Y Ltd.

$r_{XY}$  = Coefficient of Correlation between X Ltd. and Y Ltd.

$\text{Cov.}_{XY}$  = Covariance between X Ltd. and Y Ltd.

Therefore,

$$\% \text{ X Ltd.} = \frac{231.25 - (-41.25)}{50.25 + 231.25 - [2 \times (-41.25)]} = \frac{272.50}{364} = 0.7486$$

or 74.86% or 75%

Y Ltd. = 25.14% or 25%

X Ltd. = 74.86% or 75%

**(b)** (i)  $\beta = \frac{\text{Covariance of Market Return and Security Return}}{\text{Variance of Market Return}}$

$$\beta = \frac{30\%}{20\%} = 1.25$$

$$\begin{aligned} \text{Required Rate of Return} &= R_f + \beta(R_m - R_f) \\ &= 12\% + 1.25(16\% - 12\%) \\ &= 12\% + 5.00\% = 17.00\% \end{aligned}$$

(ii) Intrinsic Value

Year	Dividend (₹)	PVF (17%,n)	Present Value (₹)
1	3.90	0.855	3.33
2	5.07	0.731	3.71
3	6.59	0.624	4.11
4	8.57	0.534	4.58
5	11.14	0.456	5.08
			20.81

$$\text{PV of Terminal Value} = \frac{11.14 \times 1.15}{0.17 - 0.15} \times 0.456 = ₹ 292.09$$

$$\text{Intrinsic Value} = ₹ 20.81 + ₹ 292.09 = ₹ 312.90$$

**Question 6**

(a) A machine used on a production line must be replaced at least every four years. Costs incurred to run the machine according to its age are:

Age of the Machine (Years)					
	0	1	2	3	4
Purchase Price (in ₹)	1,00,000				
Maintenance (in ₹)		18,000	20,000	22,000	24,000
Repairs (in ₹)		0	3,000	6,000	10,000
Scrap Value (in ₹)		35,000	23,000	12,000	6,000

Future replacement will be with identical machine having same cost. Revenue is unaffected by the age of the machine. Ignore Inflation and tax and determine the optimum replacement cycle.

PV factors of the cost of capital of 15% for the respective four years are:

Year	1	2	3	4
PVF (15%)	0.8696	0.7561	0.6575	0.5718

**(8 Marks)**

(b) The equity shares of XYZ Ltd., are currently being traded at ₹34 per share in the market.

XYZ Ltd., has total 10,00,000 equity shares outstanding in number and promoters equity holding in the company is 30%

ABC Ltd., wishes to acquire XYZ Ltd., because of likely synergies. The estimated present value of these synergies is ₹ 1,00,00,000.

Further ABC Ltd., feels that management of XYZ Ltd., has been overpaid. With better motivation, lower salaries and fewer perks for the top management, will lead to savings of ₹ 5,00,000 per annum. Top management with their families are promoters of XYZ Ltd., Present value of these savings would add ₹ 25,00,000 in value to the acquisition.

Following additional information is available regarding ABC Ltd.,

Earnings per share	₹ 5
Total number of shares outstanding	15,00,000
Market price of equity share	₹ 30

**You are required to:**

- Calculate the maximum price per equity share which ABC Ltd., can offer to pay for XYZ Ltd.
- Calculate the minimum price per equity share at which the management of XYZ Ltd., will be willing to offer their controlling interest. **(6 Marks)**

**Answer**

**(a) Working Notes:**

First of all, we shall calculate cash flows for each replacement cycle as follows:

One Year Replacement Cycle				₹
Year	Replacement Cost	Maintenance & Repair	Residual Value	Net cash Flow
0	(1,00,000)	-	-	(1,00,000)
1	-	(18,000)	35,000	17,000

**Two Year Replacement Cycle**

₹

Year	Replacement Cost	Maintenance & Repair	Residual Value	Net cash Flow
0	(1,00,000)	-	-	(1,00,000)
1	-	(18,000)	-	(18,000)
2	-	(23,000)	23,000	-

**Three Year Replacement Cycle**

₹

Year	Replacement Cost	Maintenance & Repair	Residual Value	Net cash Flow
0	(1,00,000)	-	-	(1,00,000)
1	-	(18,000)	-	(18,000)
2	-	(23,000)	-	(23,000)
3	-	(28,000)	12,000	(16,000)

**Four Year Replacement Cycle**

₹

Year	Replacement Cost	Maintenance & Repair	Residual Value	Net cash Flow
0	(1,00,000)	-	-	(1,00,000)
1	-	(18,000)	-	(18,000)
2	-	(23,000)	-	(23,000)
3	-	(28,000)	-	(28,000)
4	-	(34,000)	6,000	(28,000)

Now we shall calculate NPV for each replacement cycles.

Year	PVF@ 15%	1 Year		2 Years		3 Years		4 Years	
		Cash Flows	PV	Cash Flows	PV	Cash Flows	PV	Cash Flows	PV
0	1	-1,00,000	-1,00,000	-1,00,000	-1,00,000	-1,00,000	-1,00,000	-1,00,000	-1,00,000
1	0.8696	17,000	14,783	-18,000	-15,653	-18,000	-15,653	-18,000	-15,653
2	0.7561	-	-	-	-	-23,000	-17,390	-23,000	-17,390
3	0.6575	-	-	-	-	-16,000	-10,520	-28,000	-18,410
4	0.5718	-	-	-	-	-	0	-28,000	-16,010
			-85,217		-1,15,653		-1,43,563		-1,67,463

Replacement Cycles		EAC (₹)
1 Year	$\frac{85,217}{0.8696}$	97,995.63
2 Years	$\frac{1,15,653}{1.6257}$	71,140.43
3 Years	$\frac{1,43,563}{2.2832}$	62,877.98
4 Years	$\frac{1,67,463}{2.855}$	58,656.04

Since EAC is least in case of replacement cycle of 4 years hence machine should be replaced after every fourth year.

- (b) (i) Calculation of maximum price per share at which ABC Ltd. can offer to pay for XYZ Ltd.'s share

Market Value (10,00,000 x ₹ 34)	₹ 3,40,00,000
Synergy Gain	₹ 1,00,00,000
Saving of Overpayment	₹ 25,00,000
	₹ 4,65,00,000
Maximum Price (₹ 4,65,00,000/10,00,000)	₹ 46.50

Alternatively, it can also be computed as follows:

Let ER be the swap ratio then,

$$30 = \frac{34 \times 10,00,000 + 30 \times 15,00,000 + 1,00,00,000 + 25,00,000}{15,00,000 + 10,00,000 \times ER}$$

$$ER = 1.55$$

$$MP = PE \times EPS \times ER = \frac{30}{5} \times ₹ 5 \times 1.55 = ₹ 46.50$$

Or

$$\begin{aligned} MP &= \text{Market Price of Share of XYZ Ltd.} \times 1.55 = ₹ 30.00 \times 1.55 \\ &= ₹ 46.50 \end{aligned}$$

- (ii) Calculation of minimum price per share at which the management of XYZ Ltd.'s will be willing to offer for their controlling interest

Value of XYZ Ltd.'s Management Holding (30% of 10,00,000 x ₹ 34)	₹ 1,02,00,000
Add: PV of loss of remuneration to top management	₹ 25,00,000
	₹ 1,27,00,000
No. of Shares	3,00,000
Minimum Price (₹ 1,27,00,000/3,00,000)	₹ 42.33