Paper- 14: STRATEGIC FINANCIAL MANAGEMENT

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Full Marks: 100 **Time Allowed: 3 Hours**

This paper contains two sections **A** and **B**. **Section A** is compulsory and contains questionNo.1 for 20 marks. **Section B** contains question Nos. 2 to 8, each carrying 16 marks.

Answer any five questions from **Section B**.

Section – A [20 Marks]

1. Choose the correct option among four alternative answer. (1 mark for correct choice, 1 mark for justification.) [10×2= 20]

(i) Buenos Aires Limited has 10 lakh equity shares outstanding at the beginning of the year 2013. The current market price per share is ₹ 150. The current market price per share is ₹ 150. The company is contemplating a dividend of ₹ 9 per share. The rate of capitalization, appropriate to its risk class, is 10%.

Based on MM approach, calculate the market price of the share of the company when Dividend is declared

(a) ₹ 156

(b) ₹ 166

(c) ₹ 176

(d) ₹ 186

(ii) Sea Rock Ltd. Has an excess cash of ₹ 30,00,000 which it wants to invest in short-term marketable securities.

Expenses resulting to investment will be ₹ 45,000. The securities invested will have an annual yield of 10%. The company seeks your advice as to the period of investments so as to earn a pre-tax income of 6%.

(a) 5 months

(b) 6 months

(c) 9 months

(d) 12 months

(iii) Rishav holds two equity shares A and B in equal proportion with the following risk and return:

$E(R_A)$ = 26%

σ_A = 20%

$E(R_B)$ = 22%

σ_B = 24%

The returns of these securities have a positive correlation of 0.7. Calculate the portfolio return and risk.

(a) 25% (expected return), 29% risk

(b) 24% (expected return), 30% risk

(c) 24% (expected return), 20.30% risk

(d) 25% (expected return), 20.30% risk

(iv) Consider the following quotes:

Spot (Euro/Pound) = 1.3904 — 1.3908

Spot (Pound/NZ $) = 0.5020 — 0.5040

What will be the possible % spread on the cross rate between Euro and NZ $?

(a) 0.40

(b) 0.39

(c) 0.41

(d) 0.43

(v) Following information is available regarding a mutual fund:

Return	**13**
Risk (σ)	**16**
Beta (β)	**0.90**
Risk free rate	**10**

Calculate Sharpe ratio.

(a) 0.18

(b) 0.19

(c) 0.20

(d) 0.21

(vi) The risk free return is 8 per cent and the return on market portfolio is 14 per cent. If the last dividend on Share 'A' was `2.00 and assuming that its dividend and earnings are expected to grow at the constant rate of 5 per cent. The beta of share 'A' is 2.50. Compute the intrinsic value of share A.

(a) ₹ 10.67

(b) ₹ 11.67

(c) ₹ 12.67

(d) ₹ 13.67

(vii) I What is the price of a European put option on a non-dividend-paying stock when the stock price is ₹69, the strike price is ₹ 70, the risk-free interest rate is 5% per annum, the volatility is 35% per annum, and the time to maturity is six months?

(a) 3.40

(b) 6.40

(c) 4.50

(d) 5.40

(viii) A characteristic line is formed by regressing

(a) Stock prices with market index

(b) Beta with required rate of return

(c) Standard deviation with required rate of return

(d) Stock returns with market returns

(ix) Beta of a security measures its

(a) Diversifiable risk

(b) Market risk

(c) Financial risk

(d) None of the above

(x) The February Pepper future traded at 16.80, the February 18.00 call at 0.45 and the February 18.00 put at 0.58. Both are options on the February future. Find out whether any arbitrage opportunity exists.

(a) Arbitrage opportunity exists

(b) Does not exists

Answer:

(i) (a)

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

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

If the dividend is declared:

$$150 = \frac{1}{1+0.10} \times (9 + P_1)$$

$$150 = \frac{9+P_1}{1.10}$$

165 = 9 + P1

P1 = 165 – 9 = ₹ 156

(ii) (c)

Pre-tax income required on investment of ₹ 30,00,000 is ₹ 1,80,000.

Let the period of investment be 'P' for return required on investment ₹1,80,000 (₹30,00,000 × 6%)

Accordingly,

$(₹30,00,000 \times \frac{10}{100} \times \frac{P}{12}) - ₹45,000 = ₹1,80,000$

P = 9 months.

(iii) (c)

24% (expected return), 20.30% risk

Computation of Expected Return:

$E(R_P)$ = Proportion of A × $E(R_A)$ + Proportion of B × $E(R_B)$

= 26(.5) + 22(.5) = 13 + 11 = 24%

Computation of Portfolio Risk

$$\sigma_P = \sqrt{\left(\sigma_A^2 \times W_A^2\right) + \left(\sigma_B^2 \times W_B^2\right) + 2(\sigma_A \times W_A \times \sigma_B \times W_B \times \rho_{AB})}$$

$$= \sqrt{\left(20^2 \times 0.50^2\right) + \left(24^2 \times 0.50^2\right) + (2 \times 20 \times 0.50 \times 24 \times 0.50 \times 0.70)}$$

$$= \sqrt{100 + 144 + 168} = \sqrt{412} = 20.30\%$$

(iv) (d) 0.43

The % spread on Cross rate between the Euro and NZ $. Let us find out the Cross rate first.

SPOT (Euro / NZ) = (0.5020 ×1.3904) : (0.5040 × 1.3908) = 0.6980 :0.7010

So, % Spread on Euro to NZ $ = [(0/7010 – 0.6980) / 0.6980] ×100 = 0.4298 = 0.43.

(v) (b) 0.19

Sharpe's ratio = $(R_P - R_F) / \sigma$ = [13 – 10]/16 = 0.19

(vi) (b)

Basic Data

Notation	Particulars	Value
	Beta of Share	2.5
R_M	Market Return	14%

R_F	Risk Free Rate of Return	8%
R	Growth rate of Dividends	5%
D_0	Last Year's dividend	₹2

1. Computation of Expected Return

Expected Return $[E(R_A)] = R_F + [\beta_A \times (R_M - R_F)]$

$= 0.08 + [2.5 \times (0.14 - 0.08)]$

$= 0.08 + 2.5 (0.14 - 0.08) = 0.08 + 0.15 = 0.23$

i.e., $K_e = 23\%$

2. Intrinsic Value of share $= D1 \div (K_e - g) = D_0 \times (1+ g) \div (K_e - g)$

$= 2 \times (1+0.05) \div (0.23 - 0.05) =$ ₹ 11.67

The Intrinsic Value of share A is ₹ 11.67.

(vii) (b) 6.40

In this case,

$S_0 = 69$, $K = 70$, $r = 0.05$, $\sigma = 0.35$ and $T = 0.5$

$$d_1 = \frac{\ln(60/70) + (0.35^2/2) \times 0.5}{0.35\sqrt{0.5}} = 0.166$$

$$d_2 = d_1 - 0.35\sqrt{0.5} = -0.0809$$

The price of the European put is

$70e^{-0.05\times0.5} N(0.0809) - 69 N(-0.1666)$

$= 70e^{-0.05\times0.5} \times 0.5323 - 69 \times 0.4338$

$= 6.40.$

(viii) (c)

Standard deviation with required rate of return.

Characteristic Line is a graph depicting the relationship between Security Returns and Market Index Returns.

(ix) (b)

Market risk

Beta of a security measures its vulnerability of security to market risk. In other words, beta measures the market risk or non-diversifiable risk.

(x) (a)

Arbitrage opportunity exists

(i) Cost of future = ₹16.80

(ii) Cost of Pepper = Present Value of Exercise Price + Value of Call -Value of Put

= ₹18 + ₹0.45 – ₹0.58 = ₹17.87

Section - B

Answer *any five*questions. **[16×5= 80]**

2. (a) A firm has an investment proposal, requiring an outlay of ₹ 80,000. The investment proposal is expected to have two years economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be ₹ 50,000 and 0.6 probability that cash inflow after tax will be ₹60,000. The probability assigned to cash inflow after tax for the year 2 are as follows:

The cash inflow year 1	**₹ 50,000**		**₹60,000**	
The cash inflow year 2	**Probability**		**Probability**	
	₹24,000	**0.2**	**₹40,000**	**0.4**
	₹32,000	**0.3**	**₹50,000**	**0.5**
	₹44,000	**0.5**	**₹60,000**	**0.1**

The firm uses a 8% discount rate for this type of investment.

Required:

(i) Construct a decision tree for the proposed investment project and calculate the expected net present value (NPV).

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

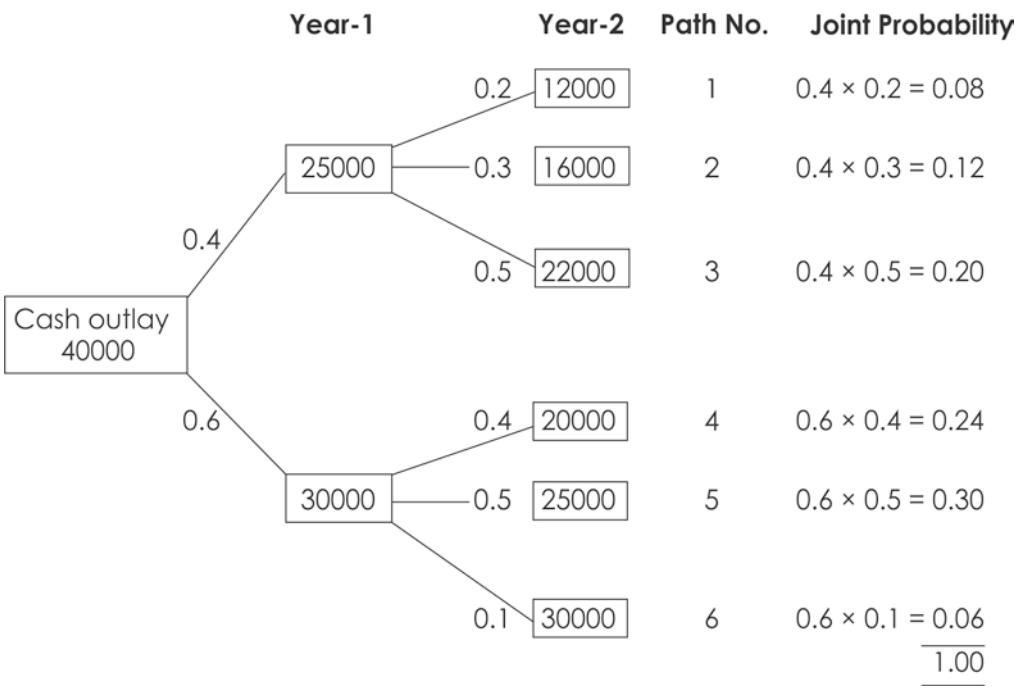
(iii) What will be the best outcome and the probability of that occurrence?

(iv) Will the project be accepted?

(Note: 8% discount factor 1 year 0.9259; 2 year 0.8573) **8**

Answer: (a)

(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:



The Net Present Value (NPV) of each path at 8% discount rate is given below:

Path	Year 1 Cash Flows (₹)	Year 2 Cash Flows (₹)	Total Cash Inflows (PV) (₹)	Cash Outflows (₹)	NPV (₹)
1	50,000×.9259= 46,295	24,000×.8573= 20,575	66,870	80,000	(—) 13,130
2	50,000×.9259= 46,295	32,000×.8573= 27,434	73,729	80,000	(—) 6,271
3	50,000×.9259= 46,295	44,000×.8573= 37,721	84,016	80,000	4,016
4	60,000×.9259= 55,554	40,000×.8573= 34,292	89,846	80,000	9,846
5	60,000×.9259= 55,554	50,000×.8573= 42,865	98,419	80,000	18,419
6	60,000×.9259= 55,554	60,000×.8573= 51,438	1,06,992	80,000	26,992

Statement showing Expected Net Present Value ₹

Path	NPV(₹)	Joint Probability	Expected NPV
1	(—) 13,130	0.08	—1,050.40
2	(—) 6,271	0.12	—752.52
3	4,016	0.20	803.20
4	9,846	0.24	2,363.04
5	18,419	0.30	5,525.70
6	26,992	0.06	1,619.52
			8,508.54

Conclusions:

(ii) If the worst outcome is realized the project will yield NPV of – ₹13,130. The probability of occurrence of this NPV is 8% and a loss of ₹ 1,050.40 (path 1).

(iii) The best outcome will be path 5 when the NPV is at ₹ 18,419. The probability of occurrence of this NPV is 30% and an expected profit of ₹ 5,525.70.

(iv) The project should be accepted because the expected NPV is positive at ₹ 8,508.54 based on joint probability.

(b) A Production Manager is planning to produce a new product and he wishes to estimate the raw material requirement for that new product. On the basis of usage for a similar product introduced previously, he has developed a frequency distribution of demand in tonnes per day for a two month period. Use this data to simulate the raw material usage requirements for 7 days. Compute also the expected value and comment on the result.

Demand Tonnes/day	Frequency No. of days
10	6
11	18
12	15
13	12
14	6
15	3

Random Number : 27, 13, 80, 10, 54, 60, 49. **8**

Answer: (b)

Demand Tonnes/day	Frequency No. of days	Probability	Cumulative Probability	Random Numbers
10	6	6÷60 = 0.10	0.10	00 - 09
11	18	18÷60 = 0.30	0.40	10 - 39
12	15	15÷60 = 0.25	0.65	40 - 64
13	12	12÷60 = 0.20	0.85	65 - 84
14	6	6÷60 = 0.10	0.95	85 - 94
15	3	3÷60 = 0.05	1.00	95 - 99
	60	1.00		

The first seven random numbers (two digits only) are simulated :

Random No.	Corresponding demand Tonnes/day
27	11
13	11
80	13
10	11
54	12
60	12
49	12
	82

Mean requirement per day= 82 / 7 = 11.7 Tonnes

The expected value (EV) = (10×0.1)+(11×0.3)+(12×0.25)+(13×0.2)+(14×0.1)+(15×0.05)

= 12.05 Tonnes

The difference = 12.05 – 11.7 = 0.35

This indicates that the small sample size of only 7 days had resulted in some error. A much larger sample should be taken and several samples should be simulated before the simulation results are used for decision making.

3. (a) Equi-Stable, is a portfolio model wherein 20% of Fund Value is invested in Fixed Income Bearing Instruments. The Balance of 80% is divided among Old Industry Stock (Iron and Steel), Automotive Industry Stock, Information Technology Stocks, Infrastructure Company Stocks and Financial Services Sector in the ratio of 4:2:6:3:5.

Three mutual funds X, Y and Z, offer a Fund Scheme based on the Equi-Stable Portfolio Model. The actual return on Equi-Stable portfolios of each of the three funds for the past 3 years is as follows —

Year	1	2	3
Portfolio X	17.35%	18.70%	21.60%
Portfolio Y	17.20%	18.25%	22.15%
Portfolio Z	17.10%	18.60%	22.00%

Beta factor of the Equi-Stable portfolio is measured at 1. 35. Return on Market Portfolio indicate that ₹1000 invested will fetch ₹153 in an year (including capital appreciation and dividend yield). RBI Bonds, guaranteed by the Central Government yields 4.50%.

Rate the fund managers of X, Y and Z. 10

(b) A mutual fund that had a net asset value of ₹30 at the beginning of month and made income and capital gain distribution of ₹0.0375 and ₹0.03 per share respectively during the month, and then ended the month with a net asset value of ₹30.06. Calculate monthly return. 6

Answer:(a)

1. Computation of Expected Rate of Return under CAPM

$E(R_X) = R_F + [\beta_X \times (R_M - R_F)]$ [Expected Return on portfolio X]

Risk Free Return R_F= 4.50% [RBI Bonds]

Return on Market Portfolio R_M 15.30% [$\frac{\text{Annual Return}}{\text{Investment}} = \frac{₹153}{₹1,000}$]

Beta of Equi-Stable = β_X 1.35 [Given]

Expected Return of Equi-Stable $E(R_E)$ = 4.50% + [1.35 × (15.30% -4.50%)] = **19.08%**

2. Computation of Alpha Factor of the 3 Funds

Year	Mutual Fund X		Mutual Fund Y		Mutual Fund Z	
	Actual Return	Abnormal Return [AR_X]	Actual Return	Abnormal Return [AR_Y]	Actual Return	Abnormal Return [AR_Z]
(1)	(2)	(3) = (2)- $E(R_E)$	(4)	(5) = (4) - $E(R_E)$	(6)	(7) = (6)- $E(R_E)$
1	17.35%	17.35 -19.08 = (1.73)	17.20%	17.20 -19.08 =(1.88)	17.10%	17.10 -19.08 = (1.98)
2	18.70%	18.70 -19.08 = (0.38)	18.25%	18.25 -19.08 = (0.83)	18.60%	18.60 -19.08 = (0.48)
3	21.60%	21.60 -19.08 = 2.52	22.15%	22.15 -19.08 = 3.07	22.00%	22.00 - 19.08 = 2.92
		0.41		**0.36**		**0.46**

Alpha Factor:

Fund X α_X $= \Sigma AR_x \div n$ = 0.41 ÷ 3 Years = **0.137%**

Fund Y α_Y $= \Sigma AR_y \div n$ = 0.36 ÷ 3 Years = **0.120%**

Fund Z α_Z $= \Sigma AR_z \div n$ = 0.46 ÷ 3 Years = **0.153%**

Evaluation: Equi-Stable Scheme of Mutual Fund Z has the highest Alpha i.e. it has yielded 0.153% return more than the market expectations, when compared to 0.137% and 0.12% of Fund X and Y. Therefore, Fund Manager of Mutual Fund Z has performed better. Ranking of the fund managers are as follows —

1. → Fund Manager of Z
2. → Fund Manager of X
3. → Fund Manager of Y

Answer: (a)

Particulars	Amount (₹)
Opening NAV	30
Closing NAV	30.06
Capital Appreciation = Closing NAV - Opening NAV = 30.06 - 30.00	0.06
Capital Gain Distribution	0.03
Income during the period	0.0375
Total Return for the period Capital Appreciation + Income + Capital Gains = 0.06 + 0.0375 + 0.03	0.1275
Monthly Return =Total Return ÷ Opening NAV = 0.1275 ÷ 30	0.00425 / 0.425% p.m.
Annual Return = Monthly Return X 12 = 0.425 X 12	5.1% p.a.

4. (a) The Beta Co-efficient of Moon Light Ltd is 1.40. The Company has been maintaining 8% rate of growth in dividends and earnings. The last dividend paid was ₹4 per share. Return on Government Securities is 12%. Return on Market Portfolio is 18%. The Current Market Price of one share of Moon Light Ltd is ₹32.00.

Required —

1. What will be the equilibrium price per share of Moon Light Ltd?

2. Would you advise purchasing the share? 8

(b) Securities X and Y have standard deviations of 3% and 9%. Nitin is having a surplus of ₹20 Lakhs for investment in these two securities. How much should he invest in each of these securities to minimize risk, if the correlation co-efficient for X and Y is — (a) -1; (b) -0.30; (c) 0; (d) 0.60 8

Answer: (a)

1. Required Rate of Return on Shares of Moon Light Ltd

(Based on Capital Asset Pricing Model)

Expected Return = R_f + β of Security X (Rm - Rf)

R_f =Risk Free Return =12%

β = Beta of Security (Moon Light Ltd) = 1.40

R_m = Return on Market Portfolio =18%

Expected Return = 12% + 1.40 x (18% - 12%) = 20.4%

2. Expected Market Price of Shares of Moon Light Ltd

(Based on Dividend Growth Model)

Expected Return = $D_1 / P_0 + G$

D_1 = Dividend at end of Year 1 = Last Years Dividend X (1 + Growth Rate)

= ₹ 4 x (1 + 8%) = ₹ 4 X 1.08 = ₹ 4.32

P_0 = Price at Year Beginning = **To be determined (Expected Price)**

G = Growth Rate in Dividends

20.4 = (₹4.32 ÷ Expected Price) + Growth rate of 8%

Or, 20.4% - 8% = ₹4.32 ÷ Expected Price

Or, Expected Price = ₹4.32 ÷ 12.4% = ₹34.83

3. Evaluation of Shares of Moon Light Ltd

Actual Market Price	₹32.00
Expected Market Price	₹34.83
Inference	Shares of Moon Light Ltd. is underpriced.
Decision	Moon Light Ltd. should be purchased.

Answer: (b)

1. Basic Values of Factors for Determination of Portfolio Risk

Standard Deviation of Security X	X	3%
Standard Deviation of Security Y	Y	9%
Correlation co-efficient of Securities X and Y	XY	-1,- 0.30, 0,0.60
Weight of Security X	W_X	a
Weight of Security Y	W_Y	1-a

2. Computation of Investment in Securities

Proportion of Investment in Security X, $W_X = \frac{\sigma Y^2 - Cov_{xy}}{\sigma X^2 + \sigma Y^2 - 2Cov_{xy}}$

Proportion of Investment in Security Y, $W_Y = 1 - W_X$

$$Cov_{XY} = \rho XY \times \sigma X \times \sigma Y$$

If r_{XY} is	Cov_{XY} is	Computation	Investment
-1	-27 (-1x3x9)	$\rightarrow W_X = [Y^2 - Cov_{XY}] / [X^2 + Y^2 - 2Cov_{XY}]$ $\rightarrow W_X = [9^2 - (-27)] / [3^2 + 9^2 - 2 \times (-27)]$ $\rightarrow W_X = [81 + 27] / [9 + 81 + 54]$ $\rightarrow W_X = 108/144 = 0.75$	0.750 in X 0.250 in Y ₹15,00,000 in X ₹5,00,000 in Y
-0.3	-8.1 (-0.3x3x9)	$\rightarrow W_X = [Y^2 - Cov_{XY}] / [X^2 + Y^2 - 2Cov_{XY}]$ $\rightarrow W_X = [9^2 - (-8.1)] / [3^2 + 9^2 - 2 \times (-8.1)]$ $\rightarrow W_X = [81 + 8.1] / [9 + 81 + 16.2]$ $\rightarrow W_X = 89.1 / 106.2 = 0.839$	0.839 in X 0.161 in Y ₹16,78,000 in X ₹3,22,000 in Y
0	0 (0 x 3 x 9)	$\rightarrow W_X = [Y^2 - Cov_{XY}] / [X^2 + Y^2 - 2Cov_{XY}]$ $\rightarrow W_X = [9^2 - 0] / [3^2 + 9^2 - 2 \times 0]$ $\rightarrow W_X = [81 - 0] / [9 + 81 - 0]$ $\rightarrow W_X = 81/90 = 0.90$	0.900 in X 0.100 inY ₹ 18,00,000 in X ₹ 2,00,000 in Y
0.60	16.2 (0.6 x 3 x 9)	$\rightarrow W_X = [Y^2 - Cov_{XY}] / [X^2 + Y^2 - 2Cov_{XY}]$ $\rightarrow W_X = [9^2 - 16.2] / [3^2 + 9^2 - 2 \times 16.2]$ $\rightarrow W_X = [81 - 16.2] / [9 + 81 - 32.4]$ $\rightarrow W_X = 64.8 / 57.60 = 1.125 > 1$ At this correlation level, risk reduction is not possible.	Reducing Risk below 3% is not possible.

5. (a) Shares of Sandeep Ltd are being quoted at ₹600. 3-Months Futures Contract Rate is ₹636 per share for a lot size of 500 shares. If the Sandeep Ltd is not expected to distribute any dividend in the interim, risk free rate of return is 9%, what is the recommended course of action for a trader in shares?

If the 3-Months Futures Contract Rate is ₹600, what should be the action? 6

(b) Ascertain the value of Options expiring one year later, for the following securities —

1. **ABC Ltd (ABCL) is quoted at ₹110. At the end of 3 Months, the stock price will either be ₹100 or ₹150. Exercise price is ₹120.**
2. **3-Month Options on MN Ltd (MNL) carry an exercise price of ₹350. Stock Price is expected to be ₹250 or ₹450.Presently the shares are traded for ₹380**

Risk Free Rate may be assumed at 12% for continuous discounting. 10

Answer:(a)

1. Computation of Theoretical Forward Rate [TFP]

Particulars	Value
Spot Price [S_x]	₹600
Risk Free Interest Rate [r]	9% or 0.09
Period [t]	3 Mths or 3/12 Yrs i.e. 0.25
Theoretical Forward Rate [TFP_X] = $S_x \times e^{rt}$ = ₹600 × $e^{0.09x0.25}$ = ₹600 × $e^{0.0225}$ = ₹600 × 1.022755	₹613.653

2. Evaluation and Suggested Course of Action

Particulars	Case A	Case B
3-Months Futures Contract Rate [AFP_X]	₹636	₹600
TFP_x Vs. AFP_x	AFP_X is Higher	AFP_X is Lower
Valuation in Futures Market	Overvalued	Undervalued
Action	Buy Spot. Sell Future.	Sell Spot. Buy Future.

Answer: (b)

1. ABC Ltd

(a) Basic Data

Particulars	₹
Stock Price (SP_0)	110
Exercise Price (EP)	120
Expected Future Spot Price on Expiry Date	
• Future Price 1 [FP_1]	100
• Future Price 2 [FP_2]	150

(b) Computation of Option Delta:

Particulars	FP_1	FP_2
Future Spot Price	100	150
Position on Expiry Date (in comparison with Exercise Price)	Out of Money	In the Money
Action on Expiry Date	Lapse	Exercise
Value of Option on Expiry [Future Spot Price **Less** Exercise Price]	—	₹30 [150-120]

Option Delta = Change in Value of Option ÷ Change in Future Spot Price

= (₹30 - 0) ÷ (₹150 - ₹100) = ₹30/₹50 = 0.60

(c) Computation of Amount to be Invested at Risk Free Rate:

= Present Value of Lower Band of Future Spot Price i.e. FP_1

= Present Value of ₹100 discounted at 12% Continuous Compounding for a 3-Month Period

= ₹100 x e^{-rt} =₹100 ÷ e^{rt}

= ₹100 ÷ $e^{0.12 \times 0.25}$= ₹100 ÷ 1.0305 = ₹97.04

(d) Value of Call [C]

= Option Delta X [Current Stock Price Less Amount to be invested at Risk Free Rate]

= 0.60 X (₹110 - ₹97.04) = 0.60 x ₹12.96 = ₹7.78

(e) Value of Put [P] (Under Put Call Parity):

→ Value of Call + Present Value of Exercise Price = Current Spot Price + Value of Put

→ C + EP x e^{-rt} = SP_0 + P

→ ₹7.78 + (₹120 ÷ 1.0305) = ₹110 + P

→ P = ₹7.78 + ₹116.45 - ₹110 = ₹14.23

2. MN Limited

(a) Basic Data

Particulars	₹
Stock Price ($SP_{0)}$	380
Exercise Price (EP)	350
Expected Future Spot Price on Expiry Date	
• Future Price 1 [FP_1]	250
• Future Price 2 [FP_2]	450

(b) Computation of Option Delta

Particulars	FP_1	FP_2
Future Spot Price	250	450
Position on Expiry Date (in comparison with Exercise Price)	Out of Money	In the Money
Action on Expiry Date	Lapse	Exercise
Value of Option on Expiry [Future Spot Price Less Exercise Price]	₹0	₹100 [450 - 350]

Option Delta = Change in value of options ÷ Change in future spot Price

= (₹100 – 0) ÷ (₹450 – ₹250) = ₹100 / ₹200 = 0.50

(c) Computation of Amount to be Invested at Risk Free Rate:

= Present Value of Lower Band of Future Spot Price i.e. FP_1

= Present Value of ₹250 discounted at 12% Continuous Compounding for a 3-Month Period

= ₹250 × e^{-rt} = ₹250 ÷ e^{rt}

= ₹250 ÷ $e^{0.12 \times 0.25}$ = ₹250 ÷ 1.0305 = ₹242.60

(d) Value of Call [C]

= Option Delta × [Current Stock Price Less Amount to be invested at Risk Free Rate]

= 0.50 × (₹380 - ₹242.60) = 0.50 x ₹137.40 = ₹68.70

(e) Value of Put [P] (Under Put Call Parity):

→ Value of Call + Present Value of Exercise Price = Current Spot Price + Value of Put

→ C + EP x e^{-rt} = SP_0 + P

→ ₹68.70 + (₹350 ÷ 1.0305) = ₹380 + P

→ P = ₹68.70 + ₹339.64 - ₹380 = ₹28.34.

6. (a) DS Inc. is considering a new plan in Netherlands. The plan will cost 26 Million Guilders. Incremental Cash Flows are expected to be 3 Million Guilders per year for the first 3 years. 4 Million Guilders for the next 3, 5 Million Guilders in Years 7 to 9, and 6 Million Guilders in years 10 through 19, after which the project will terminate with no residual value.

The present exchange rate is 1.90 Guilders per dollar. The required rate of return on repatriated dollar is 16%.

(a) If the exchange rate states at 1.90, what is the project NPV?

(b) If the guider appreciates to 1.84 for years 1 - 3, to 1.78 for years 4-6,1.72 for years 7-9, and to 1.65 for years 10-19, what happens to the NPV? 10

(b) You have the following quotes from Bank A and Bank B —

	Bank A		Bank B	
Spot	**USD/CHF**	**1.4650/55**	**USD/CHF**	**1.4653/60**
3 Months		**5/10**		
6 Months		**10/15**		
Spot	**GBP/USD**	**1.7645/60**	**GBP /USD**	**1.7640/50**
3 Months		**25/20**		
6 Months		**35/25**		

Calculate —

(a) How much minimum CHF amount you have to pay for 1 Million GBP spot?

(b) Considering the quotes from Bank A only, for GBP / CHF, what are the Implied Swap Points for spot over 3 months? 6

Answer: (a)

1. Net Present Value under Fixed Exchange Rate ($ 1 = Guilders 1.90)

Particulars	Years				
	0	**1- 3**	**4 - 6**	**7 - 9**	**10 - 19**
(a) Cash Flows in Guilders	(26.00)	3.00 p.a.	4.00 p.a.	5.00 p.a.	6.00 p.a.
(b) Exchange Rate [Guilders /$]	1.90	1.90	1.90	1.90	1.90
(c) Cash Flow in $	(13.6842) [26.00/1.90]	1.5789 [3.00/1.90]	2.1053 [4.00/1.90]	2.6312 [5.00/1.90]	3.1579 [6.00/1.90]
(d) Discount Factor @ 16%	1	2.246	1.439	0.922	1.270
(e) Discounted Cash Flow	(13.6842)	3.5462	3.030	2.4260	4.0105

Net Present Value = **US $(0.6715) Million**

Recommendation: Since the Net Present Value is negative, the project should not be accepted.

2. Net Present Value under Variable Exchange Rates

Particulars	Years				
	0	**1-3**	**4-6**	**7 -9**	**10-19**
Cash Flows in Guilders	(26.00)	3.00 p.a.	4.00 p.a.	5.00 p.a.	6.00 p.a.
Exchange Rate [Guilders / $]	1.90	1.84	1.78	1.72	1.65
Cash Flow in $	(13.6842) [26.00/1.90]	1.6304 [3.00/1.84]	2.2472 [4.00/1.78]	2.9070 [5.00/1.72]	3.6364 [6.00/1.65]
Discount Facfor @ 16%	1	2.246	1.439	0.922	1.270
Discounted Cash Flow	(13.6842)	3.6619	3.2337	2.6803	4.6182

Net Present Value = **US $0.5099 Million**

Recommendation: Since the Net Present Value is positive, the project **may be** accepted.

Answer: (b)

1. Determination of Exchange Rates based on Cross Currency Quotes

Note: The Cheapest Available Quote among Bank A and Bank B has been chosen wherever applicable.

For Buying GBP using CHF, the relevant rate is the ask rate for GBP in CHF

Ask CHF / GBP = Ask Rate CHF / USD x Ask Rate USD / GBP

= 1 / (Bid Rate USD / CHF) x 1 /(Bid Rate GBP / USD)

= (1÷1.4653) x (1 ÷ 1.7645) = 0.3868

Therefore to buy 1 Million GBP, the required CHF = 10,00,000 X 0.3868 = CHF 386800

Similarly,

Bid CHF / GBP = Bid CHF / USD x Bid USD / GBP

= 1/ (Ask Rate USD / CHF) x 1 / (Ask Rate GBP / USD)

= (1 ÷1.4655) x (1 ÷ 1.7650) = 0.3866

2. Determination of Swap Points based on Bank A Quotes alone

The Spot Rates for GBP/CHF -

Bid GBP/CHF = Bid USD/CHF x Bid GBP/USD

= 1.4650 x 1.7645 = 2.5850

Ask GBP/CHF = Ask USD / CHF x Ask GBP / USD

= 1.4655 x 1.7660 = 2.5881

The 3 month Futures Rates for GBP/CHF -

Bid GBP /CHF = Bid USD / CHF x Bid GBP / USD

= 1.4655 x 1.7620 = 2.5822

Ask GBP / CHF = Ask USD / CHF x Ask GBP / USD

= 1.4665 x 1.7640 = 2.5869

The implied SWAP points is the difference between the Spot and Forward rates = **0.0028/0.0012 or 28/12.**

7. (a) Your company is considering to acquire an additional computer to supplement its time-share computer services to its clients. It has two options:

(i) To purchase the computer for ₹ 22 lakhs.

(ii) To lease the computer for three years from a leasing company for ₹ 5 lakhs as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of ₹6 lakhs at the end of the third year. Lease rents are payable at the year-end, and the computer reverts to the lessor after the contract period.

The company estimates that the computer under review will be worth ₹ 10 lakhs at the end of third year.

Forecast Revenues are:

Year	1	2	3
Amount (₹ in lakhs)	22.5	25	27.5

Annual operating costs excluding depreciation/lease rent of computer are estimated at `9 lakhs with an additional ₹ 1 lakh for start up and training costs at the beginning of the first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of the computer. Repayments are to be made according to the following schedule:

Year end	1	2	3
Principal (₹'000)	500	850	850
Interest (₹'000)	352	272	136

The company uses straight line method (SLM) to depreciate its assets and pays 50% tax on its income. The management approaches you to advice. Which alternative would be recommended and why?

Note: The PV factor at 8% and 16% rates of discount are:

Year	1	2	3
8%	0.926	0.857	0.794
16%	0.862	0.743	0.641

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(b) You can choose to invest in two shares, A and B.

	E(R)	(σ)
A	10%	10%
B	15%	20%

The correlation between the returns on the two shares is 0.15. Your portfolio consists of 100 A shares and 50 B shares. The current price of A is 50 and the current price of B is 100. Calculate the expected return and standard deviation of the portfolio. 6

Answer:(a)

Working Notes:

(a) Depreciation: ₹ (22,00,000 – 10,00,000)/3 = ₹ 4,00,000 p.a.

(b) Effective rate of interest after tax shield: 0.16 × (1 - 0.50) = 0.08 or 8%.

(c) Operating and training costs are common in both alternatives hence not considered while calculating NPV of cash flows.

Calculation of NPV

1. Alternative I: Purchase of Computer

Particulars	Year 1	Year 2	Year 3
	₹	₹	₹
Instalment Payment			
Principal	5,00,000	8,50,000	8,50,000
Interest	3,52,000	2,72,000	1,36,000
Total (A)	8,52,000	11,22,000	9,86,000
Tax shield @ 50%;			
Interest payment	1,76,000	1,36,000	68,000
Depreciation	2,00,000	2,00,000	2,00,000
Total (B)	3,76,000	3,36,000	2,68,000
Net Cash outflows (A – B)	4,76,000	7,86,000	7,18,000
PV factor at 8%	0.926	0.857	0.794
PV of Cash outflows	4,40,776	6,73,602	5,70,092
Total PV of Cash outflows:			16,84,470
Less: PV of salvage value (₹10 lakhs × 0.794)			7,94,000
Net PV of cash outflows			8,90,470

2. Alternative II: Lease of the Computer

Particulars	Year 1	Year 2	Year 3
	₹	₹	₹
Lease rent	5,00,000	5,00,000	5,00,000
10% of gross revenue	2,25,000	2,50,000	2,75,000
Lump sum payment	-	-	6,00,000
Total Payment	7,25,000	7,50,000	13,75,000
Less: Tax shield @ 50%	3,62,500	3,75,000	6,87,500
Net Cash outflows	3,62,500	3,75,000	6,87,500
PV of Cash outflows @ 8%	3,35,675	3,21,375	5,45,875
Total PV of cash outflows			**12,02,925**

Recommendation:

Since the Present Value (PV) of net cash outflow of Alternative I is lower, the company should purchase the computer.

Answer: (b)

The total value of your A shares is 100 x 50 = ₹ 5000. The total value of your B shares is 50 x 100 = ₹ 5000. Your total wealth is the sum of these values, ₹ 10000. The fraction of your wealth invested in the each share, or portfolio weights, is a half for each asset:

$W_1 = W_A = 5000/10000 = 1/2$

$W_2 = W_2 = 5000/10000 = 1/2$

Covariance between A and B (σ_{12}) = ρ_{12} x σ_1 x σ_2 = 0.15 x 10 x 20 = 30

The expected return and standard deviation of the portfolio is

$E(\tilde{R}_p) = W_1 E(\tilde{R}_1) + W_2 E(\tilde{R}_2) = (1/2 \times 10\%) + (1/2 \times 15\%) = 12.5\%$

$\sigma^2(\tilde{R}_p) = W_1^2\sigma_1^2 + W_2^2\sigma_2^2 + 2w_1w_2\sigma_1\sigma_2\rho_{12}$

$= 0.5^2 . 0.1^2 + 0.5^2 . 0.2^2 + 2\times0.5\times0.5\times0.1\times0.2\times0.15$

$= 0.014$

Therefore, $\sigma(\tilde{R}_p) = \sqrt{\sigma^2(\tilde{R}_p)} = 11.83\%$

8. Write short note on (*any four*) **4×4=16**

(a) Dividend Payout Ratio

(b) DuPont Model

(c) Depository Receipts

(d) Warrants

(e) Collateralised borrowing and Lending Obligation (CBLO)

Answer:

(a) Dividend Payout Ratio

Dividend payout ratio is the fraction of net income a firm pays to its stockholders in dividends:

$$\text{Dividend payout ratio} = \frac{\text{Dividends}}{\text{Net income for the same period}}$$

The part of the earnings not paid to investors is left for investment to provide for future earnings growth. Investors seeking high current income and limited capital growth prefer companies with high Dividend payout ratio. However investors seeking capital growth may prefer lower payout ratio because capital gains are taxed at a lower rate. High growth firms in early life generally have low or zero payout ratios. As they mature, they tend to return more of the earnings back to investors. Note that dividend payout ratio is calculated as DPS/EPS.

Calculated as:

$$= \frac{\text{Yearly Dividend per share}}{\text{Earning per share}}$$

or equivalently

$$= \frac{\text{Dividends}}{\text{Net Income}}$$

The payout ratio provides an idea of how well earnings support the dividend payments. More mature companies tend to have a higher payout ratio.

(b) DuPont model

This breaks ROE down into several components so that one can see how changes in one area of the business changes return on equity.

$$\text{ROE} = \frac{\text{net income}}{\text{revenue}} \times \frac{\text{revenue}}{\text{total assets}} \times \frac{\text{total assets}}{\text{equity}}$$

Return on equity grows, all else equal:

- the more net margin increases,
- the more revenue is generated from a firm's assets,
- The more leveraged a firm becomes.

While the first two seem fairly straight forward, the third one doesn't seem to be, but it really is. If revenue-generating assets are purchased through the use of debt (not equity), then the increased amount of net income generated by that greater amount of assets will increase the return on the fixed amount of equity.

(c) Depository Receipts

A depositary receipt (DR) is a type of negotiable (transferable) financial security that is traded on a local stock exchange but represents a security, usually in the form of equity, that is issued by a foreign publicly listed company. The DR, which is a physical certificate, allows investors to hold shares in equity of other countries. One of the most common types of DRs is the American depositary receipt (ADR), which has been offering companies, investors and traders global investment opportunities since the 1920s.

Since then, DRs have spread to other parts of the globe in the form of global depositary receipts (GDRs) (the other most common type of DR), European DRs and international DRs. ADRs are typically traded on a U.S. national stock exchange, such as the New York Stock Exchange (NYSE) or the American Stock Exchange, while GDRs are commonly listed on European stock exchanges such as the London Stock Exchange. Both ADRs and GDRs are usually denominated in U.S. dollars, but can also be denominated in euros.

(d) Warrants

A warrant is a security that entitles the holder to buy the underlying stock of the issuing company at a fixed exercise price until the expiration date. Some important characteristics to consider include the following:

- A warrant is exercised when the holder informs the issuer of their intention to purchase the shares underlying the warrant.
- A warrant's "premium" represents how much extra you have to pay for your shares when buying them through the warrant as compared to buying them in the regular way.

- A warrant's "gearing" is the way to ascertain how much more exposure you have to the underlying shares using the warrant as compared to the exposure you would have if you buy the shares through the market.
- If you plan on exercising the warrant, you must do so before the expiration date. The more time remaining until expiration, the more time for the underlying security to appreciate, which, in turn, will increase the price of the warrant (unless it depreciates). Therefore, the expiration date is the date on which the right to exercise ceases to exist.
- Like options, there are different exercise types associated with warrants such as American style (holder can exercise anytime before expiration) or European style (holder can only exercise on expiration date).

Sometimes, the issuer will try to establish a market for the warrant and to register it with a listed exchange. In this case, the price can be obtained from a stockbroker. Often, though, warrants are privately held or not registered, which makes their prices less obvious.

(e) Collateralised borrowing and Lending Obligation (CBLO)

The Clearing Corporation of India Ltd. (CCIL) launched a new product- CBLO- on January 20, 2003 to provide liquidity to non-bank entities hit by restrictions on access to the call money market. CBLO is a discounted instrument available in electronic book entry for the maturity period ranging from 1 day to 19 days. The maturity period can range up to one year as per the RBI guidelines. The CBLO is an obligation by the borrower to return the borrowed money, at a specified future date, and an authority to the lender to receive money lent, at a specified future date with an option/privilege to transfer the authority to another person for value received. The eligible securities are central government securities including treasury bills with a residual maturity period of more than six months. There are no restrictions on the minimum denomination as well as lock-in period for its secondary market transactions.

Banks, Cooperative Banks, Financial Institutions, Insurance Companies, Mutual funds, and Primary Dealers who are members of negotiated dealing system (NDS) are allowed to participate in CBLO transactions. Non-members like corporate, NBFCs, pension/provident funds, and trusts are allowed to participate by obtaining associate membership to CBLO segment.

There are two types of markets available for trading in CBLO: the normal market and the auction market. Under normal market, there are two settlement cycles available to members, viz, T+0 and T+1. Normal market is available for all members including associate members. Auction market is available only to NDS members for overnight borrowing and settlement on T+0 basis. Associate members are not allowed to borrow and lend funds in auction market. Currently, the minimum order lot for auction market is fixed at ₹50 lakh and in multiples of ₹5 lakh thereof. The minimum order lot for normal market is fixed at ₹5 lakh and in multiples of ₹5 lakh thereof. Order lot refers to the minimum amount that is required to constitute a successful trade in the auction and normal market.

As the repayment of borrowing under CBLO segment is guaranteed by CCIL, all CBLO members have to maintain collateral or cash margin with the CCIL as cover. CCIL sets up borrowing limits for the members against their deposits of government securities as collaterals.

In order to increase the depth and liquidity in the CBLO market, CCIL is planning to introduce an internet- based trading platform for its CBLO product which would provide access to corporate and other non- banking entities to the institutional lending and borrowing segment of money markets.