Paper 14 - Strategic Financial Management

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Full Marks : 100 **Time allowed: 3 hours**

Answer Question No. 1 which is compulsory and carries 20 marks and any five from Question No. 2 to 8.

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) A safety mutual fund that had a net asset value of ₹ 20 at the beginning of a month, made income and capital gain distribution of ₹0.06 and ₹ 0.04 respectively per unit during the month and then ended the month with a net asset value of ₹ 20.25. The monthly return is:
- **(A) 2.25%**
- **(B) 1.75%**
- **(C) 1.25%**
- **(D) 1.65%**

(ii) Mr. Ravi is planning to purchase the shares of X Ltd. which had paid a dividend of ₹ 2 per share last year. Dividends are growing at a rate of 10%. What price would Mr. Ravi be willing to pay for X Ltd.'s shares if he expects a rate of return of 20%?
- **(A) ₹22**
- **(B) ₹24**
- **(C) ₹20**
- **(D) ₹21**

(iii) The spot price of securities of X Ltd. is ₹160. With no dividend and no carrying cost, compute the theoretical forward price of the securities for 1 month. You may assume a risk free interest rate of 9% p.a.
- **(A) ₹160**
- **(B) ₹162.75**
- **(C) ₹161.20**
- **(D) ₹159.20**

(iv) It is given that ₹/£ quote is ₹94.30 – 95.20 and that ₹/$ quote is 66.25 – 66.45. What would be the $/£ quote?
- **(A) 1.42:1.44**
- **(B) 1.44:1.42**
- **(C) 1.44:1.52**
- **(D) 1.52:1.44**

(v) When are call options and put options said to be 'in the money' in the futures market?
- **(A) In call options when strike price is above the price of underlying futures, call option is 'in the money'. In put options, when the strike price is below the price of underlying futures put option 'is in the money'**
- **(B) In call options when strike price is below the price of underlying futures, call option is 'in the money'. In put options, when the strike price is above the price of underlying futures put option 'is in the money'**
- **(C) None of the above**
- **(D) Both the above.**

(vi) A firm has an equity beta of 1.40 and is currently financed by 25% debt and 75% equity. What will be the company's equity beta if the company changes its financing policy to

33% debt and 67% equity? [Assume corporate tax at 35% and zero debt beta]

(A) 1.62
(B) 1.72
(C) 1.42
(D) 1.52

(vii) XYZ Ltd. has a uniform income that accrues in a 4-year business cycle. It has an average EPS of ₹ 20 (per share of ₹ 100) over its business cycle. Find out the cost of equity capital, if market price is ₹ 175.

(A) 11.43%
(B) 12.43%
(C) 10.43%
(D) 13.43%

(viii) 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) 0.16
(C) 0.19
(D) 0.17

(ix) Compute the theoretical forward price of the following security for 6 months.

Spot Price (S_x)	**₹160**
Risk free interest rate	**9%**

[Given: $e^{0.045} = 1.046028$]

(A) ₹168.3645
(B) ₹ 167.3645
(C) ₹166.3645
(D) ₹165.3645

(x) A project had an equity beta of 1.3 and was going to be financed by a combination of 30% debt and 70% equity. Assuming debt-beta to be zero, calculate the project beta and return from the project taking risk free rate of return to be 10% and return on market portfolio of 18%.

(A) 14.28%
(B) 17.28%
(C) 15.28%
(D) 16.28%

Answer:

(i) — (B) Capital Appreciation = Closing NAV – Opening NAV = ₹20.25 – ₹20 = ₹0.25
Total return = Capital Appreciation + Income + Capital Gain = 0.25 + 0.06 + 0.04
= ₹0.35

Monthly Return = Total Return/Opening NAV = 0.35/20 = 0.0175 = 1.75%

(ii) — (A) $P_0 = D_1 / (K_e - g)$ $D_1 = D_0(1+g) = 2(1+0.10) = ₹2.20$

$P_0 = 2.20/(0.20 - 0.10) = ₹22.$

(iii) — (C)Theoretical forward price of security of X Ltd. [F_X] $= S_x \times e^{rt} = ₹160 \times e^{0.09 \times 0.0833}$
$= ₹160 \times e^{0.0075}$
$= ₹160 \times 1.007528$
$= ₹161.20$

(iv) — (A) The rate for \$/£ is to be calculated.
The formula is –

$$\$/£ = \frac{Re/£_{bid}}{Re/\$_{ask}} : \frac{Re/£_{ask}}{Re/\$_{bid}} = \frac{94.30}{66.45} : \frac{95.20}{66.25} = 1.4190 : 1.4370$$

Or 1.42: 1.44

(v) — (B) In call options when strike price is below the price of underlying futures, call option is 'in the money'.
In put options, when the strike price is above the price of underlying futures put option 'is in the money'.

(vi) — (D) Debt Beta is 0, since it is not given.

Asset beta = Weighted Average Beta of Equity + Weighted Average Beta of Debt
$= [\beta_E \times Equity]/[Equity + Debt \times (1 - tax)] + [\beta_D \times Debt (1 - tax)]/[Equity + Debt \times (1 tax)]$
$= \{(1.40 \times 0.75)/ [0.75 + 0.25 \times (1 - 0.35)]\} + 0 = 1.1507.$

Company's Beta $= [\beta_E \times Equity]/[Equity + Debt \times (1 - tax)] + \{[\beta_D \times Debt (1 - tax)]/[Equity + Debt \times (1 - tax)]\}$

1.1507 $\beta_E \times 0.67] / [0.67 + 0.33 (1 - 0.35)] + 0 ; \beta_E = 1.52.$

(vii) — (A) K_E = [Earnings per share / Market price per share]×100=[₹ 20 /₹175] × 100 = 11.43%.

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

(ix) — (B) Forward price of securities = $₹160 \times e^{(009)(0.50)} = ₹160 \times e^{0.045}$ = ₹ 160 × 1.046028
= ₹ 167.3645.

(x) — (B) B_p is to be ascertained as -

$= [\beta_{equity} + E / (D + E)] + [\beta_{debt} + E / (D + E)] = (1.30 \times 0.70) + (0 \times 0.3) = 0.91$

Computation of return from the project $= R_F + B_p (R_M - R_F) = 0.10 + 0.91 \times (0.18 - 0.10)$
$= 0.1728 = 17.28\ \%.$

SECTION – B [80 marks]

Answer any 5 questions from this section

(2) (a) VEDAVYAS Ltd. is considering two mutually exclusive projects M and project N. The Finance Director thinks that the project with higher NPV should be chosen, whereas the Managing Director thinks that the one with the higher IRR should be undertaken, especially as both projects have the same initial outlay and length of life. The company

anticipates a cost of capital of 10% and the net after-tax cash flow of the projects are as follows:

Year	0	1	2	3	4	5
Cash flows (₹)						
Project M	(4,00,000)	70,000	1,60,000	1,80,000	1,50,000	40,000
Project N	(4,00,000)	4,36,000	20,000	20,000	8,000	6,000

You are required to:

(i) Calculate the NPV and IRR of each project.

(ii) State with reasons, which project you would recommended.

(iii) Explain the inconsistency in the ranking of the two projects.

Present value Table is given:

Year	0	1	2	3	4	5
PVIF at 10%	1.000	0.909	0.826	0.751	0.683	0.621
PVIF at 20%	1.000	0.833	0.694	0.579	0.482	0.402

[5+2+1=8]

(b) A firm has an investment proposal requiring an outlay of ₹1,92,000. The Investment proposal is expected to have two years economic life with no salvage value. In year-end 1, there is a 0.4 probability that cash inflow after tax will be ₹1,20,000 and 0.6 probability that cash inflow after tax will be ₹1,44,000. The probability assigned to cash in flows after tax for the 2nd year-end are as follows:

The cash inflow year –end 1	₹1,20,000		₹1,44,000	
The cash inflow year –end 2	Probability		Probability	
	₹57,600	0.2	96,000	0.4
	₹76,800	0.3	1,20,000	0.5
	₹1,05,600	0.5	1,44,000	0.10

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

(i) Construct a decision tree for the proposed Investment project and calculate the expected Net Present Value.

(ii) What is the most likely NPV of the project and what is the corresponding probability?

(iii) What is the probability of the project having a negative NPV? [4+2+2=8]

Answer:

(2) (a) (i) Calculation of NPV and IRR

NPV of Project M:

year	Cash Flows (₹)	Discount factor (10%)	Discounted Values(₹)	Discount factor (20%)	Discounted Values (₹)
0	(4,00,000)	1.000	(4,00,000)	1.000	(4,00,000)
1	70,000	0.909	63,630	0.833	58,310
2	1,60,000	0.826	1,32,160	0.694	1,11,040
3	1,80,000	0.751	1,35,180	0.579	1,04,220
4	1,50,000	0.683	1,02,450	0.482	72,300
5	40,000	0.621	24,840	0.402	16,080
NPV			58,260		(38,050)

IRR of Project M:

At 20%, NPV is (-) 38,050 and at 10% NPV is 58,260

$$\therefore \text{IRR} = 10 + \frac{58260}{58260 + 38050} \times 10 = 10 + \frac{58260}{96310} \times 10 = 10 + 6.05 = 16.05\%$$

NPV of Project N:

year	Cash Flows (₹)	Discount factor (10%)	Discounted Values(₹)	Discount factor (20%)	Discounted Values (₹)
0	(4,00,000)	1.000	(4,00,000)	1.000	(4,00,000)
1	4,36,000	0.909	3,96,324	0.833	3,63,188
2	20,000	0.826	16,520	0.694	13,880
3	20,000	0.751	15,020	0.579	11,580
4	8,000	0.683	5,464	0.482	3,856
5	6,000	0.621	3,726	0.402	2,412
NPV			37,054		(5,084)

IRR of Project M:

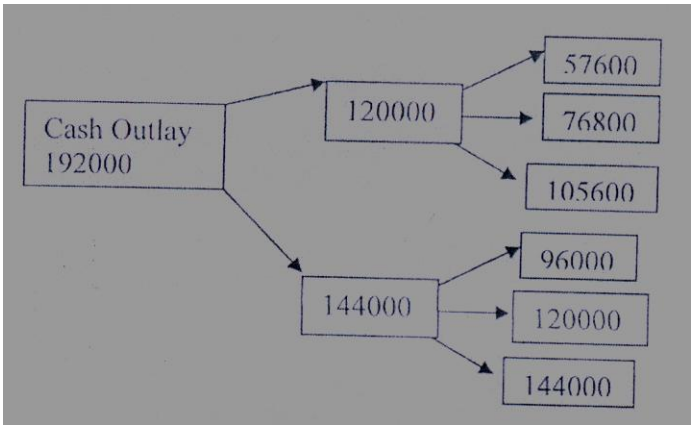
At 20%, NPV = (-) 5,084 and at 10% NPV = 37,054

$$\therefore \text{IRR} = 10 + \frac{37054}{37054 + 5084} \times 10 = 10 + \frac{37054}{42138} \times 10 = 10 + 8.79\% = 18.79\%$$

(ii) Both the projects are acceptable because they generate the positive NVP at the company's cost of capital at 10%. However, the company will have to select PROJECT M because it has higher NPV. If the company follows IRR method, then PROJECT N should be selected because of higher internal rate of return (IRR). But when NPV and IRR give contradictory results, a project with higher NPV is generally preferred because of higher return in absolute terms. Hence, Project M should be selected.

(iii) The inconsistency in the ranking of the projects arises because of the difference in the pattern of the cash flows. Project M's major cash flow occur mainly in the middle three years whereas project N generated the major cash flow in the first year itself.

(b) (i) The decision tree diagram is presented in chart identifying various paths and outcomes and computation of various paths/outcomes and NPV are presented in the following table.



Path No.	Joint Probability
1	0.08
2	012
3	0.20
4	0.24
5	0.30
6	0.06
	1.00

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

Path	Year 1 Cash flow ₹	Year 2 Cash flows ₹	Total Cash in Flow (PV) ₹	Cash Outflow ₹	NPV ₹
1	120000 × 0.9259 = 1,11,108	57,600 ×0 .8573 = 49,380	1,60,488	1,92,000	-31,512
2	1,11,108	76,800 × 0.8573 = 65,841	1,76,949	1,92,000	-15,051
3	1,11,108	1,05,600 × 0 .8573 = 90,531	2,01,639	1,92,000	9,639
4	1,44,000 × 0.9259 = 1,33,330	96,000 × 0.8573 = 82,301	2,15,631	1,92,000	23,631
5	1,33,330	1,20,000 × 0 .8573 = 1,02,876	2,36,206	1,92,000	44,206
6	1,33,330	1,44,000 × 0.8573 = 1,23,451	2,56,781	1,92,000	64,781

Statement Showing Expected Net Present value

Path	NPV (₹)	Joint probability	Expected NPV ₹
1	-31,512	0.08	-2,521
2	-15,051	0.12	-1,806
3	9,639	0.20	1,928
4	23,631	0.24	5,671
5	44,206	0.30	13,262
6	64,781	0.06	3,887
			20,421

(ii) The most likely NPV of the project = ₹44,206; Probability = 0.3 or 30%

(iii) The Probability of negative NPV of the project = Path (1) and (2) = 0.08 + 0.12 = 0.20 or 20%

(3) (a) 'S' invested ₹50000 in debt- orientated fund when NAV was ₹16.10 and sold the units allotted when NAV was ₹17.10 after one year. Assume that there existed an entry load of 2% and no exit load. He received ₹2 per unit as dividend which is taxable at 30% during the year. Ignore capital gains tax. What is the after tax rupee return from this investment?

[6]

(b) Evaluate performance of funds M, N and Market portfolio from the following information

available for the past six months-

Month (Return %)	Apr	May	Jun	July	Aug	Sept
Fund M	**3.25**	**1.50**	**(1.00)**	**3.75**	**1.25**	**0**
Fund N	**2.50**	**(1.25)**	**0**	**2.75**	**2.25**	**1.25**
Market portfolio	**1.00**	**(0.75)**	**2.00**	**1.75**	**0.25**	**3.25**

The 6 month Treasury Bills carry an interest rate of 6% p.a.

[10]

Answer:

(3) (a) 'S' invested ₹50000/- when NAV was ₹16.10 and the sale price was = ₹16.10*1.02 = ₹16.4220. At this price he was issued 3044.70 (50000/16.422) unite. On this he received dividend =₹3044.7 * 2 =₹6.89.40. However, dividends are taxable at 30%. His post tax receipt =(-)₹4262.58. Now if he sells after a year when the NAV is ₹17.10, he gets full value as there is no exit load.

Rupee return in value:

=[Post Tax dividend +(Repurchase Price-Sale Price)* No. of units]

= 4262.58+(17.10-16.422)*3044.7

=6326.89

Rupee return in %

=6326.89/50000*100

=12.65%

(b) Computation of factors

Month	Fund M		Fund N		Market portfolio	
	Return	Risk of loss	Return	Risk of loss	Return	Risk of loss
(1)	(2)	(3)=(2)-0.50 [if (2)<0.50]	(4)	(5)=(4)-0.50 [if (4)<0.50]	(6)	(7)=(6)-0.50 [if (6)<0.50]
Apr	3.25	0.00	2.50	0.00	1.00	0.00
May	1.50	0.00	(1.25)	1.75	(0.75)	1.25
Jun	(1.00)	1.50	0.00	0.50	2.00	0.00
Jul	3.75	0.00	2.75	0.00	1.75	0.00
Aug	1.25	0.00	2.25	0.00	0.25	0.25
Sep	0.00	0.50	1.25	0.00	3.25	0.00
Total	8.75	2.00	7.50	2.25	7.50	1.50
Average	1.46 (8.75/6)	0.33 (2.00/6)	1.25 (7.5/6)	0.38 (2.25/6)	1.25 (7.50/6)	0.25 (1.50/6)

Monthly Risk free Return=6%/12=0.50% p.m.

Computation of Morning Star Index(MSI)

Particulars	Fund M	Fund N	Market Portfolio
Average monthly return[A]	1.46%	1.25%	1.25%
Average monthly Risk of Loss[B]	0.33%	0.38%	0.25%
Morning Star Index (i.e. excess return)[A]-[B]	1.13% [1.46%-0.33%]	0.87% [1.25-0.38]	1%
Ranking	1	3	2

Evaluation: Fund M performed better than the Market portfolio while Fund N has not performed as good as the market portfolio despite having the equivalent average return during the period.

(4) (a) A company has a choice of investments between several Equity- oriented Funds. The company has an amount of ₹1 crore to invest. The details of the funds are as follows:

Mutual Funds	**M**	**N**	**o**	**P**	**Q**
Beta	**1.7**	**1.0**	**0.9**	**2.1**	**0.7**

Required:

(i) If the company invests 20% of its investments in the first two mutual funds, and an equal amount in the mutual funds O, P and Q, what is the beta of the portfolio?

(ii) If the company invests 15% of its investments in O, 15% in M, 10% in Q and the balance in equal amount in the other two mutual funds, what is the beta of the portfolio?

(iii) If the expected return of the market portfolio is 14% at a beta factor of 1.0, what will be the portfolio's expected return in both the situations given above? [3+3+2=8]

(b) Yamuna Ltd. is an un-levered firm and undertakes three projects A, B and C. The risk-free rate of return is 8% and the return from the market is 12%. The projects have a weight of 0.5, 0.3 and 0.2 respectively. Their respective betas are 1.3,1.0 and 0.8.
You are required to compute:

(i) Expected return from each project;

(ii) Expected return for the company; and

(iii) Cost of capital. [3+3+2=8]

Answer:

(4) (a) Investment in M and N at 20 % each, equal proportion in O, P, and Q. Mutual fund

Mutual Fund	Proportion of Investment	Beta	Proportion × Fund beta
M	0.2	1.7	0.34
N	0.2	1.0	0.20
O	0.2	0.9	0.18
P	0.2	2.1	0.42
Q	0.2	0.7	0.14
Portfolio beta			1.28

Investment in O, P, & Q = [1 – Investment in M and N]/3 = 0.6/3 = 20%

Investment in M at 15%, O at 15% and P at 10%, equal proportion in N and P:

Mutual Fund	Proportion of Investment	Beta	Proportion × Fund beta
M	0.15	1.7	0.255
N	0.30	1.0	0.300
O	0.15	0.9	0.135
P	0.30	2.1	0.630
Q	0.10	0.7	0.070
PORTFOLIO BETA			1.390

Investment in N and P = [1- INVESTMENT in M, 0, and Q]/2 =[1 - 0.15 -0.15 -0.1]/2=0.30 =30%

Expected return from portfolio: Note/Assumption: In the absence of risk-free rate of return, it is assumed that the expected return from portfolio is to be computed using Market model, i.e., there is no risk-free return, and the entire fund return moves in line with the market return. CAPM is not applicable.

Expected return = Market return × Portfolio

Situation	Return in %	Return in ₹
A	14% × 1.28 = 17.92%	14 × 17.92% = 17.92 lacs
B	14% × 1.39 = 19.46%	14 × 19.46% lacs

(b) [1] Expected return from each project: $R(A) = R_F + \beta [R_M - R_F]$

Project	Calculation	Project's return
A	8 + 1.3 ×[12- 8]	13.2
B	8 + 1.0 × [12- 8]	12.2
C	8 + 0.8 × [12 - 8]	11.2

[2] Expected return of the asset portfolio of the company:

Project	Weight	Return	W × R
A	0.5	13.2	6.60
B	0.3	12.0	3.60
C	0.2	11.2	2.24
Total			12.44

Overall cost capital: Method 1: Overall cost capital = R_A = 12.44%

Method 2:……

	PROJECT	WEIGHT	BETA	TOTAL BETA
	A	0.5	1.3	0.65
	B	0.3	1.0	0.30
	C	0.2	0.8	0.16
Total				1.11

Working note: CAPM used

$K_e = R_F + \beta [R_M - R_F] = 8 + 1.11 \times [12 - 8] = 12.44\ \%$.

(5) (a) Theoretical Forward Price — no Dividends, no carrying cost compute the theoretical forward price of the following securities for 1 month, 3 months and 6 months —

Securities of	DD Ltd	EE Ltd	FF Ltd
Spot price[S_0]	₹160	₹2600	₹600

You may assume a risk free interest rate of 9% p.a. and 12% p.a.

[8]

(b) Stock of Kamla Woodwork is currently quoted at ₹110. In three months time it could either be ₹90 or ₹135. Ascertain the value of Call Option with an exercise price of ₹120 if the risk free rate of return is 8%. [8]

Answer:

(5) (a) (1) Theoretical Forward Price of Security X [F_x] = $S_x \times e^{rt}$
Where, S_x = Current Spot Price of Security X
r = rate of interest
t = Period in Years

(2) Forward Price of Securities of the Companies:
(i) DD Ltd:

Period (t)	r = 9% p.a. or 0.09	r = 12% p.a. or 0.12
1 Month or 1/12 Year i.e. 0.0833	F_A = ₹160 × $e^{0.09x0.0833}$ = ₹160 × $e^{0.0075}$ =₹160 × 1.007528 = ₹161.20	F_A = ₹160 × $e^{0.12 x 0.0833}$ = ₹160 × $e^{0.01}$ = ₹160 × 1.01005 = ₹161.608
3 Months or 3/12 Year i.e. 0.25	F_A = ₹160 × $e^{0.09x0.25}$ = ₹160 × $e^{0.0225}$ = ₹160 × 1.022755 = ₹163.641	F_A = ₹160 × $e^{0.12 x 0.25}$ = ₹160 × $e^{0.03}$ = ₹160 × 1.030456 = ₹164.873
6 Months or 6/12 i.e. 0.50	F_A = ₹160 × $e^{0.09x0.50}$ = ₹160 × $e^{0.045}$ = ₹160 × 1.046028 = ₹167.3645	F_A = ₹160 × $e^{0.12 x 0.50}$ = ₹160 × $e^{0.06}$ = ₹160 × 1.061837 = ₹169.8939

(ii) EE Ltd.

Period (t)	r = 9% p.a. or 0.09	r = 12% p.a. or 0.12
1 Month or 1/12 Year i.e. 0.0833	F_A = ₹2600 × $e^{0.09x0.0833}$ = ₹2600 × $e^{0.0075}$ =₹2600× 1.007528 = ₹2619.573	F_A = ₹2600 × $e^{0.12 x 0.0833}$ = ₹2600 × $e^{0.01}$ = ₹2600 × 1.01005 = ₹2626.13
3 Months or 3/12 Year i.e. 0.25	F_A = ₹2600 × $e^{0.09x0.25}$ = ₹2600 × $e^{0.0225}$ = ₹2600 × 1.022755 = ₹2659.163	F_A = ₹2600 × $e^{0.12 x 0.25}$ = ₹2600 × $e^{0.03}$ = ₹2600 × 1.030456 = ₹2679.186
6 Months or 6/12 i.e. 0.50	F_A = ₹2600 × $e^{0.09x0.50}$ = ₹2600 × $e^{0.045}$ = ₹2600 × 1.046028 = ₹2719.673	F_A = ₹2600 × $e^{0.12 x 0.50}$ = ₹2600 × $e^{0.06}$ = ₹2600 × 1.061837 = ₹2760.776

(iii) FF Ltd:

Period (t)	r = 9% p.a. or 0.09	r = 12% p.a. or 0.12
1 Month or 1/12 Year i.e. 0.0833	F_A = ₹600 × $e^{0.09x0.0833}$ = ₹600 × $e^{0.0075}$	F_A = ₹600 × $e^{0.12 x 0.0833}$ = ₹600 × $e^{0.01}$

	=₹600× 1.007528 = ₹604.517	= ₹600 × 1.01005 = ₹606.03
3 Months or 3/12 Year i.e. 0.25	F_A = ₹600 × $e^{0.09x0.25}$ = ₹600 × $e^{0.0225}$ = ₹600 × 1.022755 = ₹613.653	F_A = ₹600 × $e^{0.12 x 0.25}$ = ₹600 × $e^{0.03}$ = ₹600 × 1.030456 = ₹618.274
6 Months or 6/12 i.e. 0.50	F_A = ₹600 × $e^{0.09x0.50}$ = ₹600 × $e^{0.045}$ = ₹600 × 1.046028 = ₹627.617	F_A = ₹600 × $e^{0.12 x 0.50}$ = ₹600 × $e^{0.06}$ = ₹600 × 1.061837 = ₹637.102

(b) 10 Basic Data

Factor	Notation	Value
Spot Price	SP_0	₹110
Exercise Price	EP	₹120
Expected Future Spot Price — Lower Limit [FP_1]	FP_1	₹90
Expected Future Spot Price — Higher Limit [FP_2]	FP_2	₹135
Value of Call at Lower Limit [Action = Lapse, since FP_1 < EP. Therefore Value is ₹NIL]	Cd	₹NIL
Value of Call at Upper Limit [Action = Exercise, since FP_2 > EP. Therefore Value is FP_2 - EP = ₹135 - ₹120]	Cu	₹15
Extent of Lower Limit of Future Spot Price [FP_1] on Current Price [SP_0] [FP_1 / SP_0] = ₹90/₹110	d	0.82
Extent of Upper Limit of Future Spot Price [FP_2] on Current Price [SP_0] [FP_2 / SP_0] = ₹135/₹110	u	1.227
risk free rate of return	r	8%
Tenor of Options Contract [in Years] = 3 Months/ 12 Months	t	0.25
Future Value Factor [Continuous Compounding Factor] = $e^{0.08 x 0.25}$	f	1.0202

2. Alternative 1[Formula Method]
$[C_u \{(f-d)/u-d\}]/f$
=[₹15*{(1.0202-0.82)/(1.27-0.82)}+{(1.227-1.0202)/(1.227-0.82)]/1.0202
=[₹15*(0.2002/0.407)+0]/1.0202
=₹15*0.4919/1.0202
=₹7.23

3. Alternative 2 [Decision tree Method] [Requires probability Values]
(a) Computation of probability of FP_1 and FP_2:
Probability of Lower Limit (FP_1) = (u - f) ÷ (u - d) = (1.227 - 1.0202) / (1.227 - 0.82)
= 0.2068 ÷ 0.407 = 0.508
Probability of Higher Limit (FP_2) =1- 0.508 = 0.492
(b) Value of Option [Future Value of Option] Present Value of Call = Future Value X e^{-rt} or Future Value ÷ e^{rt} = ₹7.38 ÷ 1.0202 = ₹7.23 4.

4. Alternative 3 [table Method or Delta Route]
Value of Call = No. of Shares per Call Option × [Current Stock Price - Present Value of Lower Limit of Future Spot Price]
= Option Delta × [SP_0 - (FP_1 × e^{-rt})] = [(15 - 0) / (135 - 90)] × [110 - (90 ÷ 1.0202)]
= [(15/45)] × [110 - 88.22] = 0.3333 × 21.78 = ₹7.26

(6) (a) You are given the middle rates as under:
₹ 80/£ 1 in London,
₹ 47/US $ in Delhi, and

US $ 1.58/£ 1 in New York.
Compute the Arbitrage gain on ₹ 8,00,000. **[8]**

(b) The following information is available for Call option on the stock of MACON LTD:

Current market price	**₹415**
Strike price	**₹400**
Time to expiration (1 year = 360 days)	**90 days**
Standard deviation of return	**22%**
Risk-free rate of interest	**5 %**

You are required to compute the value of call option, using Black- Scholes model.
[Given: $N(d_1) = N(0.5033) = 0.7019$;
$N(d_2) = N(0.3933) = 0.6628$;
Ln (1.0375) = 0.03681; and
E = 2.71828]. **[8]**

Answer:

(6) (a) The following sequential steps will serve the purpose:

(i) Buy US $ in Delhi and get 17,021.277 US $ for ₹ 8L

(ii) Sell the above US $ in N.Y for £ and get (£ 17,021.277 ÷ 1.58) = £ 10,772.96

(iii) Sell the £ obtained in (ii) for INR in London

£ 10,772.96 × 80 = ₹ 8,61,836.80

Arbitrage gain will be ₹ (8,61,836.80 – 8,00,000) = ₹ 61,836.80

(b) $d_1 = [L_n (S / x) + (r + 0.5 \sigma^2]/\sigma\sqrt{t}$
$=[L_n (415 /400) + (0.05 + 0.5 \times 0.22^2) \times 0.25] / [0.22 \times\sqrt{0.25}]$

$= [L_n (1.0375) + 0.01855]/ 0.11 = [L_n (0.03681) + 0.01855] / 0.11 = 0.05536 / 0.11 = 0.5033$

$d_2 = d_1: - \sigma\sqrt{t} = 0.5033-[0.22 \times/o.25] = 0.5033 - 0.1100 = 0.3933$

So, $N(d_1) = N (0.5033) = 0.7019$; AND $N(d_2) = N (0.3933) = 0.6628$

Hence, value of call option $= S \times N(d_1)] - [X \times e^{-rt} \times N(d_2)]$

$= [415 \times 0.7019] - [400/(2.71828)^{0.05 \times 0.25} \times 0.6628]$

$= [291.2885] - [400/1.01258 \times 0.6628] = [291.2885] - [261.8266] = 29.46$

(7) (a) Lotus Finance Ltd. is engaged in leasing business. The company wants your advice to structure the lease of a machine costing ₹30 lacs. The machine will have no salvage value. The life of the machine and the lease period will be 5 years and it has to be fully depreciated in 5 years on straight line basis. The average post-tax cost of funds to Lotus Finance is 10%, but to cover the effects of inflation, they prefer to hike this rate by 2%. Assume tax rate is 50% and that taxes are paid on the last day of the year.

Calculate the minimum annual lease rent to be charged if

(i) the lease rents are payable on the first day of each year.

(ii) the lease rents are payable on the last day of each year;

What is the type of the above lease? Give reasons for your classification. **[5+3+2=10]**

(b) The co- efficient of correlation between returns of Spark Ltd and Sensex is 1.10. The expected returns on the stock of Spark and Sensex are 18% and 14.37% respectively. The return on 182 day T- Bill is 6.31%. What would be the standard deviation of the returns of Spark if the standard deviation of Sensex's return is 17%? [6]

Answer:

(7) (a) (i)

End of Year	0	1	2	3	4	5	Annuity Factor
Inflows: Lease rent	x	x	x	x	x		4.0382
Depreciation Tax Shield 50% $\left[\frac{30-0}{5}\right]$		3	3	3	3	3	3.6052
Outflows: Taxes		(x/2)	(x/2)	(x/2)	(x/2)	(x/2)	3.6052
Initial	(30)						1
P/V factor 12%	1	0.893	0.797	0.712	0.636	0.567	

Minimum lease rental if paid on the 1st day of the year.

$-30 \times 1 - 3.605 \times \frac{x}{2} + 3 \times 3.6052 + x \times 4.0382 = 0.$

$x\,(4.0382 - 1.8026) = 30 - 10.8156$

$= 19.1844$

$x = \frac{19.1844}{2.2356} = 8.58132$

Lease rent = ₹ 8,58,132.

(ii) If lease rents are paid on the last day of the years

$-30 \times 1 + 3.6052 \times \frac{x}{2} + 3 \times 3.6052 = 0.$

$\frac{3.6052 \times x}{2} = 19.1844$

$x = \frac{19.1844}{3.6052} \times 2 = 10.6426273$

∴ Lease rent = 10,64,263

(iii) The type of lease is a financial lease

Reason:

- ❖ Lessor is only the financier, not interested in the asset.
- ❖ Term of the lease is the same as the life of the assets.
- ❖ Cost of the asset fully amortised during the base period.

(b) The return of the Portfolio

$0.18 = RF + (R_M - R_F)\,\beta = 0.0631 + \beta\,(0.1437 - 0.0631)$

Or, $\beta = 0.1169/0.0806 = 1.45$

Again $\beta = (\sigma_i P_{im} / \sigma_m)$

Or $\sigma_i = \beta \sigma_m / P_{im} = (1.45 \times 0.17) / 1.1 = 0.2241$ i.e. 22.41%.

(8) Answer any four questions: [4×4=16]

(a) What do you understand by credit rating? What aspects credit rating do not measure?[4]
(b) Discuss unique features of National Level Commodity Exchanges. [4]
(c) Write short note types of credit risks. [4]
(d) Write short note on NBFC-MFI [4]
(e) Write short note on FCCBs. [4]

Answer:

(8) (a) Credit rating is the assessment of a borrower's credit quality. it is the assessment carried out from the viewpoint of credit-risk evaluation on a specific date, on the quality of a-

- Specific debt-security issued, or
- Obligation undertaken by an enterprise (Term Loans, etc.)

Credit Rating do not measure the following-

1) Investment Recommendation: credit rating does not make any recommendation on whether to invest or not.
2) Investment Decision: They do not take into account the aspects that influence an investment decision.
3) Issue Price: credit rating does not evaluate the reasonableness of the issue price, possibilities for capital gains or liquidity in the secondary market.
4) Risk of Prepayment: ratings do not take into account the risk of prepayment by issuer, or interest or exchange risks.
5) Statutory Compliance: credit rating does not imply that there is absolute compliance of statutory requirements in relation to audit, taxation, etc. by-the issuing company

(b) The unique features of national level commodity exchanges are:

- They are demutualized, meaning thereby that they are run professionally and there is separation of management from ownership. the independent management does not have any trading interest in the commodities dealt with on the exchange.
- They provide online platforms or screen based trading as distinct from the open-out-cry systems (ring trading) seen on conventional exchanges. this ensures transparency in operations as everyone has access to the same information.
- They allow trading in a number of commodities and are hence multi-commodity exchanges.
- They are national level exchanges which facilitate trading from anywhere in the country. This corollary of being an online exchange.

(c) Credit risk can be classified in the following way:

- Credit default risk - The risk of loss arising from a debtor being unlikely to pay its loan obligations in full or the debtor is more than 90 days past due on any material credit obligation; default risk may impact all credit sensitive transactions, including loans, securities and derivatives.
- Counterparty risk – The risk of loss arising from non performance of counterparty in trading activities such as buying and selling of commodities, securities, derivatives and foreign exchange transactions. If inability to perform contractual obligations in

such trading activities is communicated before the settlement date of the transaction, then counterparty risk is in the form of pre-settlement risk, while if one of the counterparty defaults on its obligations on the settlement date, the counterparty risk is in the form of settlement risk.

- Concentration risk - The risk associated with any single exposure or group of exposures with the potential to produce large enough losses to threaten a lender's core operations. It may arise in the form of single name concentration or industry concentration.
- Country risk - The risk of loss arising from sovereign state freezing foreign currency payments (transfer/conversion risk) or when it defaults on its obligations (sovereign risk).

(d) NBFC-MFI is a non-deposit taking NBFC having not less than 85% of its assets in the nature of qualifying assets which satisfy the following criteria:

(i) loan disbursed by an NBFC-MFI to a borrower with a rural household annual income not exceeding ₹ 60,000 or urban and semi-urban household income not exceeding ₹ 1,20,000;

(ii) loan amount does not exceed ₹ 35,000 in the first cycle and ₹ 50,000 in subsequent cycles;

(iii) total indebtedness of the borrower does not exceed ₹ 50,000;

(iv) tenure of the loan not to be less than 24 months for loan amount in excess of ₹ 15,000 with prepayment without penalty; (e) loan to be extended without collateral;

(v) aggregate amount of loans, given for income generation, is not less than 75 per cent of the total loans given by the MFIs;

(vi) loan is repayable on weekly, fortnightly or monthly installments at the choice of the borrower

(e) Foreign Currency Convertible Bonds (FCCBs): They mean bonds issued in accordance with relevant scheme and subscribed by a non-resident in foreign currency and convertible into depository receipts or ordinary shares of the issuing company in any manner, either in whole or in part, on the basis of any equity-related warrants attached to debt instruments. A company seeking to issue FCCBs should have consistent track record of good performance for 3 years.

FCCBs are unsecured; carry a fixed rate of interest and an option for conversion into as fixed number of equity shares of the issuer company. Interest on redemption price (if conversion option is not exercised) is payable in Dollars. Interest rates are very low by Indian domestic standards.

FCCB has been popular with issuers. Local debt markets can be restrictive with comparatively short maturities and high interest rates. On the other hand, a straight equity may cause a dilution in earnings, and certainly dilutions in control, which many shareholders, especially major family shareholders, would find unacceptable. Foreign investors also prefer FCCBs because of dollar-denominated servicing, the conversion option and the arbitrage opportunities presented by conversion of FCCBs into equity at discount on prevailing market-price in India. The major drawbacks are that the issuing company cannot plan capital structure as it is not assured of conversion of FCCBs. In addition, FCCBs would result in creation of external debt for the country, as there would be foreign exchange outflow from the country, if conversion option is not exercised by the investors.

Some other regulations are: (i) Interest payment on bond, until the conversion option is exercised, shall be subjected to TDS; (ii) Conversion of FCCBs into shares shall not give

rise to capital gain in India; and (iii) Transfer of FCCBs shall not give rise to capital gain in India.

Present value factors $\left(\frac{1}{1+x}\right)^n$

End of year (n) / *Rate (x)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
7%	*0.9346*	*0.8734*	*0.8163*	*0.7629*	*0.7130*	*0.6663*	*0.6227*
10%	*0.9091*	*0.8264*	*0.7513*	*0.6830*	*0.6209*	*0.5645*	*0.5132*
12%	*0.8929*	*0.7972*	*0.7118*	*0.6355*	*0.5674*	*0.5066*	*0.4523*
20%	*0.8333*	*0.6944*	*0.5787*	*0.4823*	*0.4019*	*0.3349*	*0.2791*