

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 question No.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, 1mark for justification.) [10×2= 20]

(i) If the risk free rate of interest (R_f) is 10%, and expected return on market portfolio (R_m) is 15%, ascertain expected return of the portfolio if portfolio beta is 0.30.

- (a) 10.5%
- (b) 11.5%
- (c) 12.5%
- (d) 13.5%

(ii) There are two projects, Project A & B. From the given data please. Suggest which project will be selected?

	Project A	Project B
Investment	5000000	7500000
Net Cash Inflow	6250000	9150000

$K = 10\%$

- (a) Project A
- (b) Project B
- (c) A & B both
- (d) None of the above

(iii) 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

(iv) 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

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- (v) A mutual Fund had a Net Asset Value (NAV) of ₹72 at the beginning of the year. During the year, a sum of ₹6 was distributed as Dividend besides ₹ 4 as Capital Gain distributions. At the end of the year, NAV was ₹ 84. Total return for the year is:

- (a) 30.56%
- (b) 31.56%
- (c) 40.56%
- (d) 41.56%

(vi) Sales unit	2,000	2,800
Selling price per unit	₹ 10	₹ 10
EPS	₹ 9.60	₹ 38.40

What is the Degree of Combined Leverage?

- (a) 6.5
- (b) 5.6
- (c) 7.5
- (d) 5.7

- (vii) The following details relate to an investment proposal of XYZ Ltd. Investment outlay — ₹ 100 lakhs Lease Rentals are payable at ₹180 per ₹1,000 Term of lease — 8 years Cost of capital—12% What is the present value of lease rentals, if lease rentals are payable at the end of the year? [Given PV factors at 12% for years (1-8) is 4.9676.

- (a) ₹ 98,14,680
- (b) ₹ 89,41,680
- (c) ₹ 94,18,860
- (d) ₹ 96,84,190

- (viii) A company has obtained quotes from two different manufacturers for an equipment.

The details are as follows:

Product Cost (Million) Estimated life (years) Make X 4.50 10

Make Y 6.00 15

Ignoring operation and maintenance cost, which one would be cheaper? The company's cost of capital is 10%.

[Given: PVIFA (10%, 10 years) = 6.1446 and PVIFA (10%, 15 years) = 7.6061]

- (a) Make X will be cheaper
- (b) Make Y will be cheaper
- (c) Cost will be the same
- (d) None of the above

- (ix) The capital structure of a company is as under:

300000 Equity shares of ₹10 each

32000, 12% Preference shares of ₹100 each

General Reserve ₹15,00,000

Securities Premium Account ₹5,00,000

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25000, 14% Fully Secured Debentures of ₹100 each Term Loan of ₹13,00,000.

Based on these, the leverage of the company is:

- (a) 60.22%
- (b) 58.33%
- (c) 55.21%
- (d) 62.10%

(x) The spot Value of Nifty is 4430. An investor bought a one-month Nifty for 4410 call option for a premium of ₹12. The option is:

- (a) In the money
- (b) At the money
- (c) Out of the money
- (d) Insufficient data.

Answer:

(i) - (b)

Rule for determining Expected Return on Portfolio under CAPM Under Capital Asset Pricing Model (CAPM), $R_p = R_f + (\beta \times (R_m - R_f))$ Notation Particulars Value R_p Expected Return on Portfolio To be computed R_f Risk Free Rate of Interest/ Return 10% β Portfolio Beta 0.30 R_m Expected Return on Market Portfolio 15% Computation of Expected Return on Portfolio Expected Return on Portfolio, $R_p = R_f + \beta \times (R_m - R_f) = 10\% + 0.30(15\% - 10\%) = 11.5\%$

(ii) - (b)

At first, NPV and IRR of the projects are calculated and it has been found that, $NPVA < NPVB$, $IRRA > IRRB$. The above results indicate that there is a conflict in ranking of the projects under NPV and IRR. Such conflict is mainly due to the difference in the initial investment of the projects and it can be resolved using incremental approach as follows. Differential Cash Outflows = 25,00,000, Differential Net Cash Inflows = 29,00,000 We know that IRR is the discount rate at which Present Value of Cash Inflows are equal to the Present Value of Cash Outflows.

So, $25,00,000 = 29,00,000 / (1 + r)^1$

Or, $1 + r = 29,00,000 / 25,00,000$ Or, $r = 1.16 - 1 = 0.16$

IRR (r) of the differential cash flows = 16%, which is greater than Cost of Capital (k).

Therefore, Project with higher non-discounted cash inflows, i.e., Project B would be selected.

(iii) - (d)

0.43 The % spread on Cross rate between the Euro and NZ \$. Let us find out the Cross rate first. $S_{POT} (\text{Euro} / \text{NZ } \$) = (0.5020 \times 1.3904) : (0.5040 \times 1.3908) = 0.6980 : 0.7010$ So, % Spread on Euro to NZ \$ = $[(0.7010 - 0.6980) / 0.6980] \times 100 = 0.4298 = 0.43$.

(iv) - (c)

Theoretical forward price of security of X Ltd. $[F_x] = S_x \times e^{rt} = ₹160 \times e^{0.09 \times 0.0833}$
 $= ₹160 \times e^{0.0075}$
 $= ₹160 \times 1.007528$
 $= ₹161.20$

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(v) - (a)

$$\frac{84 - 72 + 6 + 4}{72} = 30.56\%$$

(vi) - (c) ₹7.5 Degree of Combined leverage

$$\begin{aligned} = \Delta \text{EPS} / \text{EPS} / \Delta \text{Sales} / \text{Sales} &= (38.40 - 9.60) / 9.60 \div (28,000 - 20,000) / 20,000 \\ &= 3 / 0.4 \\ &= ₹7.5 \end{aligned}$$

(vii) - (b) ₹89,41,680

$$\begin{aligned} \text{P. V. of lease rentals} &= ₹18 \text{ lakhs} \times \text{PVI FA (12\%, 8)} \\ &= ₹18 \text{ lakhs} \times 4.9676 \\ &= ₹89,41,680 \end{aligned}$$

(viii) - (a) Make X will be cheaper

Make X
Purchase cost = ₹ 4.50 million
Equivalent annual cost = $4.50 / 6.1446 = ₹ 0.73235$ million

Make Y
Purchase cost = ₹ 6.00 million
Equivalent annual cost = $6.00 / 7.6061 = ₹ 0.78884$ million
Therefore, equivalent annual cost of make X is lower than make Y, make X is suggested to purchase.

(ix) - (b) 58.33%

$$\begin{aligned} \text{a. Fixed Income Funds} &= ₹(32,00,000 + 25,00,000 + 13,00,000) \\ \text{b. Equity Funds} &= ₹(30,00,000 + 15,00,000 + 5,00,000) \\ \text{Leverage} &= a / (a + b) = ₹70,00,000 / ₹120,00,000 = 58.33\% \end{aligned}$$

(x) - (a) In the money Spot Value > Exercise Price/Strike Value => In the money ₹4430 > ₹4410

Section – B

Answer any five questions.

[16×5= 80]

2. (a) M Ltd. is attempting to decide whether or not to invest in a project that requires an initial outlay of ₹ 4 lakhs. The cash flows of the project are known to be made up of two parts, one of which varies independently over time and the other one which display perfect positive correlation. The cash flows of the six-year life of the project are

Year	Perfectly Correlated Components		Independent Component	
	Mean	Standard Deviation	Mean	Standard Deviation
1	40,000	4,400	42000	4000
2	50,000	4,500	50000	4400
3	48,000	3,000	50000	4800
4	48,000	3,200	50000	4000
5	55,000	4,000	52000	4000
6	60,000	4,000	52000	3600

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- (i) Find out the expected value of the NPV and its standard deviation, using a discount rate of 10%
- (ii) Also find the probability that the project will be successful, i.e. $P(NPV > 0)$ and state the assumptions under which this probability can be determined. [12]

(b) A manager is lying to decide which of the three mutually exclusive projects to undertake. Each of the projects could lead to varying net profits which are classified as outcomes I II III. Manager has constructed the following pay –off table or matrix (a conditional profit tables):

Project	I	II	III
A	50,000	65,000	80,000
B	70,000	60,000	75,000
C	90,000	80,000	55,000
Probability	0.25	0.50	0.25

Which project should be undertaken?

[4]

Answer:

(a)

Calculation of NPV

Year	Mean (Perfectly correlated component)	Mean (Independent component)	Expected Value	PV factor @ 10%	Present value
(1)	(2)	(3)	(4) = (2) + (3)	(5)	(6)=(4)X(5)
1	40,000	42,000	82,000	0.909	74,538
2	50,000	50,000	1,00,000	0.826	82,600
3	48,000	50,000	98,000	0.751	73,598
4	48,000	50,000	98,000	0.683	66,934
5	55,000	52,000	1,07,000	0.621	66,447
6	60,000	52,000	1,12,000	0.564	63,168
					4,27,285
Less: Cash outflow					4,00,000
Expected Net Present Value					27,285

Calculation of Standard Deviation for Perfectly Correlated Components

Year	Standard Deviation	PV factor @ 10%	Present Value
1	4,400	0.909	3,999.6
2	4,500	0.826	3,717.0
3	3,000	0.751	2,253.0
4	3,200	0.683	2185.6
5	4,000	0.621	2484.0
6	4,000	0.564	2256.0
			16895.2

Standard Deviation = $\text{Variance}^2 = (16.895.2)^2 = 285447783$
 calculation of variance for independent components

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Year (1)	Standard Deviation (2)	PV Factor @ 10% (3)	Present Value (4)=(2)X(3)	(Present Value) ² (5)
1	4,000	0.909	3,636.0	1,32,20,496
2	4,400	0.826	3,634.4	1,32,08,863
3	4,800	0.751	3,604.8	1,29,94,583
4	4,000	0.683	2,732.0	74,63,824√
5	4,000	0.621	2,484.0	61,70,256
6	3,600	0.564	2,030.4	41,22,524
Variance = 5,71,80,546				

Variance of the Project

$$= \text{Variance of Perfectly Correlated Components} + \text{Variance of Independent Components}$$

$$= (16,895.2)^2 + ₹5,71,80,546 = ₹28,54,47,783 + ₹5,71,80,546$$

$$= ₹34,26,28,329$$

$$\sqrt{\text{Standard Deviation } (\sigma)} = \sqrt{342628329} = 18,510$$

$$(ii) P(NPV \geq 0) = P(z \geq \frac{0-27285}{18510}) = P(z \geq -1.47)$$

$$= 0.5 + 0.4292 (\text{from normal table})$$

$$= 0.9292$$

Hence, the probability that the project will be successful is 92.92%. The assumption made under which this probability can be determined is that the cash flows follow normal distribution with mean (M) is 27,285 and standard deviation (a) is 18,510 as calculated above.

(b) If the project with higher EV of profit were chosen, this would be project C

Outcome	Probability	Project A EV	Project B EV	Project C EV
I	0.25	12500	17500	22500
II	0.50	32500	30000	40000
III	0.25	20000	18750	13750
	1.00	65000	66250	76250

However, If the maximum criteria were applied, the assessment would be as follows:

Project Selected	The worst outcome that could happen	Profit (₹)
A	I	50000
B	II	60000
C	III	55000

Analysis: By choosing B, we are 'guaranteed' a profit of at least ₹60,000, which is more than we would get from project A or C if the worst outcome were to occur for them. The decision would therefore be to choose project B.

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3. (a) Mr. Z has invested in the three mutual funds as per the following details:

Particulars	MF X	MF Y	MF Z
Amount of investment	2,00,000	4,00,000	2,00,000
Net assets value (NAV) at the time of purchase (₹)	10.30	10.10	10.00
Dividend received up to 31.03.2023	6,000	NIL	5,000
NAV as on 31/03/2023	10.25	10.00	10.20
Effective yield p.a. as on 31/03/2023	9.66	11.66	24.15

Assume 1 year = 365 days

Mr. Z has misplaced the documents of his investment. Help him in finding of his original investment after ascertaining the following:

(i) Numbers of units in each scheme,

(ii) Total net present value,

(iii) Total yield,

(iv) Number of days of investment held.

[10]

(b) Sovereign Investments have floated an Equity Based Fund Scheme called "A - Cube", the funds of which will be invested only in stocks and Bonds of Infrastructure and Construction Companies. 60% of the Fund Value is invested in Companies engaged Commercial Construction Services and the other 40% in companies engaged in developing Residential Colonies /Townships. Average Beta of Return from development of residential Townships is measured at 1.9 and that from commercial construction is measured at 1.4. The Benchmark Index yields 11.20% return and RBI Bonds carry an interest rate of 4.25 %.

Ascertain Jensen's Alpha from the following monthly particulars relating to "A- cube ". Opening NAV for January was ₹ 17.75

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Closing NAV	18.60	17.80	18.20	18.00	17.80	16.80	17.20	17.80	17.90	18.10	18.80	18.50
Dividend payment		0.75				1.20	—	—	—	—	—	—

[6]

Answer:

(a) (i) Number of units in each scheme

$$\begin{aligned}
 & \frac{2,000,00}{10.30} = 19,417.48 \\
 \text{MF X} & \text{-----} \rightarrow \text{₹} \\
 & \frac{4,00,000}{10.10} = 39,603.96 \\
 \text{MF Y} & \text{-----} \rightarrow \text{₹} \\
 & \frac{2,00,000}{10.00} = 20,000.00 \\
 \text{MF Z} & \text{-----} \rightarrow \text{₹}
 \end{aligned}$$

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(ii) Total NAV as on 31/03/2023

MF X-----→ 19,417.48 x ₹ 10.25 = ₹ 1,99,029.17
 MF Y-----→ 39,603.96 x ₹ 10.00 = ₹ 3,96,039.60
 MF Z-----→ 20,000.00 x ₹ 10.20 = ₹ 2,04,000.00

(iii) Total yield

Name of Mutual Funds	Capital Yield	Dividend Yield	Total
MF X	₹1,99,029.17-₹ 2,00,000 = ₹ 970.83	₹ 6,000	₹5029.17
MF Y	₹ 3,96,039.60- ₹4,00,000 = ₹ 3960.40	NIL	- ₹3960.40
MF Z	₹ 2,04,000-₹ 2,00,000= ₹ 4000	₹ 5,000	₹ 9,000
Total			₹10,068.00

Total Yield = $\frac{10068.77}{8,00,000} \times 100 = 1.2586\%$

(iv) No. of days' investment was held

Particulars	MF X	MF Y	MF Z
Let numbers of days be	X	Y	Z
Initial investment	2,00,000	4,00,000	2,00,000
Yield (₹)	5029.17	-3960.40	9000
Yield (%)	2.5146	-0.9901	4.5
Period of holding (days)	$\frac{2.5146}{9.66} \times 365$ = 95 days	$\frac{-0.9901}{-11.66} \times 365 = 31$ days	$\frac{4.5}{24.15} \times 365$ = 68 days
Date of original investment	26.12.22	28.02.23	22.01.23

(b) Computation of Return on " A-Cube " Scheme

Months	Op. NAV ₹	Clg NAV ₹	Dividend Distributed ₹	Total Return ₹	Return%
1	2	3	4	5=(4)+(3)-(2)	6=(5)÷(2)× 100
Jan	17.75	18.60		0.85	4.79%
Feb	18.60	17.80	0.75	(0.05)	(0.27%)
Mar	17.80	18.20	---	0.40	2.25%
Apr	18.20	18.00	---	(0.20)	(1.10%)
May	18.00	17.80	---	(0.20)	(1.11%)
Jun	17.80	16.80	1.20	0.20	1.12%
Jul	16.80	17.20	---	0.40	2.38%
Aug	17.20	17.80	---	0.60	3.49%
Sep	17.80	17.90	---	0.10	0.56%
Oct	17.90	18.10	---	0.20	1.12%
Nov	18.10	18.80	---	0.70	3.87%
Dec	18.80	18.50	---	(0.30)	(1.60%)
Total	214.75	215.50	1.95	2.70	15.50%

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therefore, Actual Return from "A-Cube" Scheme is $[R_{A-Cube}]$ 15.50%

2. Computation of Jensen's Alpha

Beta "A-Cube" β_{A-Cube}	CAPM Return $[E(R_{A-Cube})]$	Jensen's Alpha (α)
Weighted Average Beta = 60% x 1.40 + 40% x 1.90 = 0.84+0.76 = 1.60	= $R_f + [\beta_{A-Cube} \times (R_m - R_f)]$ = 4.25% + [1.60 x (11.20% - 4.25%)] = 15.37%	= Actual return - Expected Return = R_{A-Cube} Less $E(R_{A-Cube})$ = 15.50% - 15.37% = 0.13%

Evaluation: Since Jensen's Alpha is positive, it has exceeded the expectations outperformed the market portfolio

4. (a) Mahadev Real Estate Ltd invested at the beginning of year 1 in certain Equity Shares as below:

Name of the Company	No. of Shares	Cost (₹)
M Ltd	1,000 (₹ 100 each)	2,00,000
N Ltd	500 (₹ 10 each)	1,50,000

in Year 1, 10% dividend was paid out by M Ltd., and 30% Dividend paid out by N LTD. At the end of 1 Year, market quotation showed a value of ₹ 220 and ₹ 290 per share for M Ltd. N Ltd respectively.

At the beginning of year 2, Investment advisors indicate –

- (a) that the Dividend from M Ltd. and N Ltd. for the Year 2 are likely to be 20% and 35% respectively and
- (b) that the probabilities of market quotations at the end of Year 2 are as below:

Probability	Price Per Share of M Ltd.	Price per Share of N Ltd.
0.2	220	290
0.5	250	310
0.3	280	330

- (i) Calculate the average Return from the Portfolio for the Year 1
- (ii) Calculate the expected Average Return from the portfolio for the year 2, and
- (iii) Advise Mahadev Real Estate Ltd of the comparative risk in the two Investment by Calculation the Standard Deviation in each case. [10]

(b) Return on portfolios, W and L for the past 4 years are—

Year	1	2	3	4
Portfolio W	12.00%	12.50%	11.50%	13%
Portfolio L	15.00%	11.25%	13.50%	11.00%

Beta factor of the two portfolios are 1.3 and 1.2 respectively. If the market Portfolio fetches 12 % return and RBI bonds. Which are considered risk free, yield 5 % return which of the above two portfolios will an investor prefer? [6]

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Answer:

(a)

1. Calculation of Closing MPS and Total Return for Year 1

Emps = expected market price per share

Gain = Closing MPS less Opening MPS,

DIV = Dividend

Yield = Div+Gain

M LTD.						
Prob.	Clg.	Opg.	Gain.	Div.	Yield	MPS x Prob.
0.2	220	220	0	20	20	44
0.5	250	220	30	20	50	125
0.3	280	220	60	20	80	84
						EMPS=253

N LTD						
Prob.	Clg.	Opg.	Gain.	Div.	Yield	MPS x Prob.
0.2	290	290	0	3.5	3.5	58
0.5	310	290	20	3.5	23.5	155
0.3	330	290	40	3.5	43.5	99
						EMPS=312

2. Calculation of return on portfolio

Particulars	For Year 1		For Year 2	
	M Ltd.	N Ltd.	M Ltd.	N Ltd.
Opening Market Price (P ₀)	200	300	220	290
Clg/Exp. Market Price (P ₁)	220	290	253	312
Return = $\frac{\text{Div}(P_1 - P_0)}{P_0}$	$\frac{10 + (220 - 200)}{200}$	$\frac{3 + (290 - 300)}{300}$	$\frac{20 + (253 - 220)}{220}$	$\frac{3.5 + (312 - 290)}{290}$

3. Computation of Standard Deviation

R_m = Return from M LTD.

D_m = Deviation of M LTD.

R_n = Return from N LTD.

D_n = Deviation of N LTD.

Prob (P)	M Ltd.					N Ltd.					
	R _m	R _i x P	D _m = R _m - 53	D _m ²	P x D _m ²	R _n	R _i x P	D _n = R _n - 53	D _n ²	P x D _n ²	
0.2	20	4	-33	1089	217.80	3.5	0.70	-22	484	96.80	
0.5	50	25	-3	9	4.50	23.5	11.75	-2	4	2.00	
0.3	80	24	27	729	218.70	43.5	13.05	18	324	97.20	
		53	Variance of M LTD		441.00	25.50		Variance of N LTD		196.00	
		Standard deviation = $\sqrt{PD^2} = \sqrt{441}$			21	Standard deviation = $\sqrt{PD^2} = \sqrt{196}$			14		

Comment: Shares of M LTD is riskier as its Standard Deviation is more than the Standard Deviation of N LTD.

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(b)

1. Computation of expected Rate of return under CAPM

$E(R_x)$ $R_F + \beta_x \times (R_M - R_F)$ i.e expected return on portfolio

Risk Free Return R_F 5% i.e Treasury bills

Return On Market Portfolio 12% given

Expected Return on	Portfolio W	Portfolio L
Beta factor	1.3	1.2
expected Return	$5\% + 1.3 \times (12\% - 5\%)$ =14.10%	$5\% + 1.2 \times (12\% - 5\%)$ =13.40%

2. Computation of Alpha Factors

year	Portfolio W		Portfolio L	
	Actual Return	Abnormal Return [AR _w]	Actual Return	Abnormal Return [AR _L]
(1)	(2)	(3) = (2) - E (R _w)	(4)	(5) = (4) - E (R _L)
1	12.00%	12.00% - 14.10% = (2.10%)	15.00%	15.00% - 14.10% = 0.9%
2	12.50%	12.50% - 14.10% = (1.60%)	11.25%	11.25% - 14.10% = (2.85%)
3	11.50%	11.50% - 14.10% = (2.60%)	13.50%	13.50% - 14.10% = (0.6%)
4	13.00%	13.00% - 14.10% = (1.10%)	11.00%	11.00% - 14.10% = (3.10%)
		(7.40)%		(5.65%)

Alpha Factor:

Portfolio W = $\sum AR_w \div n = (7.40\%) \div 4 \text{ Years} = (1.85)$

Portfolio L = $\sum AR_L \div n = (5.65\%) \div 4 \text{ Years} = (1.41)$

3. Expected Return adjusted for Alpha

Alpha adjusted return = Return under CAPM + α

Portfolio W = $E(R_w) + \alpha = 14.10\% - 1.85\% = 12.25\%$

Portfolio L = $E(R_L) + \alpha = 13.40\% - 1.41\% = 11.99\%$

Alpha for Security W is higher than L, indicating its better performance relative to L. Hence, an investor should prefer Portfolio W.

5. (a) Compute the theoretical forward price of the following securities:

Securities	P Ltd	Q Ltd	R Ltd
Spot price	₹ 4,500	₹ 350	₹ 900
Dividend Expected	₹ 50	₹ 20	₹ 50
Dividend Receivable in	2 months	3 months	4 months
6 month's futures contract rate	₹ 4650	₹ 360	₹ 900

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You may assume a Risk Free Interest Rate of 9% p. a. What is the course of action to benefit from futures contract? Is there any arbitrage? [8]

- (b) XYZ Ltd. shares are presently quoted at ₹100. The 3 Month Call Option carries a premium of ₹15 for an Exercise Price of ₹120 and a 3 Month's put option carries a premium of ₹20 for a strike price ₹120.

If the spot price on the expiry date is in the range of ₹90 to ₹160 with an interval of ₹5, calculate Net Pay-Off along with graph for both call option and put option from the option buyer's perspective and option writer's perspective. [8]

Answer:

(a)

Particulars	P LTD	Q LTD	R LTD
Spot Price [Sx]	₹ 4,500	₹ 350	₹ 900
Dividend Expected [Df]	₹ 50	₹ 20	₹ 50
Dividend Receivable in [t]	2 months	3 months	4 months
6 month's futures contract rate	₹ 4650	₹ 360	₹ 900

Particulars	P LTD	Q LTD	R LTD
Present value of dividend [Dp]	$DF \times e^{-rt}$ or $DF \div e^{ert}$ $= ₹ 50 \times e^{-0.09 \times 0.1667}$ $= ₹ 50 \times e^{-0.015}$ $= ₹ 50 \times 0.9851$ $= ₹ 49.255$	$DF \times e^{-rt}$ or $DF \div e^{ert}$ $= ₹ 20 \times e^{-0.09 \times 0.25}$ $= ₹ 20 \times e^{-0.0225}$ $= ₹ 20 \times 0.9775$ $= ₹ 19.555$	$DF \times e^{-rt}$ or $DF \div e^{ert}$ $= ₹ 50 \times e^{-0.09 \times 0.3333}$ $= ₹ 50 \times e^{-0.03}$ $= ₹ 50 \times 0.9704$ $= ₹ 48.52$
Adjusted spot price = $S_x - D_p$	$= ₹ 4500 - ₹ 49.255$ $= ₹ 4,450.744$	$= ₹ 350 - ₹ 19.555$ $= ₹ 330.445$	$= ₹ 900 - ₹ 48.520$ $= ₹ 851.48$
Theoretical forward Price [TFPx] = $S_{Adj} \times e^{ert}$ = 6 months future contract rate [AFPx]	$= ₹ 4,450.745 \times e^{0.09 \times 0.50}$ $= ₹ 4,450.745 \times e^{0.045}$ $= ₹ 4,650$	$₹ 330.445 \times e^{0.09 \times 0.50}$ $= ₹ 330.445 \times e^{0.045}$ $= ₹ 345.645$	$₹ 851.48 \times e^{0.09 \times 0.50}$ $= ₹ 851.48 \times e^{0.045}$ $= ₹ 890.648$
[TFPx] Vs [AFPx] Valuation in Futures Market Recommended Action	$= ₹ 4,650$ AFPx is lower Undervalued Sell Spot. Buy Future	AFPx is Higher Overvalued Buy Spot. Sell Future	AFPx is Higher Overvalued Buy Spot. Sell Future

Conclusion: Since the theoretical Forward Price is different from the Stock Price, Arbitrage exists in all the three cases.

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(b) Calculation of Net Payoff of Call Option Buyer and Writer

Call Option						
Spot Price	Exercise Price (₹)	Gross Payoff	Premium	Action	Net Payoff (Long/Buyer)	Net Payoff (Short/Seller)
90	120	0	15	Lapse	(15)	15
95	120	0	15	Lapse	(15)	15
100	120	0	15	Lapse	(15)	15
105	120	0	15	Lapse	(15)	15
110	120	0	15	Lapse	(15)	15
115	120	0	15	Lapse	(15)	15
120	120	0	15	Lapse	(15)	15
125	120	5	15	Exercise	(10)	10
130	120	10	15	Exercise	(5)	5
135	120	15	15	Exercise	0	0
140	120	20	15	Exercise	5	(5)
145	120	25	15	Exercise	10	(10)
150	120	30	15	Exercise	15	(15)
155	120	35	15	Exercise	20	(20)
160	120	40	15	Exercise	25	(25)
Put Option						
Spot Price	Exercise Price (₹)	Gross Payoff	Premium	Action	Net Payoff (Long/Buyer)	Net Payoff (Short/Seller)
90	120	30	20	Exercise	10	(10)
95	120	25	20	Exercise	5	(5)
100	120	20	20	Exercise	0	0
105	120	15	20	Exercise	(5)	5
110	120	10	20	Exercise	(10)	10
115	120	5	20	Exercise	(15)	15
120	120	0	20	Lapse	(20)	20
125	120	(5)	20	Lapse	(20)	20
130	120	(10)	20	Lapse	(20)	20
135	120	(15)	20	Lapse	(20)	20
140	120	(20)	20	Lapse	(20)	20
145	120	(25)	20	Lapse	(20)	20
150	120	(30)	20	Lapse	(20)	20
155	120	(35)	20	Lapse	(20)	20
160	120	(40)	20	Lapse	(20)	20

6. (a) X Ltd. an Indian company has a payable of US\$ 1,00,000 due in 3 months. The company is considering to cover the payable through the following alternatives:

- i) Forward contract,
- ii) Money market
- iii) Option

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The following information is available with the company: Exchange rate:

Spot	₹/\$45.50/45.55
3-m Forward	45.90/46.00

Interest Rate (%):	Per annum
US	4.5/5.0 (Deposit/Borrow)
India	10.0/11.0 (Deposit/Borrow)

Call option on \$ with a strike price of ₹46 is available at a premium of ₹ 0.10/\$. Put option on \$ with a strike price of ₹ 46.00 is available with a premium of ₹ 0.05/\$.

Treasury department of the company forecasted the future spot rate after 3 months to be:

Spot rate after 3-m Probability

₹ 45.60/\$	0.10
₹ 46.00/\$	0.60
₹ 46.40/\$	0.30

You are required to suggest the best alternative of hedging.

[8]

(b) A firm is contemplating import of a consignment from USA for a value of USD 10,000. It requires 90 days to make payment. Supplier has offered 60 days' interest-free credit and is willing to offer additional 30 days' credit at an interest rate of 6% per annum. The Bankers of the firm offer a short loan for days at 9% per annum. Bankers quotation for Foreign exchange is

- (a) Spot 1 USD = ₹ 46.00,
- (b) 60 days forward 1 USD = ₹ 46.20,
- (c) 90 days forward 1 USD = ₹ 46.35.

You are required to advise the firm as to whether it should—

- (i) Pay the supplier in 60 days or
- (ii) Avail the suppliers offer of 90 days' credit.

[8]

Answer:

(a) :	<u>Exchange rate</u>	<u>₹/\$</u>
	Spot	45.50 / 45.55
	3-m Forward	45.90 / 46.00
	3-m Interest Rate	%
	US	4.5 / 5.0
	India	10.00 / 11.00

- i. Forward Hedge: After 3-m, outflow of ₹ for the month is ₹(1,00,000×46.00) = 46,00,000
- ii. Money Market: The firm should borrow ₹ and convert it into \$ at the spot rate. Then the \$ proceeds for 3-m to be invested and the payable will be settled at maturity out of the \$ investment.

Therefore, \$ to be invested to get \$ 1,00,000 3-m hence is:

$$1,00,000 = \$98,887.52$$

$$\text{To get } \$98,887.52 \text{ the amount of ₹ required is } = (98,887.52 \times 45.55) = ₹ 45,04,326.54.$$

So, the firm has to borrow a sum of ₹ 45,04,326.54.

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Hence, rupee repayment after 3-m is = ₹ 45,04,326.54 × 1 + 0.11 = ₹ 46,28,195.52

- iii. Option Hedge: Since the firm has a \$ liability, it should go long on call \$ option. That means the firm will buy \$ call option with a strike price of ₹ 46.00 at a premium of ₹ 0.10/\$.

So, total premium paid is ₹ (1,00,000 × 0.10) = ₹ 10,000.

Possible spot rate after 3-m (₹/\$)	Whether to exercise Option	Total ₹ outflow	Probability
45.60	No	45,70,000	0.10
46.00	No	46,10,000	0.60
46.40	Yes	46,00,000	0.30

Expected rupee outflow after 3 month is -

$$= ₹(45,70,000 \times 0.10) + ₹(46,10,000 \times 0.60) + ₹(46,10,000 \times 0.30)$$

$$= ₹46,06,000.$$

The firm can also go short on the put option, that is sell \$ put option with a strike price of ₹ 46.00 at a premium of ₹ 0.05/\$. Total premium received is ₹ (1,00,000 × 0.05) = ₹ 5,000

(b) Cash Outflows under the two options are—

Particulars	Alternative 1	Alternative 2
(i) Supplier's Credit	60 days NIL interest	90 days 30 days Credit @ 6 % p.a.
(ii) Bank Loan	30 days @ 9% p.a.	NA
(iii) Amount in USD	10,000	10,000 + (interest) 50 = 10,050 [see pt. (vi)]
(iv) Application forward rate	46.20	46.35
(v) Amount in ₹ [(c) × (d)]	4,62,000	4,65,818
(vi) Interest	$4,62,000 \times 9\% \times \frac{1}{12} = ₹ 3,465$	$10,000 \times 9\% \times 1/12 =$ USD 50
(vii) Total Cash Outflow [(e) + (f)]	₹ 4,65,465	₹ 4,65,818

conclusion: Alternative 1 is better because of lower cash outflow.

7. (a) XYZ. Ltd. is considering the possibility of purchasing a multipurpose machine which cost ₹ 10 lakhs. The machine has an expected life of 5 years. The machine generates ₹ 6 lakhs per year before depreciation and tax, and the management wishes to dispose the machine at the end of 5 years which will fetch ₹ 1 lakh. The depreciation allowable for the machine is 25% on written down value and the company's tax rate is 50%. The company approached a NBFC for a five-year lease for financing the asset which quoted a rate of ₹ 28 per thousand per month. The company wants you to evaluate the proposal with **purchase option.**

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The cost of capital of the company is 12% and for lease option it wants you to consider a discount rate of 16%. [8]

- (b) An investor estimates return on shares in two different companies under four different scenarios as under:

Scenario	Probability of its happening	Return on Security A (%)	Return on Security B (%)
I	0.2	12	10
II	0.4	16	20
III	0.3	18	25
IV	0.1	25	30

You are required to:

- (i) Calculate Expected rate of return if the investor invests all his funds in Security A alone or in Security B alone.
- (ii) Determine the preferred security based on return.
- (iii) Ascertain the risk associated with each of the security.
- (iv) If the investor invests 40% in Security A and 60% in Security B, what is the expected return and the associated risk. [8]

Answer:

(a)

Evaluation of Purchase Option

Particulars	(₹ in lakhs)					
	0	1	2	3	4	5
Initial outlay	(10)	-	-	-	-	-
Operating Profit		6.00	6.00	6.00	6.00	6.00
Less : Depreciation		2.50	1.88	1.40	1.06	0.79
Profit before tax		3.50	4.12	4.60	4.94	5.21
Less : Tax (a.1 50%)		1.75	2.06	2.30	2.47	2.60
Profit after tax		1.75	2.06	2.30	2.47	2.61
Add : Depreciation		2.50	1.88	1.40	1.06	0.79
Salvage value of machine		-	-			1.00
Net cash Inflow		4.25	3.94	3.70	3.53	4.40
Present value factor @ 12%	1.00	0.893	0.797	0.712	0.636	0.567
Present values	(10)	3.80	3.14	2.63	2.25	2.49

Therefore, ₹ (3.80+3.14+2.63+2.25+2.49-10) = ₹ 4.31

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Net present value of the purchase option is ₹ 431000

(₹ in Lakhs)

Particulars	1	2	3	4	5
Operating profit	6.00	6.00	6.00	6.00	6.00
Less ; Lease rent	3.36	3.36	3.36	3.36	3.36
Profit before tax	2.64	2.64	2.64	2.64	2.64
Tax @ 50%	1.32	1.32	1.32	1.32	1.32
Profit after tax	1.32	1.32	1.32	1.32	1.32
Discount factor @ 16%	0.862	0.743	0.641	0.552	0.476
Present values	1.14	0.98	0.85	0.73	0.63

Therefore, ₹ (1.14+0.98+0.85+0.73+0.63) = ₹ 4.33

The net present value of lease option is ₹ 4,33,000.

Suggestion: From the analysis of the above we can observe that NPV of lease option is more than that of purchase option. Hence, lease of machine is recommended.

(b) P= probability, R_A = Return of A, R_B = Return of B, D_A = Deviation of A (R_A-ER_A), D_B = Deviation of B (R_B-ER_B), PR_A =Probability x R_A , ER_A = Expected Return from A i.e. mean , PD_P^2 = Probability x Deviation of portfolio

(i) Expected Return from Security A & Security B

Scenario	Probability (P)	Return (%) R_A	Expected Return (%) = PR_A	Deviation (D) from Mean D_A	Deviation square (D_A^2)	Variance PD_A^2
(1)	(2)	(3)	(4)= (2)*(3)	5=(3)- Σ (4)]	(6)=[(3)- Σ (4)] ²	6=(2)*(5)
I	0.2	12	2.4	-4.7	22.09	4.418
II	0.4	16	6.4	-0.7	0.49	0.196
III	0.3	18	5.4	1.3	1.69	0.507
IV	0.1	25	2.5	8.3	68.89	6.889
	ER_A	71	16.7	σ_A^2		12.01

Scenario	Probability (P)	Return (%) R_B	Expected Return (%) = PR_B	Deviation (D) from Mean D_B	Deviation square (D_B^2)	Variance PD_B^2
(1)	(2)	(3)	(4)= (2)*(3)	5=(3)- Σ (4)]	(5)=[(3)- Σ (4)] ²	6=(2)*(5)
I	0.2	10	2.0	-10.5	110.25	22.05
II	0.4	20	8.0	-0.5	0.25	0.1
III	0.3	25	7.5	4.5	20.25	6.075
IV	0.1	30	3.0	9.5	90.25	9.025
	ER_B	85	20.5	σ_B^2		37.25

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Expected return on Security A=16.7%

Risk on Security A (σ) = $\sqrt{\text{variance}} = \sqrt{12.01} = 3.465$

Expected return on Security B=20.5%

Risk on Security B (σ) = $\sqrt{\text{varaince}} = \sqrt{37.25} = 6.103$

(ii) Preferred Security: Based on return alone, Security B is preferable since it has a higher return at 20.5 %

(iii) Determination of Portfolio Risk :

Standard Deviation of Security A σ_A is 3.465 %

Standard Deviation of Security A σ_B is 6.103 %

Covariance between Security A & B

Scenario	Probability (P)	Deviation from Mean for A(%) D_A	Deviation from Mean for B (%) D_B	Deviation Product $D_A \times D_B$	Covariance COV_{AB}
(1)	(2)	(3)	(4)	(5)	(6)=(2)*(5)
I	0.2	-4.7	-10.5	49.35	9.87
II	0.4	-0.7	-0.5	0.35	0.14
III	0.3	1.3	4.5	5.85	1.755
IV	0.1	8.3	9.5	78.85	7.885
COV_{AB}					19.65

Correlation Co-efficient of A and B

$$P_{AB} = \frac{\text{COV}_{AB}}{\sigma_A \sigma_B} = \frac{19.65}{3.465 \times 6.103} = 0.9292$$

Risk of portfolio i.e. standard deviation of Portfolio A and B [40% and 60% Ratio] (σ) A and B=

$$\begin{aligned} & \sqrt{(3.465^2 \times 0.40^2) + (6.103^2 \times 0.60^2) + 2 \times 0.9292(3.465 \times 0.40 \times 6.103 \times 0.60)} \\ & = \sqrt{1.921 + 13.408 + 9.431} \\ & = \sqrt{24.76} = 4.975\% \end{aligned}$$

Risk Return:= 40% of Return on A+60% Return on B

$$\begin{aligned} & = (0.40 \times 16.7 + 0.60 \times 20.5) \\ & = 6.68 + 12.3 \\ & = 18.98 \end{aligned}$$

8. Write short notes on any four of the following: [4×4=16]

- (a) Optionally Convertible Debentures(OCD) and its advantages.
- (b) Four exchange of India.
- (c) Credit risks and its types.
- (d) Sources of Foreign Currency.
- (e) Major main functions and activities of RBI.

Answer:

(a) These are the debentures that include the option to get converted into equity. The investor has the option to either convert these debentures into shares at price decided by the issuer/ agreed upon at the time of issue.

Advantages of OCD:

(1) Issuer-

- (i) dependence of financial institution is reduced because of the inherent option for conversion.
- (ii) It is possible to maintain Equity Price at a high level, by issuing odd-lot shares consequent to conversion of the debentures, and hence lower floating stocks.

(2) Investor:

- (i) investor gets assured interest during gestation periods of the project, and start receiving dividends once the project is functional and they choose to convert debentures.
- (ii) The investment is secured against the assets of the company, as against company deposits which are unsecured.
- (iii) there is a possibility of capital gain associated with conversion, which compensates for the lower interest rate debentures.

(3) Government:

- (i) Debentures helped in mobilizing significant resources from the public and help in spreading the equity investors, thereby reducing the pressure on financial institutions for their resources.
- (ii) By making suitable tax amendments, benefits are extended to promote these instruments to:
 - A. safe guard the funds of Financial Institutions.
 - B. Encouraging more equity participation, which will also require a higher compliance under Corporate Laws, whereby organizations can be monitored more effectively.

(b) The four exchanges of India are -

(1) National Multi Commodity Exchange of India Ltd.(NMCEIL):

The NMCE is the first demutualized electronic commodity exchange of India granted the National Exchange of Govt. of India and operational since 26th Nov. 2002. The head of it is located in Ahmedabad. There are various commodity trades on NMCE platform including Agro and non-Agro commodities. Promoters of NMCE are CWC, NAFED, GAIICL etc.

(2) National Commodity & Derivatives Exchange Limited (NCDEX):

NCDEX is a public limited company incorporated on April 23 2003 under the companies Act ,1956.It obtained its certificated for commencement of business on may 9 ,2003. It has commenced its operation on December 15 2003.It is professionally managed online multi commodity exchange promoted by ICICI Bank Limited, LIC, NABARD and NSE.

(3) Multi – Commodity Exchange of India Limited (MCX): MCX Inaugurated in November 2003 by Shree Mukesh Ambani, Chairman & managing director ,Reliance Industries Ltd.MCX offers futures trading in the following commodity categories , Agri commodity, bullion cOmodity, Metal- Ferrous & Non – Ferrus , Pulses , Oils & Oilseeds , Energy , Plantation ,Spices and other soft commodity.Key shareholders of MCX are financial Technologies (india) Ltd., State bank of Saurashtra,Sbl Life Insurance Co. Ltd. Union Bank of India, Bank of India, Bank of Boroda, Canara bank ,Corporation Bank. Etc

(4) Indian Commodity Exchange Ltd.(ICEL): It is latest commodity exchange of India started Function from 27 Nov , 09 . It is a Screen based on-line derivatives exchange for commodities and has established a reliable, time- tested and a transparent trading platform.It is also in the process of putting in palce robust assaying and warehousing facilities in order to facilitate deliveries. It is jointly Ne promoted by Reliance exchange next infrastructures limitedand MMTC limited, India bulls Financial Services Ltd.KRIBHCO, Indian Potash Ltd., and IDFC among others ,as its partners.

(c) Credit Risk & Its types: Credit risk refers to the risk that an obligor will default, either willfully or due to incapacity on any type of debt by failing to make payments which it is obligated to do.The risk is primarily that of the lender and includes lost principal and interest, disruption to cash flows and increased collection costs.

Credit risk can be classified in the following way:

(i) 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.

(ii) Counterparty risk: The risk of loss arising from nonperformance 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.

(iii) 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.

(iv) 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) Sources of Foreign Currency: The major sources for raising foreign currency finances are as follows:

1. **Foreign currency term loan** for meeting the foreign currency expenditures towards import of plant, machinery, payment of foreign technical knowhow fees.
2. **Export Credit scheme** like export agencies finance exports of capital goods and related technical services.
3. **External Commercial Borrowings (ECB)** include, raising finance from international markets for plant and machinery imports.
4. **Euro Issues:** subscription can come from any part of the world by various forms like depository receipts mechanism, foreign Currency /Euro Convertibles Issues, debt Route.

(e) The major Functions and activities of RBI: The Reserve Bank is the umbrella network for numerous activities, all related to the nation's financial sector, encompassing and extending beyond the functions of a typical central bank. This section provides an overview of our primary activities:

Monetary Authority→ The main objectives of monetary

Issuer of Currency

Banker and Debt Manager to Government

Banker to Banks

Regular of the Banking System

Manager of Foreign Exchange

Maintaining Financial Stability

Regulator and Supervisor of the Payment and settlement Systems

Developmental Role