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 marks]**

   (i) Given that the strike price is ₹240, the current stock price is ₹225, and risk-free interest rate is 5% p. a., calculate the theoretical minimum price of a put option after 6 months.
   (A) 9.07
   (B) 10.07
   (C) 11.07
   (D) 12.07

   (ii) An investor 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

   (iii) The foreign exchange market prices for US dollar ($) against Indian rupees (₹) are quoted as under:

	Buying	Selling
Spot	65.30	65.50
Three months' forward	66.35	67.20

   Calculate the cost of the forward cover.
   (A) 8.33%
   (B) 8.22%
   (C) 8.11%
   (D) 8.00%

(iv) S invested in a mutual fund when the NAV was ₹13.50 per unit. 90 days later, the NAV was ₹12.45 per unit. During the period S got a cash dividend of ₹1.25 per unit and capital gain distribution of ₹ 0.25. Calculate the annualized return.

(A) 16.51%

(B) 15.51%

(C) 14.51%

(D) 13.51%

(v) Presently, the company's share price is ₹ 120. After 6 months, the price will be either ₹150 with a probability of 0-8 or ₹ 110 with a probability of 0-2. A European call option exists with an exercise price of ₹ 130. What will be the expected value of call option at maturity date?

(A) ₹ 20

(B) ₹ 16

(C) ₹ 18

(D) ₹10

(vi) 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

(vii)A project had an equity beta of 1.4 and was going to be financed by a combination of 25% Debt and 75% Equity (Assume Debt Beta as zero).

Hence, the required rate of return of the project is

(A) 16.72%

(B) 18.30%

(C) 17.45%

(D) 12.00%

(Assume R_f = 12% and R_m = 18%).

(viii) Given for a project:

Annual Cash inflow ₹80,000

Useful life 4 years

Pay-Back period 2.855 years

What is the cost of the project?

(A) ₹ 2,28,500

(B) ₹ 2,28,400

(C) ₹ 2,28,600

(D) ₹ 2,28,700

(ix) Government securities are free from

    (A) Default risk

    (B) Purchasing power risk

    (C) Interest rate risk

    (D) Re-investment risk

(x) Beta of a security measures its

    (A) Diversifiable risk

    (B) Market risk

    (C) Financial risk

    (D) None of the above.

Answer:

1.   (i)   (A)   9.07

Exercise Price	₹ 240
Current Stock Price	₹ 225
Risk free rate of return	5% of 0.05
Time in year (t)	6/12 : 0.5

Theoretical Minimum Price

= Present Value of Exercise Price – Current Stock Price.

= $240 \times e^{-rt} - 225$

  (240 ÷ 1.02532) – 225 = 234.07 – 225 = 9.07

    (ii)   (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

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

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

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

    (iii)   (B)   8.22%

When customer is buying dollar under three month forward cover.

$$\frac{1.05}{66.35} \times \frac{12}{3} \times 100 = 6.33\%$$

When customer is selling dollar under three month forward cover:

$$\frac{1.70}{67.20} \times \frac{12}{3} \times 100 = 10.12\%$$

Cost of forward cover will be:

$\frac{6.33\% + 10.12\%}{2} = 8.22\%$

(iv) (D) 13.51%

Returns = 1.25 + 0.25 – 1.05

= 0.45

Return ÷ Opening NAV = $\frac{0.45}{13.50}$ = 0.033 = 3.33%

Annualised return = $\frac{3.33 \times 365}{90}$ = 13.51% p.a.

(v) (B) ₹ 16

Expected value of call option

Expected share price (₹)	Exercise price (₹)	Call value (₹)	Probability	Call option value (₹)
150	130	20	0.8	16
110	130	0	0.2	0
				16

(vi) (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.

(vii) (B) 18.30%

We know, B_P = [β EQUITY × {E / (D+E)}] + [β DEBT × {D / (D + E)}]

= (1.4 × 0.75) + (0 × 0.25) = 1.05;

Rate of return of the Project   = $R_P = R_F + B_p (R_M – R_F)$ = 12% + 1.05 (18% – 12%)

= 12% + 6.30% = 18.30%

(viii) (B) ₹ 2,28,400

Pay-back period = Cost of project / Annual cash inflow

So, Cost of project = Annual cash inflow × Pay-back period = 80,000 × 2.855 = ₹2,28,400

(ix) (A) Default risk

Government securities are free from default risk since government does not default payment.

(x) (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.

Section - B

Answer any five questions from question nos. 2 to 8. Each question carries 16 marks.

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 cot 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

(b) Determine the risk adjusted net present value of the following projects:

	A	B	C
Net cash outlays (₹)	1,00,000	1,20,000	2,10,000
Project life	5 years	5 years	5 years
Annual cash inflow (₹)	30,000	42,000	70,000
Coefficient of variation	0.4	0.8	1.2

The company selects the risk-adjusted rate of discount on the basis of the co-efficient of variation:

Coefficient of variation	Risk adjusted rate of discount	Present value factor 1 to 5 years at risk adjusted rate of discount
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

[10+6]

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

$\therefore$ 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 N:

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

$\therefore$ 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)

Statement showing the determination of the risk adjusted net present value

Projects	Net cash outlays	Coefficient of variation	Risk adjusted discount rate	Annual cash inflow	PV factor 1-5 years at risk adjusted rate of discount	Discounted cash inflow	Net present value
	₹			₹	₹	₹	₹
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)=(v)x(vi)	(viii)=(vii)-(ii)
A	1,00,000	0.4	12%	30,000	3.605	1,08,150	8,150
B	1,20,000	0.8	14%	42,000	3.433	1,44,186	24,186
C	2,10,000	1.20	16%	70,000	3.274	2,29,180	19,180

3. (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?**

(b) **You are running a portfolio management business and have assembled the following portfolio for client A.**

Scrip	Value	Beta
Infosys	₹5 lakhs	1.21
Hind. Lever	₹8 lakhs	0.97
Hind. Lever	₹5 lakhs	1.09
Reliance	₹5 lakhs	1.09
Tata Motors	₹2 lakhs	1.32

Your client insists that the portfolio should comprise the above 4 scrips alone and that each scrip should be at least 10% of the total portfolio value. You project the Sensex which is currently 4200 to move to 4500 by the end of 3 months and to 4800 by the end of 6 months.

(i) **What will be the value of your portfolio at the end of 3 months and 6 months?**

(ii) **What is the portfolio beta currently?**

(iii) **What could you do to improve the portfolio performance given your view on the market?** **[8+8]**

Answer:

3. (a) (i) 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%

(ii) 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 %

(iii) 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 lakhs
B	14% × 1.39 = 19.46%	14 × 19.46% lakhs

(b)

Current Portfolio	Value (₹)	Weightage	Beta	Port. Beta
Infosys	5,00,000	25%	1.21	0.3025
Hind Lever	8,00,000	40%	0.97	0.3880
Reliance	5,00,000	25%	1.09	0.2725
Tata Motors	2,00,000	10%	1.32	0.1320
	2,00,000	100%		1.0950

End of	Senses	Senses % rise	Portfolio % rise	Port. value
Current	4,200			
3 months	4,500	7.14%	7.82%	21,56,429
6 months	4,800	14.29%	15.64%	23,12,857

The weight age of Tata Motors should be increased as it has highest beta and will outperform the Senses substantially, given the client's condition, other scrip are reduced to the minimum level of 10% weight age each in the portfolio.

Suggested Portfolio	Value (₹)	Weightage	Beta	Port. Beta
Infosys	2,00,000	10%	1.21	0.1210
Hind Lever	2,00,000	10%	0.97	0.097
Reliance	2,00,000	10%	1.09	0.1090
Tata Motors	14,00,000	70%	1.32	0.9240
	20,00,000	100%		1.2510

4. (a) A Ltd., and B Ltd., has the following risk and return estimates

R_A	R_B	σ_A	σ_B	(Correlation coefficient) = r_{AB}
20%	22%	18%	15%	-1.50

Calculate the proportion of investment in A Ltd., and B Ltd., to minimize the risk of Portfolio.

(b) As an investment manager, you are given the following information:

Investment	Initial Price (₹)	Dividend (₹)	Market Price (₹)	Beta
Equity Shares of				
A Ltd.	70	5	140	0.8
B Ltd.	80	5	150	0.7
C Ltd.	90	5	270	0.5
Govt. of India bonds	1,000	160	1,010	0.95

Risk-free return may be taken at 16%.

Required:

(i) Expected rate of return of Portfolio using CAPM.

(ii) Average return of Portfolio [8+8]

Answer:

4. (a) (i) Basic Values of Factors for Determination of Portfolio Risk

Standard Deviation of Security A	σ_A	18%
Standard Deviation of Security B	σ_B	15%
Correlation co-efficient of Securities A and B	ρ_{AB}	-1.50
Weight of Security A	W_A	a
Weight of Security B	W_B	1-a

(ii) Computation of Investment in Security A (W_A)

Proportion or Investment in A Ltd., $W_A = \dfrac{\sigma_A^{\,2} - Cov_{AB}}{\sigma_A^{\,2} + \sigma_B^{\,2} - 2Cov_{AB}}$

Proportion of Investment in B Ltd., $W_B = 1 - W_A$

(a) Computation of Covariance

$Cov_{AB} = \rho_{AB} \times \sigma_A \times \sigma_B$

= -1.50 x 18 x 15 = -405

(b) Proportion of investment in A Ltd.

$W_A = [\sigma_Y^2 - Cov_{XY}] \div [X^2 + Y^2 - 2Cov_{XY}]$

$W_A = [15^2 - (-405)] \div [18^2 + 15^2 - 2 \times (-405)]$

$W_A = [225 + 405] \div [324 + 225 + 810] = 630/1359 = 0.46$

(c) Proportion of investment in B Ltd.

$W_B = 1 - 0.46 = 0.54$

(b) (i) Calculation of expected rate of returns of Portfolios:

Investment	Amount (₹)	Market price (₹)	Capital gain (₹)	Dividend (₹)	Total (₹)
Equity shares of					
A	70	140	70	5	75
B	80	150	70	5	75
C	90	270	180	5	185
Govt. of India bonds	1,000	1,010	10	160	170
Total	1240	1570	330	175	505

Expected rate of return on portfolio = [505/1240] × 100 = 40.73 %.

CAPM Model

$E[RP] = R_F + B \times [R_M - R_F]$

A Ltd = 16 + 0.8 [40.73 -16] = 35.78 %

B Ltd = 16 + 0.7 [40.73 - 16] = 33.31 %

C Ltd = 16 + 0.5 [40.73 - 16] = 28.37 %

G of I Bonds = 16 + 0.95 [40.73 -16] = 39.49 %

(ii) Simple average return of portfolio = [35.78+33.31+28.37+39.49]/4 = 136.95/4 = 34.24 %

Average of Beta = [0.80 + 0.70 + 0.50 + 0.95] /4 = 0.7375.

ALTERNATIVE APPROACH for Average return:

Weighted average return:

Securities	Cost	Proportion	Expected return	Weighted return %
A	70	0.056	35.78	2.004
B	80	0.065	33.31	2.132
C	90	0.073	28.37	2.043
G. Bonds	1,000	0.806	39.49	31.829
	1,240	1.000		37.008

5. **(a) The current price (in Dec 2018) of sugar is ₹40 per kg. Sugar Mill SM expects to produce 200 MT of sugar in February 2019. February futures contract due on 20th February is trading at ₹ 45 per kg. SM wants to hedge itself against a price decline to below ₹45 kg in February. 100% cover is required and each contract is for 10 MT.**

(i) Explain SM's appropriate hedging measure showing cash flows for full value if the price falls to ₹42 per kg in February 2019.

(ii) What is the position of SM in the futures and in the spot market? (1 MT = 1000 kg.)

(b) The equity shares of R Ltd. are being sold at ₹ 210. A 3-month call options is available for a premium of ₹6 per share and a 3 month put option is available for a premium of ₹5 per share. Find out the net pay off of the option holder of the call option and put option given that:

(i) the strike price in both cases is ₹220, and

(ii) the share price on the exercise day is ₹200 or ₹ 210 or ₹230 or ₹240.   [8 + 8]

Answer:

5. **(a)** (i) Quantity to be hedged = $\frac{200 \text{ MT}}{10}$ = 20 futures

Hedging Strategy:

Sell 20 futures in Dec 18 : 20×10×45×1000	₹90,00,000
Buy futures in Feb 19 : 20×10×42×1000	₹84,00,000
Gain in Future Market (A)	₹6,00,000
Price in Spot Market : 20×10×42×1000 (B)	₹84,00,000
Effective price realized [A+B]	₹90,00,000

(ii) SM's position in futures market is short and since SM holds the underlying asset, it is long in the spot market.

(b) Net Pay off (Call Option) for option holder.   ₹

Spot Price on Expiry Date(SP)	Exercise Price (EP)	Value of call [Maximum of (SP-EP), 0]	Action	Option premium	Net pay-off[option holder]
(1)	(2)	(3)= Max[(1-2),0]	(4)	(5)	(6)= (3)-(5)
200	220	200-220 =(-)20,--→0	Lapse	6	(-)6
210	220	210-220 =(-)10-→0	Lapse	6	(-)6
230	220	230-220 =10→0	Exercise	6	4
240	220	240-220=20---→20	Exercise	6	14

Net pay off (put option)   (₹)

Spot Price on Expiry Date(SP)	Exercise Price (EP)	Value of call [Maximum of (EP-SP),0]	Action	Option premium	Net pay-off[option holder]
(1)	(2)	(3)= Max [(2-1),0]	(4)	(5)	(6) =[(3)-(5)]
200	220	20	exercise	5	15
210	220	10	exercise	5	15
230	220	(-)10----------0	lapse	5	(-)5
240	220	(-)20---------0	lapse	5	(-)5

6. (a) Nihar, a foreign exchange dealer, is actively engaged in simultaneously buying and selling same foreign currencies to make guaranteed profit.

The rates prevailing in the market are as follows:

Spot rate	:	₹65.80/$
3 months forward rate	:	₹66.40/$
3 months interest rates	:	₹ : 7% p. a.
		$: 11% p. a.

Discuss the possibility of a net gain in arbitrage if Nihar's borrowing potential is limited to ₹100 million.

(b) An Indian customer who has imported equipment from Germany has approached a bank for booking a forward Euro contract. The delivery is expected six months from now. The following rates are quoted:
($/Euro) spot 0.8453/0.8457
6m-Swap points 15/20
₹/$ spot 46.47/46.57
6m-Swap points 20/30
What rate the bank will quote, if it needs a margin of 0.5%? [10+6]

Answer:

6. (a) 3 month forward rate of dollar is higher (at ₹ 66.40) than the spot rate (₹ 65.80). It implies that the dollar is at premium.

Premium (%) $= \dfrac{₹66.40 - ₹65.80}{65.80} \times \dfrac{12}{3} \times 100 = 3.647$ or 3.65% p.a.

Interest rate differential = 11% – 7% = 4% p.a.

Since the interest rate differential (4%) and premium (3.65%) do not match, there are arbitrage gain possibilities. An arbitrageur (Nihar) can take the following steps in this regard:

(i) Nihar (arbitrageur) borrows, say ₹100 million at 7% for 3 months (as ₹carries lower interest rate)

(ii) He then converts ₹100 million in US $ at the spot rate of ₹65.80 in the spot market. He gets an amount of US $ 1519757 (i.e. 100,000,000/65.80 = 1519756.839 or 1519757)

(iii) He invests US $ 1519757 in the US money market at 11% interest p.a. for 3 months and he obtains interest of US $ 41793 ($ $1519757 \times \dfrac{3}{12} \times \dfrac{11}{100}$)

(iv) Total sum available with arbitrageur, 3 months from now is (US $1519757 + $41793) = US $1561550.

(v) Since he would get US $1561550 after 3 months, he sells forward US $ 1561550 at the rate of ₹66.40.

(vi) As a result of forward deal, at the end of 3 months from now, he would get ₹103686920, i.e. ($ 1561550 x 66.40)

(vii) He refunds ₹100 million borrowed, along with interest due on it. The refunded sum is ₹100,000000 + ₹1750,000 i.e. (₹100,000,000 × $\frac{3}{12}$ × $\frac{7}{100}$) ₹101750000.

(viii) Net gain is ₹103686920 – 101750000 = ₹1936920

(b) For arriving at a quote the bank has to calculate outright forward rates keeping in to consideration the margin of 0.5% as follows:

$/∈ 6m Forward Rates:
Bid rate = 0.8453+0.0015=0.8468
Offer rate = 0.8457+0.0020=0.8477

$/ ₹6m Forward rates
Bid rate = 46.47+0.20=46.67
Offer rate = 46.57+0.30=46.87

In the instant case, the customer needs to pay for imports. He would purchase euros. Therefore he needs a quote of Euro in Rupee terms. Hence, we therefore need to find only ask quote.
(₹/∈) = (₹/$) x ($/∈) = 0.8477 x 46.87
The Bank would quote ₹ 39.73 + 0.5% = ₹ 39.93/∈

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

(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. [9+7]

Answer:

7. **(a)** Working Notes:
   - Depreciation: ₹ 22,00,000 – 10,00,000/3 = ₹ 4,00,000 p.a.
   - Effective rate of interest after tax shield: 0.16 × (1 - 0.50) = 0.08 or 8%.
   - Operating and training costs are common in both alternatives hence not considered while calculating NPV of cash flows.

Calculation of NPV

(i) 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 $\left[\frac{22-10}{3}\times 50\%\right]$	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

(ii) 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
P.V. Factor @ 8%	0.926	0.857	0.794
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.

(b) [i] 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

[ii] 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

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

8. Answer any 4 questions out of 5 **(4*4=16)**

(a) Functions of Secondary Market

(b) Futures contract

(c) State the measures of the potential loss amount due to market risk.

(d) Discuss Regulatory role of RBI

(e) Discuss Currency swap.

Answer:

8. (a) Functions of the Secondary Market:
   - To contribute to economic growth through allocation of funds to the most efficient channel through the process of disinvestment to reinvestment.
   - To facilitate liquidity and marketability of the outstanding equity and debt instruments.
   - To ensure a measure of safety and fair dealing to protect investors' interests.
   - To induce companies to improve performance since the market price at the stock exchanges reflects the performance and this market price is readily available to investors.
   - To provide instant valuation of securities caused by changes in the internal environment.

(b) It is an agreement between two parties to buy or sell a specified and standardized quantity and quality of an asset at certain time in the future at price agreed upon at the time of entering in to contract on the futures exchange. It is entered on centralized trading platform of exchange. It is standardized in terms of quantity as specified by exchange. Contract price of futures contract is transparent as it is available on centralized trading screen of the exchange. Here valuation of Mark-to- Mark position is calculated as per the official closing price on daily basis and MTM margin requirement exists. Futures contract is more liquid as it is traded on the exchange. In futures contracts the clearing- house becomes the counter party to each transaction, which is called novation. Therefore, counter party risk is almost eliminated. A regulatory authority and the exchange regulate futures contract. Futures contract is generally cash settled but option of physical settlement is available. Delivery tendered in case of futures contract should be of standard quantity and quality as specified by the exchange.

(c) Measuring the potential loss amount due to market risk:
   - ❖ As with other forms of risk, the potential loss amount due to market risk may be measured in a number of ways or conventions. Traditionally, one convention is to use Value at Risk. The conventions of using Value at risk are well established and accepted in the short-term risk management practice.
   - ❖ However, it contains a number of limiting assumptions that constrain its accuracy. The first assumption is that the composition of the portfolio measured remains unchanged over the specified period. Over short time horizons, this limiting assumption is often regarded as reasonable. However, over longer time horizons, many of the positions in the portfolio may have been changed. The Value at Risk of the unchanged portfolio is no longer relevant.

- ❖ The Variance Covariance and Historical Simulation approach to calculating Value at Risk also assumes that historical correlations are stable and will not change in the future or breakdown under times of market stress.
- ❖ In addition, care has to be taken regarding the intervening cash flow, embedded options, changes in floating rate interest rates of the financial positions in the portfolio. They cannot be ignored if their impact can be large.

(d) The RBI's Regulatory Role

As the nation's financial regulator, the Reserve Bank handles a range of activities, including:

- Licensing
- Prescribing capital requirements
- Monitoring governance
- Setting prudential regulations to ensure solvency and liquidity of the banks
- Prescribing lending to certain priority sectors of the economy
- Regulating interest rates in specific areas
- Setting appropriate regulatory norms related to income recognition, asset classification, provisioning, investment valuation, exposure limits and the like
- Initiating new regulation

(e) Currency swaps

A currency swap is the one in which principal and fixed rate interest payments on a loan in one currency are exchanged for the same in another currency. Akin to interest rate swaps, the currency swaps are also influenced by comparative advantage. The currency swaps are arrangements whereby currencies are exchanged at a specified exchange rates and specified intervals. The currency swap is a derivative instrument which takes care of both, principal-only-swap and interest rate swap, together. If a company has borrowed in US$ and wants to convert it into a Rupee loan, it can do a currency swap, wherein it will receive from the bank the principal and interest in US$, and pay the bank a fixed Rupee interest rate and also freeze its principal payment for the entire tenure of the loan. Effectively, the Dollar loan becomes a Rupee loan in Indian Rupees.