CA FINAL

GROUP I – PAPER 2

ADVANCED FINANCIAL MANAGEMENT

SUGGESTED ANSWERS

(Series 3)

PART – I (MCQs)

MCQ – 2 marks each														
1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**	**12.**	**13.**	**14.**	**15.**
B	B	B	A	A	A	D	A	A	C	C	B	B	D	B

PART – II (Descriptive Answers)

Answer 1A – 6 Marks

Working Notes:

(i) Calculation of Interest Accrued

Name of Security	Maturity Date	Amount (₹)
10.71% GOI 2033	100 x 100000 x 10.71% x 3/12	2,67,750
10 % GOI 2028	100 x 50000 x 10.00% x 3/12	1,25,000
Total		**3,92,750**

Note: Interests on two remaining securities shall not be considered as last interest was paid on 30.06.2021

(ii) Valuation of Securities

Name of Security	Purchase Amount ₹	Duration of Bonds	Volatility (%)	(+)/(–)	Total Amount ₹
10.71% GOI 2033	1,04,78,000	7.3494	$\frac{7.3494}{1.10}$ x 0.75 = 5.0110	–5,25,053	99,52,947
10% GOI 2028	50,00,000	5.086	$\frac{5.086}{1.05}$ x 0.75 = 3.6329	–1,81,645	48,18,355
9.5% GOI 2026	39,17,200	4.3949	$\frac{4.3949}{1.05}$ x 0.75 = 3.1392	–1,22,969	37,94,231
8.5% SGL 2030	18,27,200	6.5205	$\frac{6.5205}{1.10}$ x 0.75	–81,230	17,45,970

			= 4.4456		
					2,03,11,503

Calculation of NAV

Particulars	**₹ crores**
Value of Securities as computed above	2,03,11,503
Cash in hand	6,72,800
Interest accrued	3,92,750
Less: Liabilities	
Expenditure accrued	2,37,400
Net Assets Value	**2,11,39,653**
No. of units	1,00,000
Net Assets Value per unit (₹ 2,11,39,653/1,00,000)	**₹ 211.40**

Answer 1B – 4 Marks

Working Notes:

(a) P/E Ratio

	XYZ Ltd.	**ABC Ltd.**
Equity shares outstanding (Nos.)	10,00,000	4,00,000
EPS	₹ 40	₹ 28
Profit (EPS x No. of shares)	₹ 4,00,00,000	₹ 1,12,00,000
Market price per share	₹ 250	₹ 160
PE Ratio (MPS/EPS)	**6.25**	**5.71**

(b) EPS after merger

No. of shares to be issued (4,00,000 x 0.70)	2,80,000
Exiting Equity shares outstanding of XYZ Ltd.	10,00,000
Equity shares outstanding after merger	12,80,000
Total Profit (₹ 4,00,00,000 + ₹ 1,12,00,000)	₹ 5,12,00,000
EPS	**₹ 40**

(i) Impact of merger on EPS of both the companies

	XYZ Ltd.	**ABC Ltd.**
EPS after Merger	₹ 40	₹ 28*
EPS before Merger	₹ 40	₹ 28
	Nil	**Nil**

*Equivalent EPS = ₹ 40 x 0.70 = ₹ 28

(ii) Gain from the Merger if exchange ratio is 1: 1

No. of shares to be issued	4,00,000

Exiting Equity shares outstanding of XYZ Ltd.	10,00,000
Equity shares outstanding after merger	14,00,000
Total Profit (₹ 4,00,00,000 + ₹ 1,12,00,000)	₹ 5,12,00,000
EPS	₹ 36.57
Market Price of Share (₹ 36.57 x 6.25)	₹ 228.56
Market Price of Share before Merger	₹ 160.00
Impact (Increase)	**₹ 68.56**

(iii) Gain/loss from the Merger to the shareholders of XYZ Ltd.

Market Price of Share	₹ 228.56
Market Price of Share before Merger	₹ 250.00
Loss from the merger (per share)	**₹ 21.44**

(iv) Maximum Exchange Ratio acceptable to XYZ Ltd. shareholders

Earning after Merger (₹ 40 x 10,00,000 + ₹ 28 x 4,00,000)	₹ 5,12,00,000
PE Ratio of XYZ Ltd.	6.25
Market Value of Firm after Merger (₹ 5,12,00,000 x 6.25)	₹ 32,00,00,000
Existing Value of Shareholders of XYZ Ltd.	₹ 25,00,00,000
Value of Merged entity available to Shareholders of ABC Ltd.	₹ 7,00,00,000
Market Price per Share	₹ 250
Total No. of shares to be issued	2,80,000

Thus, **maximum acceptable ratio shall be 2.80:4.00 i.e. 0.70 share of XYZ Ltd. for one share of ABC Ltd.**

Answer 1C – 4 Marks

(i) Mezzanine Financing.

(ii) Third Stage as per indicative Risk matrix.

(iii) 1 to 3 years.

(iv) Medium risk perception.

Answer 2A – 8 Marks

(i) Average return from the portfolio for the year ended 31.3.2022

Calculation of return on portfolio for 2021-22	**(Calculation in ₹/share)**		
	X Ltd.	**Y Ltd.**	
Dividend received during the year	10	3	
Capital gain/loss by 31.03.22			
Market value by 31.03.22	220	290	
Cost of investment	200	300	

Gain/loss	20	(-)10	
Yield	30	(-)7	
Cost	200	300	
% return	15%	(-)2.33%	
Weight in the portfolio	57	43	
Weighted average return			**7.55%**

(ii) Average return from the portfolio for the year ended 2022-23 shall be calculated using the concept of joint probability as follows:

X Ltd.

Path	Income from Dividend (₹)	Gain from Market Price (₹)	Total Yield (₹)	Joint Prob.	Exp. Yield (₹)
1	10	220 – 220 = 0	10	0.20 x 0.20 = 0.04	0.40
2	10	250 – 220 = 30	40	0.20 x 0.50 = 0.10	4.00
3	10	280 – 220 = 60	70	0.20 x 0.30 = 0.06	4.20
4	15	220 – 220 = 0	15	0.30 x 0.20 = 0.06	0.90
5	15	250 – 220 = 30	45	0.30 x 0.50 = 0.15	6.75
6	15	280 – 220 = 60	75	0.30 x 0.30 = 0.09	6.75
7	20	220 – 220 = 0	20	0.50 x 0.20 = 0.10	2.00
8	20	250 – 220 = 30	50	0.50 x 0.50 = 0.25	12.50
9	20	280 – 220 = 60	80	0.50 x 0.30 = 0.15	12.00
Expected Yield (₹)					49.50
Market Value on 01.04.2022 (₹)					220
% Return					**22.50**

Y Ltd.

Path	Income from Dividend (₹)	Gain from Market Price (₹)	Total Yield (₹)	Joint Prob.	Exp. Yield (₹)
1	1.50	290 – 290 = 0	1.50	0.20 x 0.20 = 0.04	0.06
2	1.50	310 – 290 = 20	21.50	0.20 x 0.50 = 0.10	2.15
3	1.50	330 – 290 = 40	41.50	0.20 x 0.30 = 0.06	2.49
4	2.00	290 – 290 = 0	2.00	0.30 x 0.20 = 0.06	0.12
5	2.00	310 – 290 = 20	22.00	0.30 x 0.50 = 0.15	3.30
6	2.00	330 – 290 = 40	42.00	0.30 x 0.30 = 0.09	3.78
7	3.50	290 – 290 = 0	3.50	0.50 x 0.20 = 0.10	0.35
8	3.50	310 – 290 = 20	23.50	0.50 x 0.50 = 0.25	5.88
9	3.50	330 – 290 = 40	43.50	0.50 x 0.30 = 0.15	6.52
Expected Yield (₹)					24.65
Market Value on 01.04.2022 (₹)					290
% Return					**8.50**

Weight in portfolio (1,00,000 x 220): (50,000 x 290) 60.30:39.70

Weighted average (Expected) return (0.6030 x 22.50 + 0.3970 x 8.50) **16.94%**

(iii) To analyze the risk of each investment we need to calculate the Standard Deviation of each investment as follows:

X Ltd.

Path	Prob. (1)	Yield (₹)	Dev. $P_X - \overline{P_X}$	Square of dev. (2)	(1) x (2)
1	0.04	10	–39.50	1560.25	62.41
2	0.10	40	–9.50	90.25	9.03
3	0.06	70	20.50	420.25	25.22
4	0.06	15	–34.50	1190.25	71.42
5	0.15	45	–4.50	20.25	3.04
6	0.09	75	25.50	650.25	58.52
7	0.10	20	–29.50	870.25	87.03
8	0.25	50	0.50	0.25	0.06
9	0.15	80	30.50	930.25	139.54
					σ^2_M = 456.27

Standard Deviation (σ_X) **21.36**

Y Ltd.

Path	Prob. (1)	Yield (₹)	Dev. $P_Y - \overline{P_Y}$	Square of dev. (2)	(1) x (2)
1	0.04	1.50	–23.15	535.92	21.44
2	0.10	21.50	–3.15	9.92	0.99
3	0.06	41.50	16.85	283.92	17.04
4	0.06	2.00	–22.65	513.02	30.78
5	0.15	22.00	–2.65	7.02	1.05
6	0.09	42.00	17.35	301.02	27.09
7	0.10	3.50	–21.15	447.32	44.73
8	0.25	23.50	–1.15	1.32	0.33
9	0.15	43.50	18.85	355.32	53.30
					σ^2_N = 196.75

Standard Deviation (σ_Y) **14.03**

Answer 2B – 6 Marks

Working Notes:

Computation of Earnings Per Share (EPS)

Particulars		Amount (₹)

Margin of Division A	(₹ 50 crore x 10% x 5%)	25,00,000
Margin of Division B	(₹ 20 crore x 30% x 8%)	48,00,000
Margin of Division C	(₹ 8.5 crore x 2% x 10%)	1,70,000
		74,70,000
No. of Equity Shares		3,00,000
EPS		**₹ 24.90**

(i) Market Price based on One Year Forecast

Expected Market Price at the end of the year = ₹ 24.90 x 10 = ₹ 249

PV of the Expected Price = ₹ 249 x 0.847 = ₹ 210.90

I would **NOT like to purchase the share** as the expected market price of shares is less than its current price of ₹ 250.

(ii) If Earning is expected to grow @ 15%

Year	EPS (₹)	Dividend (₹)	PVF @18%	PV (₹)
1	24.90	–	0.847	–
2	28.64	–	0.718	–
3	32.93	9.88	0.609	6.02
4	37.87	11.36	0.516	5.86
5	43.55	13.07	0.437	5.71
				17.59

Share Price after 5 years = $\frac{13.07\ (1.15)}{0.18 - 0.15}$ = ₹ 501.02

PV of the Market Price after 5 years = ₹ 501.02 x 0.437 = ₹ 218.95

Total PV of Inflows = ₹ 17.59 + ₹ 218.95 = ₹ 236.54

Thus, the **maximum price I would be willing to pay for the share shall be ₹ 236.54.**

Answer 3A – 8 Marks

(i) Expected cash flows:

Year	Net cash flows	PVF	PV @ 10%
0	4,00,000 x 1 = –4,00,000	1.000	–4,00,000
1 to 4	1,00,000 x 0.3 + 1,10,000 x 0.5 + 1,20,000 x 0.2 = 1,09,000	3.169	3,45,421
5	1,09,000 + (20,000 x 0.3 + 50,000 x 0.5 + 60,000 x 0.2) = 1,52,000	0.621	94,392
ENPV			**39,813**

(ii) NPV of the worst case

NPV = –4,00,000 + 1,00,000 x 3.790 + 20,000 x 0.621 = **–₹ 8,580**

NPV of the best case

NPV = –4,00,000 + 1,20,000 x 3.790 + 60,000 x 0.621 = **₹ 92,060**

(iii) Probability of worst case if cash flows are perfectly dependent overtime = **0.3**

Probability of worst case if cash flows are perfectly independent overtime = $(0.3)^5$ = **0.00243**

(iv) NPV of the most likely case = –4,00,000 + (1,10,000 x 3.790) + (50,000 x 0.621) = ₹ 47,950

ENPV = 0.30 x –8,580 + 0.5 x 47,950 + 92,060 x 0.20 = **₹ 39,813**

$\sigma_{NPV} = \sqrt{0.3\,(-8{,}580-39{,}813)^2 + 0.5\,(47{,}950-39{,}813)^2 + 0.2\,(92{,}060-39{,}813)^2}$ = **₹ 35,800**

Therefore, Coefficient of variation = $\frac{₹\ 35{,}800}{₹\ 39{,}813}$ = **0.90**

(v) Risk adjusted out of cost of capital of X Ltd. = 10% – 1% = 9%

Year	Expected net cash flow	PVF @ 9%	PV
0	–4,00,000	1.000	–4,00,000
1 to 4	1,09,000	3.240	3,53,160
5	1,52,000	0.650	98,800
ENPV			**51,960**

Therefore, the project should be **accepted**.

Answer 3B – 6 Marks

Calculation of Maximum Price to be paid for the acquisition of Nishana Ltd. **(₹ Crore)**

Year	**0**	**1**	**2**	**3**	**4**	**5**
Operating cash flow	–	10.00	10.00	10.00	10.00	10.00
Gain on Sale of office premises	20.00	–	–	–	–	–
Synergy Benefits	–	2.00	2.00	2.00	2.00	2.00
Disposal of Nishana Ltd.	–	–	–	–	–	50.00
Net cash flow	**20.00**	**12.00**	**12.00**	**12.00**	**12.00**	**62.00**
PVF @ 20%	1	0.833	0.694	0.579	0.482	0.402
Present value	20.00	10.00	8.328	6.948	5.784	24.924

Total of Present value	**75.984**
Less: Market Value of Debentures	(15.000)
	60.984

Thus, the maximum price to be paid for acquisition of Nishana Ltd. ₹ 60.984 crore.

Answer 4A – 6 Marks

Working Notes:

(i) Initial Investment in US$

Particulars	**Amount**
Initial Outlay	₹ 80,00,000
Additional Working Capital	₹ 10,00,000
Total	₹ 90,00,000

Exchange Rate	₹ 72/US$
Initial Investment in US$	**US$ 1,25,000**

(ii) Expected Exchange Rates

Year		₹/USD
1	₹ 72.00 x (1 + 0.09)/(1 + 0.08)	72.67
2	₹ 72.67 x (1 + 0.09)/(1 + 0.08)	73.34
3	₹ 73.34 x (1 + 0.09)/(1 + 0.08)	74.02
4	₹ 74.02 x (1 + 0.09)/(1 + 0.08)	74.71
5	₹ 74.71 x (1 + 0.09)/(1 + 0.08)	75.40

(iii) Annual Cash Inflows

Particulars	Amount (₹)
Sales (80,000 x ₹ 100)	80,00,000
Less: Variable Cost (80,000 x ₹ 30)	(24,00,000)
Less: Additional Fixed Cost	(5,00,000)
Less: Depreciation [(₹ 80,00,000 – ₹ 20,00,000)/5]	(12,00,000)
Profit Before Tax (PBT)	39,00,000
Less: Tax @ 34%	(13,26,000)
	25,74,000
Add: Depreciation	12,00,000
	37,74,000

(iv) Amount repatriated each year in US$

Year		in ₹	Expected Exchange Rate (₹/US$)	in US$
1	Annual Cash Flow	37,74,000	72.67	**51,933.40**
2	Annual Cash Flow	37,74,000	73.34	**51,458.96**
3	Annual Cash Flow	37,74,000	74.02	**50,986.22**
4	Annual Cash Flow	37,74,000	74.71	**50,513.33**
5	Annual Cash Flow	37,74,000	75.40	**50,053.05**

(v) Release of Working Capital in US$ at the end (₹ 10,00,000/₹ 75.40) = **US$ 13,262.60**

(vi) Salvage Value of Project in US$ (₹ 20,00,000/₹ 75.40) = **US$ 26,525.20**

NPV of the proposed project

Particulars	Period	Cash Flows ($)	PVF @ 8%	PV ($)
Initial Outlay	0	(1,25,000.00)	1.000	(1,25,000.00)
Annual Cash Flow	1	51,933.40	0.926	48,090.33
Annual Cash Flow	2	51,458.96	0.857	44,100.33
Annual Cash Flow	3	50,986.22	0.794	40,483.06
Annual Cash Flow	4	50,513.33	0.735	37,127.30
Annual Cash Flow	5	50,053.05	0.681	34,086.13

Release of Working Capital	5	13,262.60	0.681	9,031.83
Salvage Value of the Project	5	26,525.20	0.681	18,063.66
				1,05,982.64

Since the NPV of the project is positive, it is **feasible**.

Answer 4B – 4 Marks

(i) Current Market Price of Bond

= ₹ 850 (PVIAF 10%, 5) + ₹ 10,000 (PVIF 10%, 5)

= ₹ 850 (3.79) + ₹ 10,000 (0.621) = ₹ 3,221.50 + ₹ 6,210 **= ₹ 9,431.5**

(ii) Macaulay's Duration

Year	Cash flow	P.V. @ 10%		Proportion of bond value	Proportion of bond value x time (year)
1	850	0.909	772.65	0.082	0.082
2	850	0.826	702.10	0.074	0.148
3	850	0.751	638.35	0.068	0.204
4	850	0.683	580.55	0.062	0.248
5	10,850	0.621	6,737.85	0.714	3.57
			9,431.50	1.000	**4.252**

Duration of the Bond is 4.252 years

(iii) Volatility of Bond

$$\text{Volatility of Bonds} = \frac{\text{Duration}}{(1 + \text{YTM})} = \frac{4.252}{1.10} = \mathbf{3.865}$$

(iv) Convexity of Bond

$C^* \times (\Delta Y)^2 \times 100$

$$C^* = \frac{V_+ + V_- - 2V_0}{2V_0 (\Delta Y)^2}$$

Year	Cash flow	P.V. @ 8%		P.V @12%	
1	850	0.926	787.10	0.892	758.20
2	850	0.857	728.45	0.797	677.45
3	850	0.794	674.90	0.712	605.20
4	850	0.735	624.75	0.636	540.60
5	10,850	0.681	7,388.85	0.567	6,151.95
			10,204.05		8,733.40

$$C^* = \frac{10,204.05 + 8,733.40 - 2 \times 9,431.50}{2 \times 9,431.50 \times (0.02)^2}$$

= 74.45/7.5452 = 9.867

Convexity of Bond = 9.867 x $(0.02)^2$ x 100 **= 0.395%**

Answer 4C – 4 Marks

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

Following are some **similarities between Tokenization and Securitization**:

(i) **Liquidity:** First and foremost both Securitization and Tokenization inject liquidity in the market for the assets which are otherwise illiquid assets.

(ii) **Diversification:** Both help investors to diversify their portfolio thus managing risk and optimizing returns.

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

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

Answer 5A – 6 Marks

(i) **Contract Value (₹ 17,300 x 50 x 2) = ₹ 17,30,000**

Initial Margin (10% of 17,30,000) = ₹ 1,73,000

Maintenance Margin (80% of 1,73,000) = ₹ 1,38,400

Statement showing the daily balances in Margin A/c and margin call, if any:

Day	Change in Future value (₹)	Margin A/c (₹)	Call Money (₹)
31/08/2025	–	1,73,000	–
01/09/2025	(₹ 17,340 – ₹ 17,300) x 50 x 2 = 4,000	1,77,000	–
02/09/2025	(₹ 17,180 – ₹ 17,340) x 50 x 2 = –16,000	1,61,000	–
03/09/2025	(₹ 16,990 – ₹ 17,180) x 50 x 2 = –19,000	1,42,000	–
06/09/2025	(₹ 16,900 – ₹ 16,990) x 50 x 2 = –9,000	1,73,000	40,000
07/09/2025	(₹ 17,120 – ₹ 16,900) x 50 x 2 = 22,000	1,95,000	–

(ii) Gain or Loss of Mr. R squared off position on 07/09/25

	(₹)
Ending margin	1,95,000
Less: Initial Margin	(1,73,000)
	22,000
Less: Margin Call	(40,000)
Loss	**(18,000)**

OR, Loss = ₹ (17,120 – 17,300) x 50 x 2 = (₹ 18,000)

(iii) Statement showing the daily balances in Margin A/c, if Mr. R had taken the short position:

Day	Change in Future value (₹)	Margin A/c (₹)	Call Money (₹)

31/08/2025	–	1,73,000	–
01/09/2025	(₹ 17,300 – ₹ 17,340) x 50 x 2 = –4,000	1,69,000	–
02/09/2025	(₹ 17,340 – ₹ 17,180) x 50 x 2 = 16,000	1,85,000	–
03/09/2025	(₹ 17,180 – ₹ 16,990) x 50 x 2 = 19,000	2,04,000	–
06/09/2025	(₹ 16,990 – ₹ 16,900) x 50 x 2 = 9,000	2,13,000	–
07/09/2025	(₹ 16,900 – ₹ 17,120) x 50 x 2 = –22,000	1,91,000	–

Gain or Loss on Short Position

	(₹)
Ending margin	1,91,000
Less: Initial Margin	(1,73,000)
Gain	**18,000**

OR, Gain = ₹ (17,300 – 17,120) x 50 x 2 = ₹ 18,000

Answer 5B – 4 Marks

(i) We can compute the Portfolio variance on the basis of Correlation between each pair of securities as follows:

$= (W_A \times W_A \times \sigma^2_A) + (W_A \times W_B \times Cov_{AB}) + (W_A \times W_C \times Cov_{AC}) + (W_B \times W_A \times Cov_{AB}) + (W_B \times W_B \times \sigma^2) + (W_B \times W_C \times Cov_{BC}) + (W_C \times W_A \times Cov_{CA}) + (W_C \times W_B \times Cov_{CB}) + (W_C \times W_C \times \sigma^2_C)$

= (0.20 x 0.20 x 0.015) + (0.20 x 0.50 x 0.030) + (0.20 x 0.30 x 0.020) + (0.20 x 0.50 x 0.030) + (0.50 x 0.50 x 0.025) + (0.50 x 0.30 x 0.040) + (0.30 x 0.20 x 0.020) + (0.30 x 0.50 x 0.040) + (0.30 x 0.30 x 0.10)

= 0.0006 + 0.0030 + 0.0012 + 0.0030 + 0.00625 + 0.0060 + 0.0012 + 0.0060 + 0.0090

= 0.0363

(ii) To compute the Portfolio variance considering the Co-movement between securities due to change in the market index first we shall compute the Beta of the portfolio is as follows:

0.20 x 0.40 + 0.50 x 0.50 + 0.30 x 1.10 = 0.66

Then we shall compute the Residual Variance by separating the Systematic Risk from total risk as follows:

Systematic Risk of each security shall be computed as follows:

$\beta^2_A \times \sigma^2_M = (0.40)^2 (0.01) = 0.0016$

$\beta^2_A \times \sigma^2_M = (0.50)^2 (0.01) = 0.0025$

$\beta^2_A \times \sigma^2_M = (1.10)^2 (0.01) = 0.0121$

The Residual Variance of each security

A 0.015 – 0.0016 = 0.0134

B 0.025 – 0.0025 = 0.0225

C 0.100 – 0.0121 = 0.0879

Then Portfolio variance shall be computed using Sharpe Index Model as follows:

Systematic Variance of Portfolio = $(0.10)^2 \times (0.66)^2$ **= 0.004356**

Unsystematic Variance of Portfolio = $0.0134 \times (0.20)^2 + 0.0225 \times (0.50)^2 + 0.0879 \times (0.30)^2$

= 0.014072

Total Variance = 0.004356 + 0.014072 **= 0.018428**

Answer 5C – 4 Marks

(i) Semi-annual fixed payment

= (N) (AIC) (Period)

Where,

N = Notional Principal amount = ₹ 20,000 x 25 = ₹ 5,00,000

20,000 = 5,00,000 x AIC (180/360)

20,000 = 5,00,000 x AIC (0.5)

AIC (0.5) = 20,000/5,00,000

AIC = 0.04/0.5 = .08 i.e. **8%**

(ii) Floating Rate Payment

18,000 = (N) (LIBOR) (dt/360)

18,000 = 5,00,000 x LIBOR x 180/360

18,000/5,00,000 = LIBOR x 180/360

LIBOR = 0.036 x 360/180 = 0.072 or **7.20%**

(iii) Net Amount

= (i) – (ii)

= ₹ 20,000 – ₹ 18,000 = **₹ 2,000**

Answer 6A – 8 Marks

(i) To compute perfect hedge, we shall compute Hedge Ratio (Δ) as follows:

$$\Delta = \frac{C_1 - C_2}{S_1 - S_2} = \frac{150 - 0}{780 - 480} = \frac{150}{300} = 0.50$$

Mr. Dayal should **purchase 0.50 share for every 1 call option**.

(ii) Value of Option today

If price of share comes out to be ₹ 780 then value of purchased share will be:

Sale Proceeds of Investment (0.50 x ₹ 780)	₹ 390
Loss on account of Short Position (₹ 780 – ₹ 630)	₹ 150
	₹ 240

If price of share comes out to be ₹ 480 then value of purchased share will be:

Sale Proceeds of Investment (0.50 x ₹ 480)	₹ 240

Accordingly, Premium say P shall be computed as follows:

(₹ 300 – P) 1.025 = ₹ 240

P = ₹ 65.85

(iii) Expected Return on the Option

Expected Option Value = (₹ 780 – ₹ 630) x 0.60 + ₹ 0 x 0.40 = ₹ 90

Expected Rate of Return = $\frac{90 - 65.85}{65.85}$ x 100 = **36.67%**

Answer 6B – 6 Marks

(i) The **FRA on Yen shall be Nil** as interest rate for both periods i.e. 3 months and 6 months are same.

(ii) 3 Months Interest rate is 4.50% & 6 Months Interest rate is 5% p.a.

Future Value 6 Months from now is a product of Future Value 3 Months now & 3 Months Future Value from after 3 Months.

$(1 + 0.05 \times 6/12) = (1 + 0.045 \times 3/12) \times (1 + i_{3,6} \times 3/12)$

$i_{3,6} = [(1 + 0.05 \times 6/12)/(1 + 0.045 \times 3/12) - 1] \times 12/3$

i.e. **5.44% p.a.**

(iii) 6 Months Interest rate is 5% p.a & 12 Month interest rate is 6.5% p.a.

Future value 12 month from now is a product of Future value 6 Months from now and 6 Months Future value from after 6 Months.

$(1 + 0.065) = (1 + 0.05 \times 6/12) \times (1 + i_{6,6} \times 6/12)$

$i_{6,6} = [(1 + 0.065/1.025) - 1] \times 12/6$

6 Months forward 6 month rate is 7.80% p.a.

The Bank is quoting 6/12 USD FRA at 6.50 – 6.75%

Therefore, there is an arbitrage Opportunity of earning interest @ 7.80% p.a. & paying @ 6.75%

Borrow for 6 months, buy an FRA & invest for 12 months

Receive	$ 1.065 at the end of 12 months for $ 1 invested today
Pay	$ 1.060 [(1 + 0.05/2) (1 + 0.0675/2)] at the end of 12 months for $ 1 Borrowed today
Net gain	**$ 0.005** i.e. risk less profit for every $ borrowed