1 – Swastik Ltd.

Swastik Ltd.

Evaluation of Project under NPV Method

Step 1: Calculation of PV of Cash Outflows @ t = 0	Rs.
a. Cost of Land (already owned by the Company)	Nil
b. Cost of Construction of new centre (Including Furnishing)	1,500,000
c. :. PV of Cash Outflows	1,500,000

Step 2: Calculation of PV CFATs (i.e. Net Savings)					(Rs.'000)
Particulars	**1**	**2**	**3**	**4**	**5**
a. Annual Savings in Cost:					
i. Savings in Boarding Chgs	50	50	50	50	50
ii. Savings in Hotel Rent	200	200	200	200	200
iii. Savings in Hotel Accom.	800	1,000	1,200	1,400	1,600
:. Total Savings	1,050	1,250	1,450	1,650	1,850

Particulars	1	2	3	4	5
b. Less: Additional Costs	150	150	150	150	150
c. :. CFBT	900	1100	1300	1500	1700
d. Less: Depreciation	300	300	300	300	300
e. :. EBIT	600	800	1000	1200	1400
f. Less: Tax @ 35%	210	280	350	420	490

Particulars	1	2	3	4	5
g. :. EAIT	390	520	650	780	910
h. Add: Depreciation	300	300	300	300	300
i. :. CFAT	690	820	950	1080	1210
j. PV Factor @ 15%	0.87	0.76	0.66	0.57	0.50
k. :. PVCFAT	600.3	623.2	627	615.6	605

:. Total PVCFAT RS. 3,071,100

Step 3: Computation of NPV	Rs.
a. PV of CFATs	3,071,100
b. PV of Outflows	1,500,000
c. :. NPV of the Project	1,571,100

Recommendation: Since the NPV is positive, Swastik Ltd. should construct the Consultancy centre.

Case (i): All cash flows are in money terms.

- Hence, sales cash flow less cost cash flow becomes the net cash flows. Discount rate is also in money terms.

Computation of NPV (Rs. Lakhs)

Year	Money Cash Flow	DF @ 5%	DCF
0	5	1.000	5.000
1	2	0.952	1.904
2	3	0.907	2.721
3	6	0.864	5.184
		:. NPV	4.809

Case (ii): As both cash flows and discount rates are in money terms, no conversion need to be made

Computation of NPV (Rs. Lakhs)

Year	Money Cash Flow	MDF @ 15%	DCF
0	5	1.000	5.000
1	2	0.870	1.740
2	3	0.756	2.268
3	6	0.658	3.948
		:. NPV	2.956

Case (iii): Cash inflows have been given in money terms. They have to be converted into real terms.

Cash outflows are already in real terms

Computation of Real Cash Inflows (Rs. Lakhs)

Year	Money Cash Inflows	IR @ 10%	Real Cash Inflows
1	5	0.909	4.545
2	9	0.826	7.434
3	15	0.751	11.265

Computation of NPV (Rs. Lakhs)

Year	Net Cash Flows (Real Terms)	RDR @ 8%	DCF
0	5.000	1.000	5.000
1	1.545	0.926	1.431
2	1.434	0.857	1.229
3	2.265	0.794	1.798
		:. NPV	0.542

Case (iv): As cash flows and discount rate are both in real terms, there is no need for conversion.

Computation of NPV (Rs. Lakhs)

Year	Net Cash Flows	RDR @ 6%	DCF
0	5	1.000	5.000
1	2	0.943	1.886
2	3	0.890	2.670
3	6	0.840	5.040
		:. NPV	4.596

Case (v): As cash inflows are in real terms and money discount rate has been given, the real cash inflows have to be converted into money cash inflows

Computation of NPV (Rs. Lakhs)

Year	Real Cash Inflows	IR @ 10%	Money Cash Inflows
1	5	1.100	5.500
2	9	1.210	10.890
3	15	1.331	19.965

Computation of NPV (Rs. Lakhs)

Year	Net Cash Flows	MDR @ 15%	DCF
0	(Sales – Costs i.e. 5.50 – 2.00) 5.000	1.000	5.000
1	2.500	0.870	2.175
2	4.890	0.756	3.697
3	10.965	0.658	7.215
		:. NPV	8.087

Step 1: Initial Outflow	Rs. Lakhs
Capital expenditure	600
Working capital	125
Total	725

W.N: 1 Depreciation

Year	Opening WDV	Depreciation	Closing WDV
1	600	150	450
2	450	113	337
3	337	84	253
4	253	63	190
5	190	48	142
6	142	36	106
7	106	27	79

W.N: 2 Tax = (35% + 5% on 35) = 36.75%

It is assumed that the loss of first year can be adjusted in the first year itself.

:. Tax Saved = 220 x 36.75% = **Rs. 81 Lakhs**

W.N: 3 Change in Working capital **(Rs.lakhs)**

Details	1	2	3	4	5	6	7
WC (25% of sales)	250	400	500	750	1,000	1,000	1,000
Increase in WC	125	150	100	250	250	-	-

Step 2: Computation of CFATs during project life (Rs. lakhs)

Details	1	2	3	4	5	6	7
Volume (%)	25	40	50	75	100	100	100
Volume (Units)	5,000	8,000	10,000	15,000	20,000	20,000	20,000
Sales	1,000	1,600	2,000	3,000	4,000	4,000	4,000
Contr. (@30%)	350	560	700	1,050	1,400	1,400	1,400
Less: Cash FC	420	300	300	300	300	300	300

Details	1	2	3	4	5	6	7
Less: Depr.	150	113	84	63	48	36	27
PBT	220	147	316	687	1,052	1,064	1073
Less: Tax (36.75)	81	54	116	252	387	391	394
PAT	139	93	200	435	665	673	679
Add: Depr.	150	113	84	63	48	36	27
Less:WC Chg.	125	150	100	250	250	--	--
Net CFAT	114	56	184	248	463	709	706

Step 3: Terminal Value		Rs. Lakhs
a.	Sale Price (Invoice price x 20%)	100
	Less: WDV	79
	Excess of Sale price over WDV	21
	Tax @ 36.75%	8
	:. Net Sale Value (100 – 8)	92
b.	Recapture of Working Capital	1,000
c.	Total	1,092

Step 4: Capital Budgeting Analysis Statement (Rs. Lakhs)

Year	CF	DF (@12%)	DCF
0	725	1.000	725
1	114	0.893	102
2	56	0.797	45
3	184	0.712	131
4	248	0.636	158
5	463	0.567	263
6	709	0.507	359
7	1,798 (706 + 1,092)	0.452	813
		:. NPV	942

Conclusion: Since, NPV of the project is positive, project may be accepted.

Step 1: Initial Outflow

Details	Amount (Rs.)	Reasons
a Wages	Nil	Sunk Cost
b Materials	Nil	Sunk Cost
c Machine Vega	3,00,000	Purchase price
d Machine Mega	50,000	Release value
Total	**3,50,000**	

W.N: 1 No change in sales volume / price

Sales = 5,000 x 90 = **Rs. 4,50,000**

W.N: 2 Material Cost

Details	Y1	Y2 - Y8	Reasons/Calculations
Material A	60,000	60,000	5,000 units x 3 x 4
Material B	25,000	25,000	5,000 units x 2 x 2.5
Material C	10,000	27,500	5,000 units x 1 x 2 and
			5,000 units x 1 x 5.5
Total	**95,000**	**1,12,500**	

Note: Material B – Replacement cost of Rs. 2.5 taken, since fast moving item. Scrap not relevant

Material C – Slow moving item. Hence, until stocks last, realisable price of Rs. 2 would be appropriate rate.

Thereafter, purchase price of Rs. 5.50 would be appropriate rate

W.N: 3 Labour Cost

Year 1:

Total hours required (5,000 units x 15 hpu)	=	75,000
Appropriate rate (Rs. 2.20 + Oppr Cost of Rs. 1)	=	3.20
:. Labour Cost (75,000 x 3.20)	=	240,000
Year 2 – 8: Labour Cost (75,000 x 2.20)	=	165,000
W.N: 4 Overheads (Rs. 16 pu x 5,000)	=	80,000

Step 2: In-between flows (Rs.)

Details	Note	Y 1	Y2 – Y8
A. Sales	1	450,000	450,000
B. Materials	2	95,000	112,500
Labour	3	240,000	165,000
Overheads	4	80,000	80,000
C. Profits (A – B)		**35,000**	**92,500**

Step 3: Terminal Flows	Rs.
Vega	30,000
Mega	Nil
Total	30,000

Step 4: Capital Budgeting Analysis Statement (Rs.)

Year	Cash Flows	PVF (7%)	DCF
0	350,000	1.000	350,000
1	35,000	0.935	32,725
2 –8	92,500	5.036 (8 – 1)	465,830
8	30,000	0.582	17,460
		NPV	166,015

Conclusion: Since NPV is positive, Project should be accepted

Step 1: Computation of Fair Futures Price

W.N: 1 PV of Storage Cost

Storage cost for 100 gms = 3 x 100 = Rs. 300

$\therefore$ PV $= 300 \times e^{-(0.12 \times 0.167)}$

$= 300 \times e^{-(0.02)}$

= Rs. 294.06

W.N: 2 $F = (S_o + S) \times e^{r t}$

$= (60{,}000 + 294) \times e^{0.12 \times 0.5}$

= Rs. 64,022 or 640 per gram

Step 2: **Decision**

FFP	AFP	Valuation	Futures	Spot
640	620	Under	Buy	Sell
640	660	Over	Sell	Buy

The gain or loss incurred by Ram can be estimated as follows

Today's Valuation:

Value of Bought Shares = 22 x 10,000 = Rs. 2.2 lakhs

Value of Short Futures = 400 x 1,100 = Rs. 4.4 lakhs

Next Days' Valuation:

Value of Bought Shares = 21.56 x 10,000 = Rs. 2.156 lakhs

Value of Short Futures = 400 x 1,083.5 = Rs. 4.334 lakhs

Gain / (Loss):

Value of Bought Shares (2.2 L – 2.156 L) = **Rs. 0.044 lakhs**

Value of Short Futures (4.4 L– 4.334 L) = Rs. 0.066 lakhs

:. Net gain (0.066 L – 0.044 L) = Rs. 2,200

Part (i): Since you are long on the spot market,

you have to go short in the futures market.

Hence, you have to sell Nifty futures

:. Futures to be sold

$$= \text{Hedge Ratio} \times \frac{\text{Rupee value of spot position requiring hedging}}{\text{Rupee value underlying one futures contract}}$$

$$= 0.7 \times (1200 \times 150 / (1400 \times 200))$$

$$= 0.45 \text{ contracts}$$

Part (ii): Price Falls

- If the price of KM falls by 10%, it means it has fallen from

  Rs. 150 x 10% = Rs. 15.

- Consequently, the index would have fallen by 10 / 0.7

  i.e. 14.2857%

- The Index would have fallen to 1,400 x (100% - 14.2857%)

  = 1,200 index points

- Since your stock fell by Rs. 15, on your 1200 shares you have lost 1200 x 15 = Rs. 18,000
- Since the Index fell from 1,400 to 1,200 points, and you sold Index, you have gained 200 points
- You have sold 0.45 contracts in Index Futures.
- You have gained 0.45 x 200 x Rs. 200 = Rs. 18,000
- Your gain is offset by your loss.

Part (iii): Price Increases

- If the price of KM increases by 5%, it means it has fallen from Rs. 150 x 5% = Rs. 7.5.
- Consequently, the index would have risen by 5 / 0.7 i.e. 7.14285%
- The Index would have risen to 1,400 x (100% + 7. 14285%) = 1,500 Index points

- Since your stock rose by Rs. 7.5, on your 1200 shares bought you have gained 1200 x 7.5 = Rs. 9,000
- Since the Index rose from 1,400 to 1,500 points, and you sold Index, you have lost 100 points
- You have sold 0.45 contracts in Index Futures.
- You have lost 0.45 x 100 x Rs. 200 = Rs. 9,000
- Your gain is offset by your loss.

Exercise Price	Option Premium	Nature	IV	TV
45	5	In	5	0
48	6	In	2	4
50	4	At	0	4
52	5	Out	0	5
55	7	Out	0	7

W.N: 1 Based on Put-Call Parity Theory

P = C + PV of Exercise price – S

$= 2 + 25 \times e^{(-0.05 \times 0.5)} - 20$ $\{e^x = (0.02 + 0.03) / 2\}$

$= 2 + (25 \times 0.9753) - 20 = 6.38$

W.N: 2 In case, the actual price is less than 6.38, it means that the put is undervalued.

Undervalued puts should be bought. i.e. you will buy puts.

W.N: 3 In case, the actual price is greater than 6.38, it means that the put is overvalued.

Overvalued puts will be sold. i.e. you will write puts.

Buy 2 calls and one put with the same exercise price expiring on the same date.

		Numbers	Ex Price	Premium
Call	Holder	2	60	7 x 2 = 14
Put	Holder	1	60	10

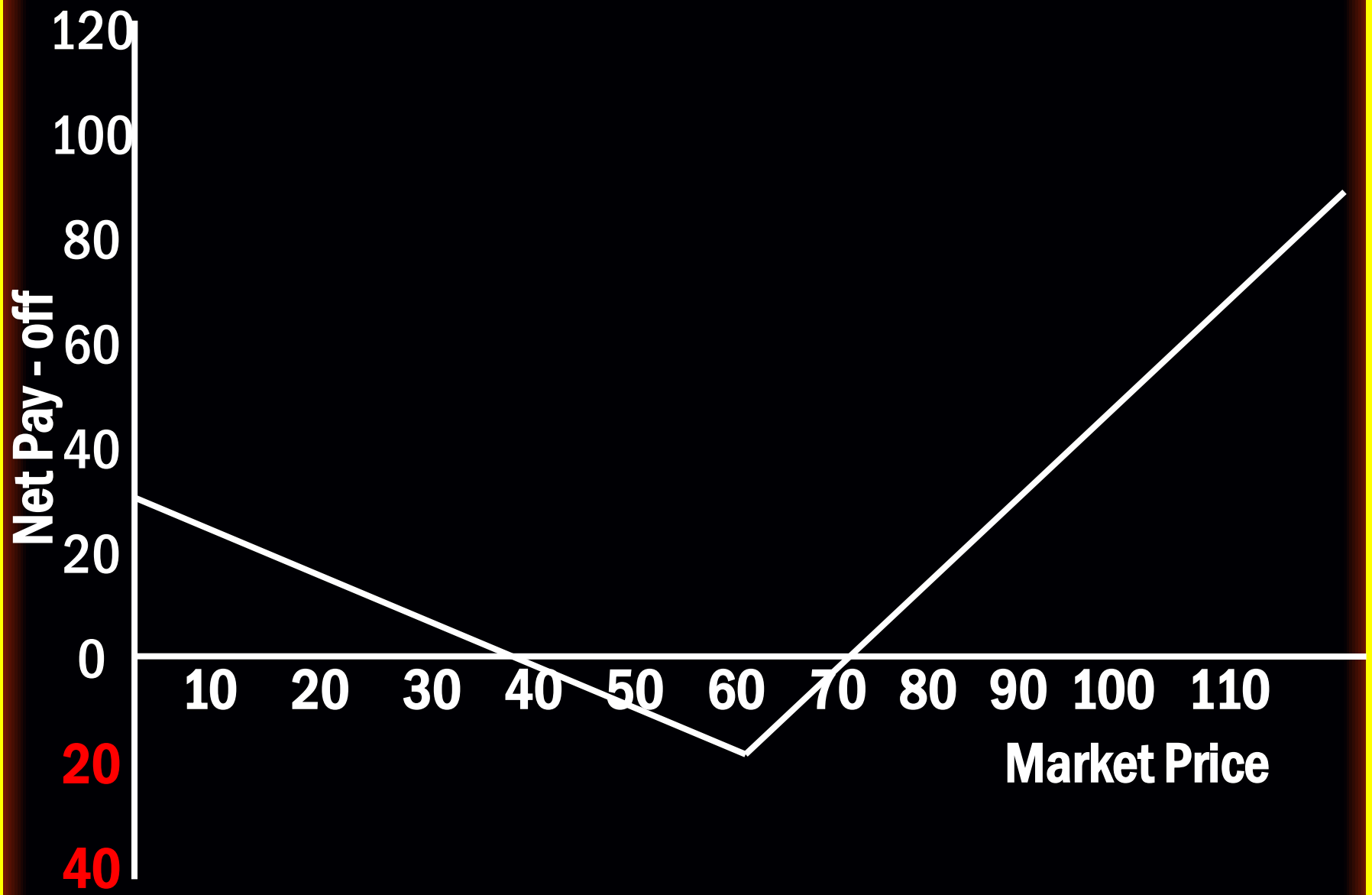
:. Premium = 14 + 10 = 24

Pay – Off Table

Possibilities	Call Option Holder	Put Option Holder	Premium	Net P/L	BEP
SP < E1	Lapse	Exercise	24	(60 – SP)-24	36
SP = EP	Lapse	Lapse	24	24	NA
E1 < SP	Exercise	Lapse	24	2(SP-60)-24	72

Break-Even Table:	Stock Price	What happens
a	1 - 35	Decreasing Profits
b	36	BEP
c	37 - 59	Increasing Loss
d	60	Stagnant Loss
e	61 - 71	Decreasing Loss
f	72	BEP
g	73 & above	Increasing Profits

Strap:


120
100
80
60
40
20
0
20
40
Net Pay - off
10
20
30
40
50
60
70
80
90
100
110
Market Price

1. Dividends

Part (i): W.N: 1 Computation of EPS

EPS = Earnings after Tax / No. of shares outstanding

= 1,000,000 / 100,000 = Rs. 10

W.N: 2 Computation of DPS

DPS = EPS x Pay-out ratio

= 10 x 60% = Rs. 6

W.N: 3 Computation of Cost of Equity (Ke)

Po = D1 / (Ke – g) (Note: P/E = 6:. Po =Rs. 60)

60 = 6 / (Ke - 0.06)

:. Ke = 16.67%

W.N: 4 Computation of Theoretical Market Price

$$Po = \frac{D}{Ke} + \frac{(r/Ke)(E-D)}{Ke}$$

$$= (6/16.67) + \{(15/16.67)(4)\}/16.67 = \text{Rs. } 57.58$$

Part (ii): No , since R - 15% < K - 16.67%

Part (iii): Suggested pay-out = 100%

Part (iv): Walter's model is not very different form "all or nothing" approach. This is because in deriving the formula for Walter's model, it is assumed that all earnings are either distributed or retained.

Let the 3 Companies be A, B and C

Part (i): Pay-out ratio = 30 %

Particulars	A	B	C
Ke	10%	10%	10%
r	15%	10%	12%
EPS (Rs.)	10	10	10
DPS (EPS x 30%)	3	3	3
Retention ratio (b)	70%	70%	70%
Growth (g = b x r)	10.5%	7%	8.4%
Po {DPS / (Ke – g)}	Negative	100	187.50

Part (ii): Pay-out ratio = 60%

Part (iii): Pay-out ratio = 80%

2. Gordon's Model

Part (iv): Inference

(a) In the case of Company B, r = Ke.

This is a point of indifference and hence no optimum pay-out.

The Company B is a normal Company. Po same in all cases.

(b) In the case of Company A, r > Ke.

This is a growing Company and the optimum pay-out would be nil.

(c') In the case of Company C also, r > Ke.

This is also a growing Company and the optimum pay-out would be nil. Market value of Company C is greatest (Rs. 187.50) when the pay-out ratio is lowest (30%) and its Po is lowest (Rs. 105.25) when the pay-out is highest (80%)

3. Modigliani and Miller Model

(i) If dividend declared

Step 1: Compute P_1

$P_1 = P_0 (1 + Ke) - D_1$

$= 120 (1 + 0.096) - 6.40 = Rs. 125.12$

Step 2: Compute money available as retained earnings

Retained Earnings $= PAT - Dividend = X_1 - nD_1$

$= 16,000,000 - (800,000 \times 6.40)$

$= Rs. 10,880,000$

Step 3: Compute money required through issue of equity shares

$= I_1 - (X_1 - nD_1)$

$= 32,000,000 - 10,880,000$

$= Rs. 21,120,000$

Step 4: Raise money under step 3 by issuing shares at P1:

$m = \text{Step 3} / P_1$

$= 21{,}120{,}000 / 125.12$

$= 168{,}798 \text{ shares}$

Step 5: Compute nPo

$nPo = 800{,}000 \times 120 = \text{Rs. } 96{,}000{,}000$

Step 6: Substituting in the formula:

$$= \frac{(n + m) \times P_1 - I_1 + X_1}{1 + Ke}$$

$$= \frac{(800{,}000 + 168{,}798) \times 125.12 - 32{,}000{,}000 + 16{,}000{,}000}{1 + 0.096}$$

$= \text{Rs. } 96{,}000{,}000$

(i) If dividends are not declared

Step 1: Compute P_1

$P_1 = P_0 (1 + Ke) - D_1$

$= 120 (1 + 0.096) - 0 = Rs. 131.52$

Step 2: Compute money available as retained earnings

Retained Earnings $= PAT - Dividend = X_1 - nD_1$

$= 16,000,000 - (800,000 \times 0)$

$= Rs. 16,000,000$

Step 3: Compute money required through issue of equity shares

$= I_1 - (X_1 - nD_1)$

$= 32,000,000 - 16,000,000$

$= Rs. 16,000,000$

Step 4: Raise money under step 3 by issuing shares at P_1:

m = Step 3 / P_1

= 16,000,000 / 131.52 = 121,655 shares

Step 5: Compute nPo

nPo = 800,000 x 120

= Rs. 96,000,000

Step 6: Substituting in the formula:

$$= \frac{(n + m) \times P_1 - I_1 + X_1}{1 + Ke}$$

$$= \frac{(800{,}000 + 121{,}655) \times 131.52 - 32{,}000{,}000 + 16{,}000{,}000}{1 + 0.096}$$

= Rs. 96,000,000

4. Radical Approach

Part (i): After tax return on Company A

Dividend paid	= Rs. 15.00
Less: Tax thereon @30%	= **Rs. 4.50**
Effective Inflow	= Rs. 10.50
Market price	= Rs. 100.00
Return % (10.50 / 100)	= 10.50%

Part (ii): After tax return on Company B

Current Price	= Rs. 100.00
Price in Year 1 (+15%)	= Rs. 115.00
Price in Year 2 (+15%) (i.e Sale Price)	= Rs. 132.25

:. Capital Gain (Rs. 132.25 – Rs. 100) = Rs. 32.25

Less: Tax thereon @ 30% = **Rs. 9.68**

:. Effective Inflow = Rs. 22.57

:. Average **Annual** Return % (22.57 / 2) = 11.28%

Part (iii): Changed Situation

Changed Situation	A	B
Dividend / Capital Gain	15.00	32.25
Less: Tax @10% - 15%	**1.50**	**4.84**
Effective Inflow	13.50	27.41
Annual Return %	**13.50%**	**13.70%**

5. Stock – splits & Bonus

Part (i): Bonus Issue

1 Current number of share (20,00,000 / 8) = 2,50,000

2 Bonus Issue = 1 : 5

:. Number of shares to be issued = 50,000

3 Transfer of amount from Retained Earnings to Equity Share Capital (50,000 x 8) = Rs. 4,00,000

4 Number of shares outstanding = Current + Bonus

= 2,50,000 + 50,000

= 3,00,000

5 New Market Price (Po) = (S x Po) / (S + N)

= (2,50,000 x 60) / (3,00,000)

= Rs. 50 per share.

Part (ii): Reverse Split: A 1 : 2 reverse split means 1 share will be issued for every 2 shares held

1 New Face Value (Rs. 8 x 2/1) = Rs. 6

2 New number of shares = $\frac{\text{Old no. of shares x Old FV}}{\text{New Face Value}}$

= (2,50,000 x 8) / 16

= 1,25,000 shares

3 There will be no change in the Equity Account.

1 – International Finance

A. Cost of buying Rs. 55,000/-

- This is a direct quote for Singapore Dollar.
- Rs. 26.50 is the bid rate and Rs. 26.75 is the ask rate.
- We want to buy Rs. 55,000 – The relevant rate is the bank's Ask rate for rupees.
- The quote for Rs will be

Bid (SGD/INR) = 1 /Ask (INR/SGD)

= 1 / 26.75

= 0.037383

C. Cost of buying SGD 7,450 = 7,450 x 26.75

= Rs. 1,99,287.50

D. Proceeds from selling SGD 18,340 = 18,340 x 26.50

= Rs. 4,86,010

Ask (SGD/INR) = I / Bid (INR/SGD)

= 1 / 26.50

= 0.037736

Cost of buying INR 55,000 = Rs. 55,000 x SGD 0.037736

= SGD 2,075.48

B. Sell Rs. 92,000/-

We want to sell Rupees – The relevant rate is the bank's Bid rate for rupees.

Proceeds of Selling INR 92,000 = Rs. 92,000 x SGD 0.037383

= SGD 3,439.25

a. Appreciating / Depreciating

The exchange rate is a direct quote on AUD in India

AUD is the Commodity.

Since F>S, AUD is appreciating & INR is depreciating

b. AUD is appreciating and is hence said to be trading at a Forward Premium to the Rupee.

The Rupee is depreciating and is hence said to be trading at a Forward Discount to the AUD.

c. AUD is more expensive.

d. Formula based

% of Appreciation of AUD = (F – S) / S x (12/m) x 100

= (29.45 – 29.36) / 29.36 x (12/3) x 100

= 1.226%

% of Depreciation of INR = (S– F) / F x (12/m) x 100

= (29.36 – 29.45) / 29.45 x (12 /3) x 100

= 1.222%

A. Buy CAD 25,000 Spot

The bank has to sell CAD.

Hence, Spot Ask rate is relevant.

CAD x Ask (INR/CAD) = 25,000 x 34.80 = Rs. 8,70,000

B. Sell CAD 75,000 one month forward

Forward Rate:

This is a DQ, Swap Ask (20) < Swap Bid (30).

Hence, FC CAD is depreciating & HC INR is appreciating.

Hence, Deduct.

C. Sell NZD 20,000 One month forward

Forward Rate: This is a DQ, Swap Ask (20) > Swap Bid (10).

Hence, FC NZD is appreciating & HC INR is depreciating.

Hence, Add

Bid rate is 29.85 + 0.10 = 29.95

Ask rate is 30.05 + 0.20 = 30.25

:. Forward Rate is 29.95 – 30.25

Value: NZD x Bid (INR/NZD) = 20,000 x 29.95 = Rs. 5,99,000

Step 1: Compute expected exchange rate 18 months from today

WN 1: In deciding the price the bidder should consider the advantage of a depreciating rupee.

- ✓ Depreciation of Re gives the exporter a competitive advantage since his return is only a function of Re.

WN 2: The likely future exchange rate can be estimated on the basis of the relative inflation rates.

- ✓ The expected future spot rate at the end of 18^{th} month is to be computed.

WN 3: The quotation is a two-way direct quote.

- ✓ The transaction involves receipt of foreign currency, and sale of that currency to the Bank.
- ✓ Accordingly, bank's buying rate at 159.20 will apply, and hence taken as the Base-rate for projections.

WN 4: Estimated future spot rate is to be computed in two stages as under :

Stage I: One year horizon (full year)

(1 + HIR) / (1 + FIR) = Forward / Spot

WN 1: Estimated future spot rate is to be computed in two stages as under :

Stage I: One year horizon (full year)

(1 + HIR) / (1 + FIR) = Forward / Spot

1.09 / 1.03 = Forward / 159.2

One year horizon expected future rate = Rs. 168.47 per Dinar

Stage II: 12 to 18th Month (Half Year)

Assuming the Inflation rates are Symmetrical, the Inflation rates for 6 months would be HIR = 9/2 = 4.5%; FIR = 3/2 = 1.5%

Additional six months

(1 + HIR) / (1 + FIR) = Forward / Spot

1.045 / 1.015 = Forward / 168.47

Estimate of Future sport rate of rupee = Rs. 173.45 per Dinar

Step 2: Computation of normal tender price

Marginal cost of manufacture = Rs. 580 lakhs (290 x 2 L)

Mark up = 25%

:. Normal tender price = Rs. 725 lakhs

Step 3: Fixation of Dinar quote

Assuming that exchange rates are in equilibrium, with reference to inflation rates, tender price of Rs. 725 lakhs would have to be translated in terms of Dinars, at estimated future spot rate, namely 173.45 per Dinar.

The KWD value will be Rs. 725 lakhs/173.45 = 4,17,988 KWD

a. Spot FFr / $ 5.2321 – 5.2340

Swap Points 25 – 20

Direct Quote for $ in France

Nature of Swap Descending (Swap Ask < Swap Bid)

Hence, Foreign Currency is Depreciating.

:. Deduct the Swap points from the Spot rate to get Forward Rate.

Forward Rate (5.2321 – 0.0025) – (5.2340 – 0.0020)

:. 1 month Forward Rate FFr. / $ 5.2296 – 5.2320

:. Forward Discount for Bid

= {(5.2296 – 5.2321)/5.2321} x (12/1) x 100

= **0.573%**

:. Forward Discount for Ask

= {(5.2320 – 5.2340)/5.2340} x (12/1) x 100

= **0.4585%**

a. Estimating rupee inflow for the contract value

Contract value ($ 1,825 x 10) = $ 18,250.00

25 % down payment (18,250/4) = $ 4,562.50

75% due in ten installments = $ 13,687.50

Relevant rates for recording the transaction are

45.50 for advance payment &

45.40 for installments

Estimated rupee amount = Rs. 8,29,006.25

($4,562.50 x 45.50 + $13,687.50 x 45.40)

b. Actual receipt amounted to Rs. 8,28,458.77 (WN 1)

c. The difference is Rs. 547.48.

It arises on account of differences in exchange rates as between the date on which the transaction is initially recorded, and the date(s) on which payments are received.

d. The type of exchange risk involved - Transaction Risk

W.N 1: Computation of Actual Receipts

Nature	Dollar Amount	E R	Rupee Amount
Advance Payment	4,562.50	45.50	2,07,593.75
Shipment 1	1,368.75	45.40	62,141.25
Shipment 2	1,368.75	45.30	62,004.38
Shipment 3	1,368.75	45.20	61,867.50
Shipment 4	1,368.75	45.30	62,004.38
Shipment 5	1,368.75	45.20	61,867.50
Shipment 6	1,368.75	45.00	61,593.75
Shipment 7	1,368.75	45.50	62,278.13
Shipment 8	1,368.75	45.70	62,551.88
Shipment 9	1,368.75	45.60	62,415.00
Shipment 10	1,368.75	45.40	62,141.25
Total			**8,28,458.77**

Step 1: Convert the Balances into USD (Common Currency)

Debtor	Creditor	Amount (in Million)	USD(in M)
UK	EL	€ 240	266.67
UK	JP	¥ 12000	100.00
JP	EL	€ 120	133.33
EL	UK	£ 75	107.14
EL	JP	¥ 12000	100.00

Step 2: Incorporate the information in a Matrix form: ($ in M)

	Receipts by			
	UK	EL	JP	Total
UK Will pay to	--	266.67	100	366.67
EL Will pay to	107.14	--	100	207.14
JP will pay to	--	133.33	--	133.33
Sub-total	107.14	400.00	200	
Less: Payments	366.67	207.14	133.33	
Net Receipts/Payments	259.53	192.86	66.67	

Step 3: Arrangement:

a. EL Will receive a net of $ 192.86 M

b. JP will receive a net of $ 66.67 M

c. UK will pay $259.53 M

1. Identify – FC is an asset. Amount $ 3,50,000
2. Create - $ liability
3. Borrow – in $ @ 9% pa or 2.25% per quarter.

   Amount borrowed – 3,50,000 / 1.0225 = $ 3,42,300
4. Convert – Sell $ and buy £.

   The relevant rate is the Ask rate, namely 1.5905 per £.

   Amount of £s received on conversion is 2,15, 215 GBP

   (3,42,300 / 1.5905)

5. Invest – GBP 2,15,215 will be invested at 5% for 3 months to get GBP 2,17,904

6. Settle – The liability of $ 3,42,300 @ 2.25% per quarter matures to $ 3,50,000.

   This will be settled with the amount of $ 3,50,000 receivable from customer.

W.N 1: If forward contract is used

Applicable rate for a 3 – month forward is 1.6140

Amount of £ that will be received by UK company at the end of 3 months (later) will be £ 2,16,852 (3,50,000/1.6140)

W.N 2: Comparison

Under Money market hedge, the amount is received now

Under forward contract, money is received in future.

	Amount received by the Company	
	Now (£)	3 months later (£)
Forward Market		2,16,852
Money Market hedge	2,15,215	2,17,904

W.N 3: **Decision** – It is seen that receipts under forward contract are lower than the future value of receipts under money market operations.

✓ The better strategy for the company is to opt for money market hedging.

1. The study is made for a UK based Company
2. Given, Spot 1 £ = $ 1.7106 – 1.7140
   Foreign Currency per unit of Home Currency,
   Hence, Indirect Quote.
3. Hence, the relevant quote for Exports is Ask rate for £.
   (Since, Banker buys $ & Sells £) –
   Spot 1 £ = $ 1.7140
   3 m Forward 1 £ = $ 1.7063
4. Hence, the relevant quote for Imports is Bid rate for £.
   (Since, Banker buys £ & Sells $) –
   Spot 1 £ = $ 1.7106
   6 m Forward 1 £ = $ 1.6967

Method 1: Money Market Hedging (Exporter - Receivables)

a. Exposure $ 197,000

b. Present Value of Exposure {FV /$(1+r)^n$ $ 192,665

{$ 197,000 /(1+ 0.0225) } - Since 9% pa = 2.25% pq

c. Conversion of the amount into Sterling for deposit @ Spot

1 £ = $ 1.7140

? = $ 192,665

i.e. (1/1.7140) x 192,665 = £ 112,407

Invest £ 112,407 @ 9.5% pa for 3 months. (i.e. 2.375% pq)

d. Principal & interest proceeds after 3 month = £115,077

(£112,407 x 1.02375)

Method 2: Forward Exchange Contract

a. Exposure $ 197,000

b. Forward Rate 1 £ = $ 1.7063

c. Realisation at the end of 3 months

1 £ = $ 1.7063

? = $ 197,000

i.e. (1/1.7063) x 197,000 = £ 115,454

Advice: Forward to be selected as the realisation is more than MMH .

Method 1: Money Market Hedging (Importer - Payables)

a. Exposure $ 293,000

b. Present Value of Exposure {FV /(1+r)^n $ 284,466

{$ 293,000 /(1+ 0.03) } – Since 6% pa = 3% for 6 months

a. Conversion of the amount into Sterling for Loan @ Spot

1 £ = $ 1.7106

? = $ 284,466

i.e. (1/1.7106) x 284,466 = £ 166,296

Borrow £ 166,296 @ 12.5% pa for 6 months. (i.e. 6.25 ph)

d. Principal & loan interest after 6 months = £176,690

(£166,296 x 1.0625)

Method 2: Forward Exchange Contract

a. Exposure $ 293,000

b. Forward Rate 1 £ = $ 1.6967

c. Realisation at the end of 6 months (Payables)

1 £ = $ 1.6967

? = $ 293,000

i.e. (1/1.6967) x 293,000 = £ 172,688

Advice: Forward to be selected as the Payables are less than MMH .

1 - Leasing

Option I: Evaluation of the Purchase option:

Step 1: Initial Flow

Capital Expenditure = Rs. 40 lakhs

The appropriate discount rate –

- ✓ The Pretax cost of debt is 18%.

  Hence, post tax cost will be 10.80%.

- ✓ The Equity shareholders want 24%.

  Hence, post tax cost is 24%

- ✓ The target debt equity ratio is 2:1 (Current mix –irrelevant)

:. WACC = (0.667 x 0.108) + (0.333 x 0.240) = 15.20%

Step 2: Computation of CFAT (Rs. Lakhs)

Year	EBDIT	Depn	EBIT	Tax	PAT	CFAT
1	35.00	10.00	(35 – 10) 25.00	10.00	(25 – 10) 15.00	(15 + 10) 25.00
2	30.00	7.50	22.50	9.00	13.50	21.00
3	25.00	5.63	19.37	7.75	11.62	17.25
4	20.00	4.22	15.78	6.31	9.47	13.69
5	20.00	3.16	16.84	6.74	10.10	13.26

Note: The CFAT after considering income and without taking interest is computed.

- Interest is ignored, since it is taken care of by discounting at WACC

W.N: 1 Depreciation on WDV at 25%,

leaves a residual value of Rs. 9.50 lakhs at the end of year 5

Step 3: Terminal cash flow at Rs. 9.50 lakhs,

being equal to WDV does not attract tax.

Step 3: Computation of NPV (Rs. Lakhs)

Year	CF	DF	DCF
0	40.00	1.000	40.00
1	25.00	0.868	21.70
2	21.00	0.754	15.83
3	17.25	0.654	11.28
4	13.69	0.568	7.77
5	13.26	0.493	6.54
5	9.50	0.493	4.68
		:. NPV	27.80

Option II: Evaluation of the Lease Option:

Step 1: Computation of CFAT (Rs. Lakhs)

Year	EBDIT	Lease /Fee	PBT	Tax	PAT
0	--	1.33 (3.33% of 40)	1.33	0.53	0.80
1	35.00	11.60 {Rs. 290 / 1,000 x Rs. 40 lakhs}	23.40	9.36	14.04
2	30.00	11.60	18.40	7.36	11.04
3	25.00	11.60	13.40	5.36	8.04
4	20.00	11.60	8.40	3.36	5.04
5	20.00	11.60	8.40	3.36	5.04

Note: The Cash flow is discounted at the WACC of 15.2%.
Tax shelter is considered as and when it happens.

Step 2: Computation of NPV — Rs. Lakhs

Year	CF	DF	DCF
0	0.80	1.000	0.80
1	14.04	0.868	12.19
2	11.04	0.754	8.32
3	8.04	0.654	5.26
4	5.04	0.568	2.86
5	5.04	0.493	2.48
		:. NPV	30.31

Step 3: Decision - The NPV of the lease option is higher and hence, leasing should be preferred.

1-Mutual Funds

W.N: 1 Calculation of Average Rate of Return

Year	MF	BP
2003	14	5
2002	1	21
2001	21	23
2000	31	6
1999	11	32
1998	19	18
1997	20	5
1996	12	17
1995	10	12
1994	12	10
Total	129	113
Avg Return	12.9%	11.3%

W.N: 2 Calculation of Beta

X	Y	XY	Y^2
14	5	70	25
1	21	21	441
21	23	483	529
31	6	186	36
11	32	352	1024
19	18	342	324
20	5	100	25
12	17	204	289
10	12	120	144
12	10	120	100
129	113	1,584	2,937

Beta for benchmark portfolio =1

(since β of stock market is always one)

$$\therefore \beta = (\sum XY - n\underline{X}\,\underline{Y}) / (\sum Y^2 - n\,\underline{Y}^2)$$

$$= \{1,584 - (10 \times 12.9 \times 11.3)\} / \{2,937 - 10 \times (11.3)^2\}$$

$$= 0.0761$$

This is a low Beta Stock.

W.N: 3 Calculation of Standard Deviation for the MF

Return	D	D^2	P	PD^2
14	1.1	1.21	0.1	0.12
1	13.9	193.21	0.1	19.32
21	8.1	65.61	0.1	6.56
31	18.1	327.61	0.1	32.76
11	1.9	3.61	0.1	0.36
19	6.1	37.21	0.1	3.72
20	7.1	50.41	0.1	5.04
12	0.9	0.81	0.1	0.08
10	22.9	524.41	0.1	52.44
12	0.9	0.81	0.1	0.08
AM = 12.9		:. σ = 10.98		120.48

Calculation of Standard Deviation for the Benchmark Portfolio

Return	D	D^2	P	PD^2
5	6.3	39.69	0.1	3.97
21	9.7	94.09	0.1	9.41
23	11.7	136.89	0.1	13.69
6	17.3	299.29	0.1	29.93
32	20.7	428.49	0.1	42.85
18	6.7	44.89	0.1	4.49
5	6.3	39.69	0.1	3.97
17	5.7	32.49	0.1	3.25
12	23.3	542.89	0.1	54.29
10	1.3	1.69	0.1	0.17
AM = 11.3		:. σ = 12.88		166.02

(i) Sharpe Index = $(R_P - R_f) / \sigma_P$

for MF = (129 – 6) / 10.98 = 0.628

for BP = (11.3 – 6) / 12.88 = 0.411

:. Performance of the MF is better than that of the BP

(ii) Treynor Ratio = $(R_P - R_f) / \beta_P$

for MF = (129 – 6) / 0.0761 = 90.67

for BP = (11.3 – 6) / 1 = 5.3

:. Performance of the MF is better than that of the BP

(iii) Jenson's Index = $(R_P - R_f) - \beta (R_m - R_f)$

= $(12.9\% - 6\%) - 0.076 (11.3\% - 6\%)$

= 6.497

Since, this is positive the MF has out-performed the BP

(iv) Morning Star:

Mutual Fund:

Step 1: Average Return = 12.9%

Step: 2 Calculation of Risk of Loss

Year	Return	ROL
2003	14	0
2002	1	7
2001	21	0
2000	31	0
1999	11	0
1998	19	0
1997	20	0
1996	12	0
1995	10	16
1994	12	0
	Total	23

Avg 2.3% :. Excess Return = 12.9 – 2.3 = 10.6%

Benchmark Portfolio:

Step 1: Average Return = 11.3%

Step 2: Risk of Loss = 1 + 0 + 0 + 12 + 0 + 0 +1 + 0 + 18 + 0

= 32

:. Avg = 3.2%

Step 3: Excess Return = 11.3 – 3.2 = 8.1%

Conclusion: Mutual Fund has out-performed the BP

(v) FAMA:

Step 1: Risk return = 12.9 – 6.0 = 6.9

Step 2: Risk premium from market = 11.3 – 6.0 = 5.3

Step 3: Beta = 0.0761

:. Risk premium = 0.0761 x 5.3 = 0.403

Step 4: Total Gain = 6.9 – 0.403 = 6.497

Step 5: Appropriate premium for full diversification

$= (\sigma j / \sigma m) \times (Rm - Rf) = (10.98/12.88) \times 5.3 = 4.52$

Step 6: Net Gain = 6.9 – 4.52 = 2.38

2 TWR & RWR

(i) Time – Weighted Rate of Return

0	6 Months	12Months
Rs.50	60	90
Re. 1	1.2	1.8

TWR ignores intervening cash flows

Re. 1 which has stayed invested in the fund throughout the year, has grown to Re. 1.80 indicating a growth rate of 80%.

:. TWR is 80%

(ii) Rupee – Weighted Rate of Return

0	6 Months	12Months
50	60	60
	20	
	40	

From the Investor's angle

0	6 Months	12Months
50	20	60

:. RWR is 62.71%

(iii) Mid-year inflow of Rs. 20 million

(a) This would leave the TWR unaffected since TWR is not concerned with intervening inflows and outflows of cash

(b) Since investments are coming in during a rising market (20% to 50%), the returns will be higher.

1 – Portfolio Management

Part (i): Expected return of each security

Security A			Security B		
P	R_A	P x R_A	P	R_B	P x R_B
0.05	15	0.75	0.05	8	0.4
0.20	20	4.00	0.25	18	4.5
0.20	25	12.50	0.40	26	10.4
0.20	30	6.00	0.25	34	8.5
0.05	35	1.75	0.05	44	2.2
	$\underline{R_A}$	25%		$\underline{R_B}$	26%

Part (ii): Standard deviation of security A

R_A	d_A	d^2_A	P	Pd^2_A
15	10	100	0.05	5
20	5	25	0.20	5
25	0	0	0.50	0
30	5	25	0.20	5
35	10	100	0.05	5

$\underline{R}_A = 25\%$

σ^2 20

σ 4.47

Part (ii): Standard deviation of security B

R_B	d_B	d^2_B	P	Pd^2_B
8	18	324	0.05	16.20
18	8	64	0.25	16.00
26	0	0	0.40	0
34	8	64	0.25	16.00
44	18	324	0.05	16.20
			σ^2	64.40
$\underline{R}_B = 26\%$			σ	8.02

Part (iii): Comment on Risk

- ✓ Security B has more upside potential and downside risk (higher risk), since its SD is high at 8.02% and reflects a great risk.

Part (iv) (a): Returns, if it is formed with Investment in A and B with a 70/30 ratio

W.N: 1 Return of A = 25%

W.N: 2 Expected return of Security B on probability of occurrence of Security A

Probability	Return % of B (R_B)	P x R_B
0.05	8	0.40
0.20	18	3.60
0.50	26	13.00
0.20	34	6.80
0.05	44	2.20
	$\underline{R_B}$	26%

:. Portfolio Return = (0.70 x 25) + (0.30 x 26) = 25.30%

Part (iv) (b): Assuming that the probability of outcome for both A and B is identical, Cov of AB is computed as:

Probability	d_A	d_B	$d_A \times d_B$	$P \times d_A \times d_B$
0.05	10	18	180	9
0.20	5	8	40	8
0.50	0	0	0	0
0.20	5	8	40	8
0.05	10	18	180	9
			$\therefore Cov \sum P \times d_A \times d_B$	34

Part (iv) (c):

SD for Security B, assuming the probabilities of Security A:

R_B	d_B	d^2_B	P	Pd^2_B
8	18	324	0.05	16.20
18	8	64	0.20	12.80
26	0	0	0.50	0
34	8	64	0.20	12.80
44	18	324	0.05	16.20
		σ^2	58.00 σ	7.62%

Correlation Coefficient $= Cov_{AB} / (\sigma_A) \times (\sigma_B)$

$= 34/(4.47) \times (7.62) = 0.9982$

Observation: The securities can be assumed to have a perfect positive correlation.

Formula Method:

$$\sqrt{(\sigma x)^2 (Wx)^2 + (\sigma y)^2 (Wy)^2 + 2 (\sigma x) (\sigma y) (Wx) (Wy) Corr_{xy}}$$

$$\sqrt{(20 \times 0.49)+(58 \times 0.09)+2 (4.47)(7.6157)(0.7)(0.3)(0.9882)}$$

:. Risk of the Portfolio $\sigma_P = 5.41$.

Part (v): Computation of Portfolio Risk

R_A	R_B	P	Return (R) $(0.7 R_A + 0.3 R_B)$	P x R	d $(R - \underline{R})$	Pd^2
15	8	0.05	12.9	0.645	12.4	7.688
20	18	0.20	19.4	3.880	5.9	6.962
25	26	0.50	25.3	12.65	0	0
30	34	0.20	31.2	6.240	5.9	6.962
35	44	0.05	37.7	1.885	12.4	7.688
			Total	25.30	σ^2	29.30

:. Risk of the Portfolio σ_P = 5.41.

Part (i): Computation of Beta Value

Step 1: Calculation of Returns

Returns $= \{ D_1 + (P_1 - P_0) \} / P_0 \times 100$

Year	$D_1 + (P_1 - P_0) \} / P_0 \times 100$	Returns
2000 – 01	{25 +(279 – 242)} / 242 x 100	25.62%
2001 - 02	{30 +(305 – 279)} / 279 x 100	20.07%
2002 – 03	{35 +(322 – 305)} / 305 x 100	17.05%

Step 2: Calculation of Returns from Market Index

Year	% of Index appreciation		Dividend Yield	Total Returns
00 – 01	(1950–1812)/1812 x 100	7.62%	5 %	12.62%
01 - 02	(2258–1950)/1950 x 100	15.79%	6 %	21.79%
02 – 03	(2220–2258)/2258 x 100	1.68%	7%	5.32%

Step 3: Computation of Beta

Observation	X	Y	XY	Y^2
2000 - 01	25.62	12.62	323.32	159.26
2001 - 02	20.07	21.79	437.33	474.80
2002 - 03	17.05	5.32	90.71	28.30
Total	**62.74**	**39.73**	**851.36**	**662.36**

Formula:

$$\beta = (\sum XY - n\underline{X}\,\underline{Y}) / (\sum Y^2 - n\,\underline{Y}^2)$$

$\underline{X} = 62.74 / 3 = 20.91$

$\underline{Y} = 39.73 / 3 = 13.24$

$\beta = 851.36 - 3\,(20.91) \times (13.24) / 662.36 - 3\,(13.24) \times (13.24)$

$\therefore \beta = 0.15$

Part (ii): This is a low beta stock

Part (i): Computation of expected returns after adjustment to Sensitive Factors **(β x Risk Premium)** :

Stock	Forex (a)	Interest (b)	GNP (c)	Total (a + b + c)
ABC	1.50 x 3	1.25 x 1	3.00 x 4.5	16.75%
DEF	0.80 x 3	2.00 x 1	1.00 x 4.5	8.90%
GHI	0.40 x 3	0.50 x 1	1.00 x 4.5	5.20%

Part (ii) : Determination of extent of Factor risk exposure

Stock	Forex	Interest	GNP
ABC	1.50	1.25	3.00
DEF	0.80	2.00	1.00
GHI	0.40	0.50	1.00
Total	2.70	0.25	5.00
One /third	0.90	0.08	1.67

:. Expected Return = (0.90 x 3) + (0.08 x 1) + (1.67 x 4.50)

:. Expected Return on the portfolio is 10.295 %

Part (i): Cost of Equity of DE:

Since market value of DE is said ot be in equilibrium,

Ke is computed as

PAT / e = 468 / 3744 = 12.5%

Part (ii): Market Return for AE:

AE has a Beta value of 1.00, its market return will be same as Expected return

;. Market return = 650 / 5900 = 12.5%

Part (iii): Beta value for DE:

DE is a geared company.

Tax rate is 35%

:. $\beta u = \beta_{(g)}$ (Equity/ Debt(1-t) + Equity)

1.00 = $\beta_{(g)}$ (3744/ 3556(1-0.35) + 3744)

:. $\beta_{(g)}$ =1.62

1 – Risk Analysis

(i) Viability of Project: Compute NPV (Rs. 000s)

Year	DF 8%	Outlay	PV V/C	PVI	Net PV
0	1.000	14,000	0	0	14,000
1	0.926	-	3,704	12,038	8,334
2	0.857	-	3,428	11,141	7,713
Total		14,000	7,132	23,179	2,047

NPV is positive. Project can be accepted.

(ii) **Test for Sensitivity**: Identification of significant variables

a. Initial Outlay

b. Sales Volume

c. Selling Price

d. Variable Cost and

e. Cost of Capital.

(a) Initial Outlay:

NPV = Rs. 2,047 k

If the initial outlay is increased by this amount,

NPV will become zero.

:. Sensitivity (%) = (2,047 / 14,000) x 100

= 14.62%

(b) Sales Volume:

Let the net cash flow be Rs. Z per annum at which NPV = 0

Hence, PVAF (8%, 2 years) x Z = Rs. 14,000 k

1.783 x Z = Rs. 14,000 k

:. Z = Rs. 7,852 k.

There is a fall of Rs. 1,148 k from the base of Rs. 9,000 k.

Net cash flow is made up of sales minus variable cost.

When volume changes,

variable cost also changes proportionately.

For a base of Rs. 9,000 k, the change is Rs. 1,148 k.

For a base of Rs. 13,000 k,

the change will be (1,148 / 9,000) x 13,000 = Rs. 1,658 k

:. Sensitivity (%) = (1,658 / 13,000) x 100 = 12.75%

(c) Selling Price:

Sales volume is 1,300,000 units.

At this volume, the sales revenue can come down by Rs. 1,658 k to Rs. 11,342 k (i.e. 13,000 – 1,658), before NPV can be zero.

Variable costs and sales volume will however remain unchanged by changes in sale price.

Particulars	Amount /Rs.
New (revised) sales value	11,342,000
Number of units sold	1,300,000
New Selling price per unit	8.7246
Original price per unit	10.00
Fall in price	1.2754
Resilience percentage change in selling price	**12.754%**

(d) Variable Costs:

Particulars	Amount /Rs.
PV of variable costs (a)	7,132,000
Can go up by (NPV will then be Zero)(b)	2,047,000
Applying PVAF of 1.783, annual possible increase	1,148,065
Current level	4,000,000
Resilience percentage change in variable cost (b/a)	**28.70%**

(e) Discount Rate:

The NPV will be zero at IRR.

Computation of NPV @ 18% & @ 19% (Rs. 000s)

Year	CF	18% DF	PV @18%	19% DF	PV @19%
0	14,000	1.000	14,000	1.000	14,000
1	9,000	0.847	7,623	0.840	7,560
2	9,000	0.718	6,462	0.706	6,354
	:. NPV		85		86

By interpolation, IRR = 18.50%

Cost of capital can increase from 8 % to 18.50% before the

Project becomes unviable.

:. Sensitivity (%) = (10.5 / 8) x 100 = 131.25%

Evaluation:

Resilience of	Percentage
Sales Volume	12.750%
Selling Price	12.754%
Initial Investment	14.620%
Variable Cost	28.750%
Cost of Capital	131.25%

Decision: The project is most sensitive to sales volume, and least sensitive to discount rate.

Part (i) : Expected NPV

W.N: 1 Computation of expected values of each year (Rs.)

Prob.	Year 1		Year 2		Year 3	
P	CFAT	Value	CFAT	Value	CFAT	Value
0.1	51,150	5,115	39,325	3,933	35,750	3,575
0.2	52,800	10,560	43,450	8,690	14,200	2,840
0.4	59,400	23,760	48,400	19,360	15,600	6,240
0.2	63,250	12,650	50,600	10,120	16,600	3,320
0.1	66,000	6,600	55,000	5,500	18,000	1,800
	X	58,685	X	47,603	X	17,775

W.N: 2 Computation of NPV (Rs.)

Year	Value	DF	DCF
0	1,00,000	1.000	1,00,000
1	58,685	0.926	54,342
2	47,602	0.857	40,795
3	17,775	0.794	14,113
		:. NPV	9,250

W.N: 3 Computation of Risk for year 1 (Rs.)

CFAT	d (X- $\bar{X}$)	d^2	P	Pd^2
51,150	7,535	5,67,76,225	0.1	56,77,623
52,800	5,885	3,46,33,225	0.2	69,26,645
59,400	715	5,11,225	0.4	2,04,490
63,250	4,565	2,08,39,225	0.2	41,67,845
66,000	7,315	5,35,09,225	0.1	53,50,923
$\bar{X}$	58,685		σ	4,725

W.N: 3 Computation of Risk for year 2 (Rs.)

CFAT	d (X- $\underline{X}$)	d^2	P	Pd^2
39,325	8,278	6,85,25,284	0.1	68,52,528
43,450	4,153	1,72,47,409	0.2	34,49,482
48,400	797	6,35,209	0.4	2,54,084
50,600	2,997	89,82,009	0.2	17,96,402
55,600	7,397	5,47,15,609	0.1	54,71,561
$\underline{X}$ 47,603			σ	4,222

W.N: 3 Computation of Risk for year 3 (Rs.)

CFAT	d (X- $\underline{X}$)	d^2	P	Pd^2
35,750	17,975	32,31,00,625	0.1	3,23,10,063
14,200	3,575	1,27,80,625	0.2	25,56,125
15,600	2,175	47,30,625	0.4	18,92,250
16,600	1,175	13,80,625	0.2	2,76,125
18,000	225	50,625	0.1	5,063
$\underline{X}$	17,775		σ	6,086

Step 2: Discount at the time value of money & aggregate (Rs.)

Year	SD	DF@8%	DCF
1	4,725	0.926	4,375
2	4,222	0.857	3,618
3	6,086	0.794	4,832
		:. Total	12,825

:. Standard Deviation of the probability distribution of possible NPV is Rs. 12, 825

Part (ii): Probability that NPV is less than Zero

Step 1: Z Value = $(X - \underline{X}) / \sigma$

= (0 – 9,250)/ 12,825

= **0.721**

Step 2: The table value corresponding to Z value is 0.2642

Step 3: Z value is negative. Hence, it falls on the left tail.

Since, the requirement is "Less than",

deduct from 0.5

(i.e.) 0.5 – 0.2642 = 0.2358 or 23%

:. The probability that the NPV will be zero or less is 23%

Part (iii): Probability that NPV is more than 12,000

Step 1: Z Value = $(X - \bar{X}) / \sigma$

= (12,000 – 9,250)/ 12,825

= **0.214**

Step 2: The table value corresponding to Z value is 0.0832

Step 3: Z value is positive. Hence, it falls on the right tail.

Since, the requirement is "More than",

deduct from 0.5

(i.e.) 0.5 – 0.0832 = 0.4168 or 41%

:. The probability that the NPV will be more than 12,000 is 41%

Part (i): Evaluation of Project for acceptance

W.N: 1 Expected cash flows = (0.5 x 28) + (0.5 x 10) **Rs. 19 lakhs**

W.N: 2 Expected NPV (Rs.)

Year	Cash Flows	DF@12%	DCF
0	8,000,000	1.000	8,000,000
1 - 6	1,900,000	4.111	7,810,900
		:. NPV	189,100

:. Project shows a negative NPV, and is not acceptable

Part (ii): Abandon at the end of one year

W.N: 1 NPV, if project is successful

(Rs.)

Year	Cash Flows	DF@12%	DCF
0	8,000,000	1.000	8,000,000
1 - 6	2,900,000	4.111	11,510,800
		:. NPV	3,510,800

Part (ii): Abandon at the end of one year

W.N: 2 NPV, if project is unsuccessful

(Rs.)

Year	Cash Flows	DF@12%	DCF
0	8,000,000	1.000	8,000,000
1 - 6	6,000,000	4.111	5,358,000
	(CFAT of Rs. 10 lakhs	NPV	2,642,000
	+ Terminal Value of Rs. 50 lakhs)		

Part (ii): Abandon at the end of one year

W.N: 3 Expected Value with option

(Rs.)

Event	NPV	Probability	Expected Value
Successful	3,510,800	0.5	1,755,400
Unsuccessful	2,642,000	0.5	1,321,000
	:. Value of the option		434,400

W.N: 4 Value of the option:	Rs.
Value without Option	1,89,100
Value with Option	4,34,400
:. Value of Option	2,45,300

Evaluation:

- With the option, the worth of the project is enhanced.
- Hence, the project can be implemented,

  with an option to abandon at the end of one year.

Note

PAVITHRA Academy at Khairatabad, Hyderabad, AP by CA. Vinod is starting CA Final SFM & IDT Classed from May 27 onwards.

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Our material is covering 90marks questions from the Final Exams,,, Decision is yours to refer or not.