4. CAPITAL STRUCTURE

PROBLEM NO: 1

Debt%	Equity %	K_d	K_e	K_o
0%	100%	6%	11.5%	(0%) (6%) + (100%) (11.5%) = 11.5%
10%	90%	6%	12.0%	(10%) (6%) + (90%) (12%) = 11.4%
20%	80%	6%	12.0%	(20%) (6%) + (80%) (12%) = 10.8%
30%	70%	6.5%	13.0%	(30%) (6%) + (70%) (13%) = 10.9%
40%	60%	7%	15.0%	(40%) (6%) + (60%) (15%) = 11.4%
50%	50%	7.5%	17.0%	(50%) (6%) + (50%) (17%) = 11.5%
60%	40%	8.0%	20.0%	(60%) (6%) + (40%) (20%) = 11.6%

Descion: The 20% debt & 80% equity represents optimum Capital structure because the WACC is minimum at that capital structure.

PROBLEM NO: 2

Plan I: Raising Debt of Rs.2.5 Lakhs + Equity of Rs.22.5 Lakhs

Plan II: Raising Debt of Rs. 10 Lakhs + Equity of Rs.15 Lakhs

Plan III: Raising Debt of Rs. 15 Lakhs + Equity of Rs.10 Lakhs

Evaluation of given financial plans based on EPS

Particulars	Plan I	Plan II	Plan III
EBIT	500000	500000	500000
Less: Interest (W.N 1)	(25000)	(137500)	(237500)
EBT	475000	362500	262500
Less: Tax @ 50%	(237500)	(181250)	(131250)
EAT	237500	181250	131250
Less: Preference Dividend	0	0	0
EAESHS	237500	181250	131250
No of Eq shares (W.N 2)	15000	10000	8000
EPS	15.83	18.125	16.41

WORKING NOTE 1: Calculation of Interest on Debt

Plan	Calculation	Amount (Rs.)	Amount (Rs.)
Plan I	25,000 x 10%		25,000
Plan II	25,000 x 10%	25,000	
	75,000 x 15%	1,12,500	1,37,500
Plan III	25,000 x 10%	25,000	
	75,000 x 15%	1,12,500	
	5,00,000 x 20%	1,00,000	2,37,500

WORKING NOTE 2: No of Equity Shares to be issued:

Plan I	$\frac{Rs.22,50,000}{Rs.150(M.P.S)} = 15,000\ shares$
Plan II	$\frac{Rs.15,00,000}{Rs.150\ (M.P.S)} = 10,000\ shares$
Plan III	$\frac{Rs.10,00,000}{Rs.125\ (M.P.S)} = 8,000\ shares$

Decision: Since EPS under plan II is more than plan I & plan III it is advisable to accept plan II

PROBLEM NO: 3

Particulars	Option - I	Option - II
EBIT (31,000 + 1,50,000 x 10%) ↓ Old EBIT ↓ Additional Shares	46,000	46,000
Less: Interest (W.N 1)	(4500)	(1000)
EBT	41500	45000
Less: Tax@35%	(14525)	(15750)
EAT/EAESHS	26975	29250
No. of Eq. shares (W.N 2)	5000	7000
EPS	5.395	4.178
P/E Ratio	6	7
Market price	32.37	29.25

WORKING NOTES 1: Calculation of interest on Debt

Option 1:

5% Debentures of Rs.20,000 i.e. 5% x Rs.20,000 = Rs.1,000

7% Debt of Rs.50,000 i.e. 7% x Rs.50,000 = Rs.3,500

Rs.4,500

Option 2: 5% Debentures of Rs.20,000 i.e. 5% x Rs.20,000 = Rs.1000

WORKING NOTES 2: Calculation of number of equity shares to be issued:

Option 1:

Existing $= \frac{50,000}{10}$ = 5000 shares

Option 2:

Existing $= \frac{50,000}{10}$ = 5000 shares

New issue $= \frac{50,000}{25\,(M.P.S)}$ = 2000 shares

7,000 shares

Decision :- Since M.P under option – I is more than option – II, it is advisable to accept Option – I.

PROBLEM NO: 4

Step 1 :- Calculation of Interest coverage before additional investment of Rs. 2500000

$$\text{Interest Coverage} = \frac{\text{Total EBIT}}{\text{Total Int}} = \frac{2200000}{440000 + 480000 + 180000} = \frac{22L}{11L} = 2$$

↓ ↓ ↓

(40 L x 11%) (30 L x 16%) (15 L x 12%)

Step 2 : Calculation of Interest coverage after additional investment of Rs. 2500000

$$\text{Interest coverage} = \frac{2200000 \times 120\ \%}{440000 + 480000 + 180000 + 400000} = \frac{2640000}{1500000} = 1.76 \text{ Times}$$

↓ ↓ ↓ ↓

(40 L x 11%) (30 L x 16%) (15 L x 12%) (25L x 16%)

Step 3: From the above computation it is observed that int coverage reduced from 2 times to 1.76 times after additional investment of Rs. 25L, which is not favorable situation for money lender / creditor.

PROBLEM NO: 5

Particulars	Plan A	Plan B	Plan C	Plan D
EBIT	1500000	1800000	1500000	1500000
Less: Interest	0	(180000)	(300000)	0
EBT	1500000	1320000	1200000	1500000
Lass: Tax@50%	(750000)	(660000)	(600000)	(750000)
EAT	750000	660000	600000	750000
Less: Preference Dividend	0	0	0	150000
EAESH	750000	660000	600000	600000
No. of Equity shares	80000	60000	50000	60000
EPS	9.375/-	11/-	12/-	10/-

Conclusion: From above computation we can decide that Plan 'C' i.e Rs.12 EPS is highest. So it is advised to company to Opt. 'Plan C'

PROBLEM NO: 6

Calculation of earnings available

Particulars	Company A	Company B
EBIT	1500000	1500000
Less: Interest	0	(77000)
EBT	1500000	1423000
Less: Tax@25%	(375000)	(355750)
EAT/EAESHS	1125000	1067250
Add: Interest	0	77000
Total earnings to Eq + debt	1125000	1144250

PROBLEM NO: 7

Particulars	Plan A	Plan B	Plan C
EBIT	160000	160000	160000
Less: Interest (W.N1)	(8000)	(44000)	(62000)
EBT	152000	116000	98000
Less: Tax@50%	76000	(58000)	(49000)
EAT/EAESHS	76000	58000	49000
No. of Eq. shares	36000 $\left(\frac{9L}{25}\right)$	24000 $\left(\frac{6L}{25}\right)$	20000 $\left(\frac{4L}{20}\right)$
EPS	**2.11/-**	**2.42/-**	**2.45/-**

Working Notes 1: Calculation of Interest on debt

Plan	Calculation	Amount (Rs.)	Amount (Rs.)
Plan A	1,00,000 x 8%		Rs.8,000
Plan B	1,00,000 x 8%	8,000	
	3,00,000 x 12%	36,000	Rs.44,000
Plan C	1,00,000 x 8%	8,000	
	3,00,000 x 12%	36,000	
	1,00,000 x 18%	18,000	Rs.62,000

PROBLEM NO: 8

Let 'x' b the EBIT at Indifference point

W.K.T at Indifference point

$EPS_1 = EPS_2$

$$\frac{(x-Int)(1-Tax)-PD}{No\ of\ Eq\ shares} = \frac{(x-Int)(1-Tax)-PD}{No\ of\ Eq\ shares}$$

$$\frac{(x-0)(1-0.35)-0}{300000} = \frac{(x-15L)(1-0.35)-0}{200000}$$

By Solving the Equation

x = 45 lakhs

∴ EBIT at I.D.P = 45 Lakhs

PROBLEM NO: 9

Assumed equity share F.V = Rs.100

Let 'x' be the EBIT at I.D.P

W.K.T

At I.D.P

$EPS_1 = EPS_2$

$$\frac{(x-Int)(1-Tax)-PD}{No\ of\ shares} = \frac{(x-Int^*)(1-Tax)-PD}{No\ of\ shares}$$

$$\frac{(x-0)(1-0.4)-0}{60{,}000} = \frac{(x-7.2L)(1-0.40)-0}{20{,}000}$$

$$\frac{x(0.6)}{60{,}000} = (x-7{,}20{,}000)\frac{(0.6)}{20{,}000}$$

X = 3x - 21,60,000

2x = 21,60,000

X = Rs.10,80,000

∴ EBIT at I.D.P = Rs.10,80,000

$$Interest^* = 60L \times \frac{2}{3} \times 18\% = 40L \times 18\% = 7.2L$$

PROBLEM NO: 10

Plan – I

Particulars	(i)	(ii)	(iii)	(iv)	(v)
EBIT	62500	125000	250000	375000	625000
Less: Interest	0	0	0	0	0
EBT	62500	125000	250000	375000	625000
Less: Tax @ 40%	25000	50000	100000	150000	250000
EAT/EAESHS	37500	75000	150000	225000	375000
No of Eq Shares	312500	312500	312500	312500	312500
E p s	0.12/-	0.24/-	0.48/-	0.72/-	1.20/-

Plan – II

Particulars	(i)	(ii)	(iii)	(iv)	(v)
EBIT	62500	125000	250000	375000	625000
Less: Interest	(125000)	(125000)	(125000)	(125000)	(125000)
EBT	(62500)	0	125000	250000	500000

Less: Tax @ 40% / Tax shield	25000	0	50000	100000	200000
EAT	(37500)	0	75000	1500000	300000
Less: Preference Dividend	0	0	0	0	0
EAESHS	(37500)	0	75000	150000	300000
No of Eq Shares	156250	156250	156250	156250	156250
E P S	0.24/-	0/-	0.48/-	0.96/-	1.92/-

Plan – III

Particulars	(i)	(ii)	(iii)	(iv)	(v)
EBIT	62500	125000	250000	375000	625000
Less: Interest	0	0	0	0	0
EBT	62500	125000	250000	375000	625000
Less: Tax @ 40%	(25000)	(50000)	(100000)	(150000)	(250000)
EAT	37500	75000	150000	225000	375000
Less: P.D @8%	(125000)	(125000)	(125000)	(125000)	(125000)
EAESHS	(87500)	(50000)	25000	100000	250000
No of Eq Shares	156250	156250	156250	156250	156250
E P S	(0.56)	(0.32)	0.16	0.64	1.60

Conclusion: select the alternative having highest EPS

Indifference point b/w plan I & plan II

Let 'x' be the EBIT at I.D.P

W.K.T at I.D.P

$EPs_1 = EPS_2$

$$\frac{(x-Int)(1-Tax)-PD}{No\ of\ shares} = \frac{(x-Int)(1-Tax)-PD}{No\ of\ shares}$$

$$\frac{(x-0)(1-0.4)-0}{312500} = \frac{(x-1,25,000)(1-0.40)-0}{156250}$$

By Solving

X = 83333.

∴ EBIT at I.D.P = 83,333/-

I.D.P between plan I & plan III

$$\frac{(x-0)(1-0.4)-0}{312500} = \frac{(x-0)(1-0.4)-125000}{156250}$$

X = 208333

∴ EBIT at I.D.P = 208333

PROBLEM NO: 11

Particulars	Proposal P	Proposal Q	Proposal R
EBIT	1800000	1800000	1800000
Less: Interest @ 10%	0	200000	0
EBT	1800000	1600000	1800000
Less: Tax @ 50%	900000	800000	900000
EAT	900000	800000	900000
Less : Pref. Div	0	0	200000
EAESHS	900000	800000	700000
No of Eq Shares	200000	100000	100000
E p s	4.5/-	8/-	7/-

EBIT for F.B.E.P $\left[\text{Int} + \frac{\text{P.D}}{1-\text{Tax}}\right]$	0	200000	400000 $\left(\frac{2,00,000}{0.5}\right)$

a) I.D.P between plan P & plan Q

$$\frac{(x-0)(1-0.5)-0}{200000} = \frac{(x-2L)(1-0.5)-0}{100000}$$

2 [(x-2L)0.5] = 0.5 x

2 [0.5x – 1L = 0.5 x

1.0 x – 2L = 0.5 x

0.5 x = 2L

X = 400000

b) I.D.P between plan Q & plan R

$$\frac{(x-2L)(1-0.5)-0}{100000} = \frac{(x-2L)(1-0.5)-0}{100000}$$

There is no indifference point between plan Q & R

c) I.D.P between plan P & plan R

$$\frac{(x-0)(1-0.5)-0}{200000} = \frac{(x-0)(1-0.5)-2L}{100000}$$

$$\frac{0.5x}{200000} = \frac{0.5x-2,00,000}{100000}$$

$$X = \frac{2,00,000}{0.25} = \text{Rs.8,00,000}$$

Analysis: It can be seen that financial plan Q dominates Plan R, since the financial BEP of former is only Rs.2,00,000 but in case of latter it is Rs.4,00,000

PROBLEM NO: 12

Let 'x' be the level of EBIT at I.D.P

W.K.T at I.D.P

$EPS_1 = EPS_2$

$$\frac{(x-2L(w.n))(1-0.5)-0}{320000} = \frac{(x-260000(w.n))(1-0.5)-0}{300000}$$

By Simplify

X = 1160000

∴ EBIT at I.D.P = 1160000

WORKING NOTE:

Interest on Plan I = 20,00,000 x 10% = 2,00,000

Interest on Plan II = 20,00,000 x 10%+5,00,000 x 12% = 2,60,000

PROBLEM NO: 13

i) Market value of Debt (25000 x 150) = 37,50,000

ii) Market value of equity = $\frac{\text{EAESH'}}{\text{ke}} = \frac{20,00,000-5,25,000}{16\%}$ = 92,18,750

iii) Market value of Firm [M.v of debt + M.v of equity] = 1,29,68,750 (92,18,750 + 37,50,000)

iv) Overall coc (K_o) = $\frac{\text{EBIT}}{\text{M.V of Firm}} = \frac{2000000}{12968750}$ =15.42%

PROBLEM NO: 14

Calculation of M.V of Firm & K_o

Particulars	Existing	Prop I	Prop II
i) M.V of Debt	0	600000	1000000
ii) M.V of Equity	1875000 $\left[\frac{3L}{16\%}\right]$	1411764 $\left[\frac{3L-0.6L}{17\%}\right]$	900000 $\left[\frac{3L-1.2L}{20\%}\right]$
iii) M.V of Firm (i + ii)	1875000	2011764	1900000
iv) Over all coc (K_0)	16% $\left[\frac{18.75L}{18.75L}x16\%+0\right]$	14.91% $\left[\frac{6L}{2011764}(10\%)+\frac{1411764}{2011764}(17\%)\right]$	15.78% $\left[\frac{10L}{19L}(12\%)+\frac{9L}{19L}(20\%)\right]$

PROBLEM NO: 15

Step 1 Calculation of M.V of firms

Particulars	M Ltd	N Ltd
i) K_d	7%	-
ii) Value of Debt	1,00,000	-
iii) K_e	11.5%	10%
iv) EAESHS	13,000	20,000
v) M.V of Equity $\left[\frac{iv}{iii}\right]$	1,13,043 $\left(\frac{13,000}{0.115}\right)$	2,00,000 $\left(\frac{20,000}{0.1}\right)$
vi) M.V of Firm (ii +v)	2,13,043	2,00,000

Step 2

Calculation of Arbitrage gain

If investor holds 10% holdings of M Ltd

For holding 10% Investments in M Ltd requirement 113043 x 10% = 11304

Return to Eq. share holder (20000 - 7000) x 10% =1300

Alternative Strategy

Calculation of surplus cash available

Particulars	Amount (Rs.)
Amount from sale of shares (113043 x 10%)	11304
Add: amount borrowed @ 10% (100000 x 10%)	10000
Total Amount available	21304
Less: Amount required to invest in N Ltd (200000 x 10%)	(20000)
Surplus cash	1304

- Return to investor = (20000-7000) x 10% = 1300
- Return is same i.e Rs.1300 which we are getting from N Ltd before investing in M Ltd. But still we have excess money of Rs. 1304.3 available with us.

  Hence, it is better by doing arbitrage.

PROBLEM NO: 16

Step: 1 Calculation of M.V of Firm.

Particulars	U Ltd	V Ltd
i) K_d	-	7%
ii) Value of Debt	-	100000
iii) K_e	10%	18%
iv) EBIT-Int	20000	13000
v) Value of Equity $\left[\frac{iv}{iii}\right]$	200000 $\left(\frac{20,000}{0.1}\right)$	72222 $\left(\frac{13,000}{0.18}\right)$
vi) M.V of Firm (ii +v)	200000	172222

Step: 2 Arbitrage process

Suppose investor holding 10% of shares of U Ltd. i.e investment of Rs. 200000 x 10% = 20000

Return on Investment = 20000 x 10% = 2000.

Alternative Strategy

Calculation of surplus cash available

Particulars		Amount (Rs.)
Sale of shares in U Ltd (2L x 10%)		20000
Amount for investment in equity (72222 x 10%)	(7222)	
Amount for investment in Debt (1L x 10%)	(10000)	(17222)
Surplus cash available		2778

Return on investment:

Return on Debt = 10000 x 7% = 700

Return on Equity = 13000 x 10% = 1300

Total Return = 2000

In both the cases Return Rs.2,000 and still we have excess cash of Rs.27,778.

THE END