

5. CAPITAL STRUCTURE

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

Particulars	Plan A	Plan B	Plan C	Plan D
EBIT	15,00,000	15,00,000	15,00,000	15,00,000
Less: Interest	0	(1,80,000)	(3,00,000)	0
EBT	15,00,000	13,20,000	12,00,000	15,00,000
Less: Tax @ 50%	(7,50,000)	(6,60,000)	(6,00,000)	(7,50,000)
EAT	7,50,000	6,60,000	6,00,000	7,50,000
Less: Preference Dividend	0	0	0	1,50,000
EAESH	7,50,000	6,60,000	6,00,000	6,00,000
No. of Equity shares	80,000	60,000	50,000	60,000
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: 2

Working Note: Calculation of Interest

Particulars	Option - I (50%)	Option - II (40%)	Option - III (60%)
a) Up to 40,00,000	6,00,000 (40 L x 15%)	6,00,000 (40 L x 15%)	6,00,000 (40 L x 15%)
b) 40,00,000 - 50,00,000	1,60,000 (10 L x 16%)	-	1,60,000 (10 L x 16%)
c) Above 50,00,000	-	-	1,80,000 (10 L x 18%)
Total	7,60,000	6,00,000	9,40,000

Evaluation of Financial Plans:

(Basing on EPS)

Particulars	Option - I	Option - II	Option - III
a) EBIT	22,00,000	22,00,000	22,00,000
b) Interest (Refer WN)	(7,60,000)	(6,00,000)	(9,40,000)
c) EBT (a - b)	14,40,000	16,00,000	12,60,000
d) Tax @ 50%	(7,20,000)	(8,00,000)	(6,30,000)
e) EAT / EAESH	7,20,000	8,00,000	6,30,000
f) No. of Equity Shares	$\frac{1,25,000}{\left(\frac{\text{Rs. } 50,00,000}{\text{Rs. } 40}\right)}$	$\frac{1,50,000}{\left(\frac{\text{Rs. } 60,00,000}{\text{Rs. } 40}\right)}$	$1,25,000 \left(\frac{\text{Rs. } 40,00,000}{\text{Rs. } 32}\right)$
g) EPS (e/f)	5.76	5.333	5.04

Note: company issue shares only at market price, because issue less No. of shares and increases sale proceeds but dividend can be paid only on face value of a share.

Conclusion: option-I is better because EPS more than other two options. As EPS maximize under option - I it is advisable to raise required capital in the proportion of Rs.50 lacks equity and Rs.50 lacks debt.

PROBLEM NO: 3

Calculation of EPS & Market price in each of the given options:

(Rs. In Lakhs)

Particulars	Existing	Option I	Option II	Option III
EBIT (W.N-1)	15.00 (100 x 15%)	22.5 (150 x 15%)	22.5 (150 x 15%)	22.5 (150 x 15%)
Less: Interest	1.75 (25 x 7%)	1.75	1.75	6.75 (1.75 + 50 x 10%)
EBT	16.75	20.75	20.75	15.75
Less: Tax @ 40%	6.7	8.3	8.3	6.3
EAT	10.05	12.45	12.45	9.45
Less: Preference dividend	2.25 (25 x 9%)	2.25	8.25 (2.25 + 50 x 12%)	2.25
EAESH (A)	7.8	10.2	4.2	7.2
No. of equity shares (Lakhs)				
Existing	0.40	0.40	0.40	0.40
New	-	0.25	-	-
Number of Equity shares (B)	0.40	0.65	0.40	0.40
EPS (Rs.) (A/B)	19.5	15.69	10.5	18
PE ratio	-	25	20	15
Market price (EPS x PE ratio)	-	392.25	210	270

W.N-1: Calculation of EBIT

EBIT = 15% of capital employed

Capital employed (Before expansion):	Equity share capital	Rs. 40,00,000
	Debt	Rs. 25,00,000
	Preference share capital	Rs. 25,00,000
	Reserves and surplus	Rs. 10,00,000
		<u>Rs.1,00,00,000</u>

Capital employed (After expansion) = 1,00,00,000 + Additional Debt of Rs.50,00,000 = Rs. 1,50,00,000

EBIT, before expansion = 1,00,00,000 x 15% = Rs. 15,00,000

EBIT, after expansion = 1,50,00,000 x 15% = Rs. 22,50,000

Conclusion: The objective of Financial Management is to maximize the benefits of equity shareholders. Since market price is high in option I, it is beneficial to raise the funds of Rs.25,00,000 by way of fresh equity shares.

Assumption: The return on existing capital is given as 15%. It is assumed that the same rate of return will be maintained on additional investment also.

PROBLEM NO: 4

Computation of Interest Rate on Debentures:

$$\frac{(\text{EBIT} - \text{Interest})(1-t)}{\text{No. of Equity Shares } (N_1)} = \frac{\text{EBIT}(1-t) - \text{Preference Dividend}}{\text{No. of Equity Shares } (N_2)}$$

$$\frac{(2,72,000 - \text{Interest})(1-0.5)}{8,000 \text{ Shares}} = \frac{2,72,000(1-0.5) - 40,000}{6,000 \text{ Shares}}$$

$$\frac{1,36,000 - 0.5 \text{ Interest}}{4} = \frac{1,36,000 - 40,000}{3}$$

$$1,36,000 - 0.5 \text{ Interest} = 1,28,000 \left(\frac{96,000}{3} \times 4 \right)$$

$$0.5 \text{ Interest} = 8,000$$

$$\text{Interest} = \frac{8,000}{0.5} = 16,000$$

$$\text{Rate of Interest} = \frac{\text{Rs.16,000}}{\text{Rs.2,00,000}} \times 100 = 8\%$$

PROBLEM NO: 5

Particulars	Proposal P	Proposal Q	Proposal R
EBIT	18,00,000	18,00,000	18,00,000
Less: Interest @ 10%	0	2,00,000	0
EBT	18,00,000	16,00,000	18,00,000
Less: Tax @ 50%	9,00,000	8,00,000	9,00,000
EAT	9,00,000	8,00,000	9,00,000
Less: Preference Dividend	0	0	2,00,000
EAESH	9,00,000	8,00,000	7,00,000
No of Equity Shares	2,00,000	1,00,000	1,00,000
EPS	4.5/-	8/-	7/-
EBIT for Financial Break Even Point $\left[\frac{\text{Int} + \frac{\text{PD}}{1 - \text{Tax}}}{0.5} \right]$	0	2,00,000	4,00,000 $\left(\frac{2,00,000}{0.5} \right)$

a) Indifference Point between plan P & plan Q

$$\frac{(x-0)(1-0.5)-0}{2,00,000} = \frac{(x-2L)(1-0.5)-0}{1,00,000}$$

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

$$2 [0.5x - 1L] = 0.5 x$$

$$1.0 x - 2L = 0.5 x$$

$$0.5 x = 2L$$

$$X = 4,00,000$$

b) Indifference Point between plan Q & plan R

$$\frac{(x-2L)(1-0.5)-0}{1,00,000} = \frac{(x-0L)(1-0.5)-2L}{1,00,000}$$

$$(x-2,00,000) 0.5 = 0.5x - 2,00,000$$

$$0.5x - 1,00,000 = 0.5x - 2,00,000$$

There is no indifference point between plan Q & R

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

$$\frac{(x-0)(1-0.5)-0}{2,00,000} = \frac{(x-0)(1-0.5)-2L}{1,00,000}$$

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

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

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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: 6

Working Note I: Estimation of EAESH

Particulars	Amount (Rs.)
a) EBIT	5,00,000
b) Interest	(2,00,000)
c) EBT	3,00,000

PART - A

a) Estimation of Market Value of Equity:

$$\text{Market Value of Equity} = \frac{\text{EAESH}}{k_e} = \frac{3,00,000}{16\%} = \text{Rs. } 18,75,000$$

b) Market value of Firm = Market Value of Equity + Market Value of Debt
 = Rs. 18,75,000 + Rs. 20,00,000 = Rs. 38,75,000

PART - BEstimation of k_o :

$$K_o = \frac{\text{EBIT}}{\text{Market Value of Firm}} = \frac{\text{Rs. } 5,00,000}{\text{Rs. } 38,75,000} \times 100 = 12.9\% \text{ or } 13\%$$

PROBLEM NO: 7

WN 1: Estimation of EAESH		WN 2: Calculation of Market Value of Firm	
Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
a) EBIT	5,00,000	Market value of Firm = $\frac{\text{EBIT}}{k_o}$	= $\frac{\text{Rs. } 5,00,000}{0.15}$
b) Less: Interest	(1,50,000)		= Rs. 33,33,333
EAESH	3,50,000		

WN 3: Estimation of Market Value of Equity:

Market value of Equity = Market Value of Firm - Market Value of Debt
 = Rs. 33,33,333 - Rs. 15,00,000 = Rs. 18,33,333

Calculation of k_e : $\frac{\text{EAESH}}{\text{Market Value of Equity}} = \frac{\text{Rs. } 3,50,000}{\text{Rs. } 18,33,333} \times 100 = 19.09\%$

PROBLEM NO: 8

Evaluation of different capital structures given in the problem:

% of debt	% of equity	Cost of debt(K_i)	Cost of equity(K_e)	WACC (K_o)
0%	100%	6%	11.5%	11.5%
10%	90%	6%	12%	$6 \times 10\% + 12 \times 90\% = 11.4\%$
20%	80%	6%	12%	$6 \times 20\% + 12 \times 80\% = 10.8\%$
30%	70%	6.5%	13%	$6.5 \times 30\% + 13 \times 70\% = 11.05\%$
40%	60%	7%	15%	$7 \times 40\% + 15 \times 60\% = 11.8\%$
50%	50%	7.5%	17%	12.25%
60%	40%	8%	20%	12.8%

Decision: since the WACC is minimum 20% of debt and 80% equity represents optimum capital structure

PROBLEM NO: 9

a) Return to investor and Implied required rate of return:

EBIT	6,00,000
Less: Interest	-
EBT / EAESH	6,00,000

If investor owns 3% of stock of Gamma Ltd., he would get Rs. 18,000 (Rs. 6,00,000 x 3%)

Implied Rate of Return:

Since, there is no debt, overall cost of capital (K_o) = Cost of equity (K_e) = 20%

b) i) Implied required equity return of Delta Ltd.:

Since these firms are in No tax world, Market Value of Gamma = Market Value of Delta

Market value of Gamma = Market value of Equity (since there is no debt)

$$= \frac{\text{Earnings available to Equity Shareholders}}{K_o} = \frac{\text{Rs. } 6,00,000}{20\%} = 30,00,000$$

Market value of Delta = 30,00,000

EBIT	6,00,000
Less: Interest on Debt (12,00,000 x 10%)	(1,20,000)
EAESH	4,80,000
Market Value of Equity (30,00,000 x 60%)	18,00,000

$$K_e = \frac{\text{Earnings available to Equity Shareholders}}{\text{Market Value of equity}}$$

$$= \frac{4,80,000}{18,00,000} \times 100$$

$$= 26.67\%$$

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- ii) Cost of Equity increases linearly as a function of its Debt - Equity Ratio. Therefore, Cost of Equity of Levered Firm (Delta) is always greater than Cost of Unlevered firm (Gamma Ltd.) Since, the shareholders of Delta Ltd. expects more return from Gamma Ltd.

Working Note:

$$\text{Gamma Ltd.: } K_e = K_o + (K_o - K_d) (\text{Debt/Equity}) = 20\% + 0 = 20\%$$

$$\text{Delta Ltd.: } K_e = K_o + (K_o - K_d) (\text{Debt/Equity}) = 20\% + (20\% - 10\%) (40/60) = 20\% + 6.67\% = 26.67\%$$

PROBLEM NO: 10

i) Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis

$$\text{Market Value of 'A Ltd' (Unlevered) } V_u = \frac{\text{EBIT}(1-t)}{K_e} = \frac{\text{Rs. } 2,50,000 (1-0.30)}{20\%} = \frac{\text{Rs. } 1,75,000}{20\%} = \text{Rs. } 8,75,000$$

Market Value of 'B Ltd.' (Levered)

$$V_g = V_u + TB$$

$$= \text{Rs. } 8,75,000 + (\text{Rs. } 10,00,000 \times 0.30)$$

$$= \text{Rs. } 8,75,000 + \text{Rs. } 3,00,000 = \text{Rs. } 11,75,000$$

ii) Computation of Weighted Average Cost of Capital (WACC)

WACC of 'A Ltd.' = 20% (i.e. $K_e = K_o$)

WACC of 'B Ltd.'

	B Ltd. (Rs.)
EBIT	2,50,000
Interest to Debt holders	(1,20,000)
EBT	1,30,000
Taxes @ 30%	(39,000)
Income available to Equity Shareholders	91,000
Total Value of Firm	11,75,000
Less: Market Value of Debt	(10,00,000)
Market Value of Equity	1,75,000
Return on equity (K_e) = 91,000 / 1,75,000	0.52

Computation of WACC B. Ltd

Component of Capital	Amount	Weight	Cost of Capital	WACC
Equity	1,75,000	0.149	0.52	0.0775
Debt	10,00,000	0.851	0.084*	0.0715
Total	11,75,000			0.1490

$$*K_d = 12\% (1 - 0.3) = 12\% \times 0.7 = 8.4\%$$

$$WACC = 14.90\%$$

PROBLEM NO: 11**Note 1:- Computation of EBIT:**

$$\frac{\text{Net income (NI) for equity - holders}}{K_e} = \text{Market Value of Equity}$$

$$\frac{\text{Net income (NI) for equity - holders}}{0.20} = \text{Rs. 1,140 lakhs}$$

Therefore, Net Income to equity-holders = Rs. 228 lakhs

$$\text{EBIT} = \text{Rs. 228 lakhs} / 0.7 = \text{Rs. 325.70 lakhs}$$

	All Equity (Rs. In lakhs)	Debt of Equity (Rs. In lakhs)
EBIT	325.70	325.70
Interest on Rs.200 lakhs @ 15%	-	30.00
EBT	325.70	295.70
Tax @ 30 %	97.70	88.70
Income available to equity holders	228	207

i) Market value of levered firm = Value of unlevered firm + Tax Advantage

$$= \text{Rs. 1,140 lakhs} + (\text{Rs.200 lakhs} \times 0.3) = \text{Rs. 1,200 lakhs}$$

The impact is that the market value of the company has increased by Rs. 60 lakhs (Rs. 1,200 lakhs - Rs. 1,140 lakhs)

ii) Cost of Capital/ K_o

Components	Amount (Rs. In lakhs)	Cost of Capital (%)	Weight	WACC (%)
Equity	1,000	20.7	83.33	17.25
Debt	200	(15% x 0.7) = 10.5	16.67	1.75
	1,200			19.00

The impact is that the WACC has fallen by 1% (20% - 19%) due to the benefit of tax relief on debt interest payment.

(Or)

$$K_o = \frac{\text{EBIT} (1 - T)}{\text{Value of firm}} = \frac{325.70 \text{ Lakhs} (1 - 0.3)}{1200 \text{ Lakhs}}$$

$$= \frac{228 \text{ Lakhs}}{1200 \text{ Lakhs}} \times 100$$

$$= 19\%$$

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iii) Calculation of Cost of Equity:

$$K_e = (\text{Net Income to equity holders} / \text{Equity Value}) \times 100$$

$$= (207 \text{ lakhs} / 1200 \text{ lakhs} - 200 \text{ lakhs}) \times 100 = (207 / 1000) \times 100 = 20.7 \%$$

THE END