6. CAPITAL STRUCTURE

PROBLEM NO: 1

Working Note: 1		Working Note: 2	
Estimation of EBIT		Estimation of Capital Employed	
Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
a) EBT	3,00,000	a) Equity Share Capital (80,000 x 10)	8,00,000
b) Interest	1,20,000	b) Retained Earnings	12,00,000
c) EBIT	4,20,000	c) Debenture Capital Employed	10,00,000
		Total Capital Employed	30,00,0000

Working Note: 3: Estimation of return on Capital Employed

$$\text{Return on Capital Employed} = \frac{\text{EBIT}}{\text{Capital Employed}} \times 100 = \frac{4,20,000}{30,00,000} \times 100 = 14\%$$

Working Note: 4: Estimation of Proposed EBIT:

Proposed Capital Employed x Return on Capital Employed = (30,00,000 + 4,00,000) x 14% = Rs. 4,76,000

Calculation of Earnings Per Share (EPS):

Particulars	Present	Option - I	Option - II
		100% Debt	100% Equity
a) EBIT	4,20,000	4,76,000	4,76,000
b) Interest	(1,20,000)	(1,68,000)	(1,20,000)
c) EBT (a - b)	3,00,000	3,08,000	3,56,000
d) Tax @ 50%	(1,50,000)	(1,54,000)	(1,78,000)
e) EAT / EAESH (c - d)	1,50,000	1,54,000	1,78,000
f) No. of Equity Shares	80,000	80,000	1,20,000
g) EPS (e/f)	1.875	1.925	1.483

Conclusion: It is advisable to raise additional finance through 12% debentures (Rs.4,00,000) because EPS is (Rs.1.925) is more than the option -II

PROBLEM NO: 2

Given information,

Additional amount required = 50,000

Tax rate = 50%

PART - A (EBIT remains same)

Evaluation of financial plans basing on EPS

Particulars	Present	100% equity	100% preference	100% debt
a) EBIT	40,000	40,000	40,000	40,000
b) Interest	-	-	-	(5,000)
c) EBT	40,000	40,000	40,000	35,000
d) Tax @ 50%	(20,000)	(20,000)	(20,000)	17,500
e) EAT / EASH	20,000	20,000	20,000	17,500
f) Preference shares	-	-	(6,000)	-
g) EAESH	20,000	20,000	14,000	17,500
h) No of Equity shares	10,000	15,000	10,000	10,000
i) EPS (g/h)	2	1.33	1.4	1.75
j) Impact on EPS	-	- 0.67	- 0.60	- 0.25

If there is no change in EBIT, it is not advisable to go for expansion. This is because as a result of expansion the companies EPS is decreased in all options.

PART - B (EBIT increases by 10,000)

Particulars	Present	100% equity	100% preference	100% debt
a) EBIT	40,000	50,000	50,000	50,000
b) Interest	-	-	-	(5,000)

c) EBT	40,000	50,000	50,000	45,000
d) Tax @ 50%	(20,000)	(25,000)	(25,000)	(22,500)
e) EAT / EASH	20,000	25,000	25,000	22,500
f) Preference shares	-	-	(6,000)	-
g) EAESH	20,000	25,000	19,000	22,500
h) No of Equity shares	10,000	15,000	10,000	10,000
i) EPS	2	1.67	1.9	2.25
j) Impact on EPS	-	- 0.33	- 0.1	0.25

Conclusion:

1. After expansion the company EBIT increase by Rs. 10,000 than it is better to choose option-I.
2. As it increase the EPS the company by 0.25. therefore it is better to choose additional capacity by issue of10% debentures

PROBLEM NO: 3

Particulars	Plan A	Plan B	Plan C	Plan D
EBIT	15,00,000	18,00,000	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: 4

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	$1,25,000\left(\frac{\text{Rs. } 50,00,000}{\text{Rs. } 40}\right)$	$1,50,000\left(\frac{\text{Rs. } 60,00,000}{\text{Rs. } 40}\right)$	$1,25,000\left(\frac{\text{Rs. } 40,00,000}{\text{Rs. } 32}\right)$
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: 5

The EPS is determined as follows:

Particulars	Alternatives		
	I (Rs.1,00,000 debt)	**II** (Rs.4,00,000 debt)	**III** (Rs.6,00,000 debt)

EBIT	1,60,000	1,60,000	1,60,000
Interest	(8,000)	(44,000)	(74,000)
PBT	1,52,000	1,16,000	86,000
Taxes at 50%	(76,000)	(58,000)	(43,000)
PAT	76,000	58,000	43,000
No. of shares	36,000	24,000	20,000
EPS	2.11	2.42	2.15

The second alternative maximizes EPS; therefore, it is the best financial alternative in the present case. The interest charges for Alternative II and III are calculated as follows:

Interest calculation, Alternative II

Particulars	Amount (Rs.)
1,00,000 @ 8%	8,000
3,00,000 @ 12%	36,000
Total	44,000

Interest calculation, Alternative III

Particulars	Amount (Rs.)
1,00,000 @ 8%	8,000
4,00,000 @ 12%	48,000
1,00,000 @ 18%	18,000
Total	74,000

The number of shares is found out by dividing the amount to be raised through equity issue by the market price per share. The market price per share is Rs.25 in case of first two alternatives and Rs.20 in case of last alternative.

PROBLEM NO: 6

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/EAESH	26975	29250
No. of Equity 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 $= \frac{50,000}{10}$ = 5,000 shares

Option 2: Existing $= \frac{50,000}{10}$ = 5,000 shares

New issue $= \frac{50,000}{25\,(M.P.S)}$ = 2,000 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: 7

i) Computation of EPS under three-financial plans.

Plan 1: Equity Financing

EBIT	Rs. 62,500	Rs. 1,25,000	Rs. 2,50,000	Rs. 3,75,000	Rs. 6,25,000
Interest	0	0	0	0	0
EBT	Rs. 62,500	Rs. 1,25,000	Rs. 2,50,000	Rs. 3,75,000	Rs. 6,25,000
Less: Taxes 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	Rs. 37,500	Rs. 75,000	Rs. 1,50,000	Rs. 2,25,000	Rs. 3,75,000
No. of equity shares	3,12,500	3,12,500	3,12,500	3,12,500	3,12,500
EPS	Rs. 0.12	0.24	0.48	0.72	1.20

Plan 2: Debt - Equity Mix

EBIT	Rs. 62,500	Rs. 1,25,000	Rs. 2,50,000	Rs. 3,75,000	Rs. 6,25,000
Interest	1,25,000	1,25,000	1,25,000	1,25,000	1,25,000
EBT	(62,500)	0	1,25,000	2,50,000	5,00,000
Less: Taxes 40%	25,000*	0	50,000	1,00,000	2,00,000
PAT	(37,500)	0	75,000	1,50,000	3,00,000
No. of equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(Rs. 0.24)	0	0.48	0.96	1.92

*The Company will be able to set off losses against other profits. If the Company has no profits from operations, loses will be carried forward.

Plan 3: Preference Shares - Equity Mix

EBIT	Rs. 62,500	Rs. 1,25,000	Rs. 2,50,000	Rs. 3,75,000	Rs. 6,25,000
Interest	0	0	0	0	0
EBT	Rs. 62,500	Rs. 1,25,000	Rs. 2,50,000	Rs. 3,75,000	Rs. 6,25,000
Less: Taxes 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	Rs. 37,500	Rs. 75,000	Rs. 1,50,000	Rs. 2,25,000	Rs. 3,75,000
Less: Pref. dividend	1,25,000*	1,25,000*	1,25,000	1,25,000	1,25,000
PAT for ordinary Shareholders	(87,500)	(50,000)	25,000	1,00,000	2,50,000
No. of equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(0.56)	(0.32)	0.16	0.64	1.60

*In case of cumulative preference shares, the dividend gets accumulated if there is insufficient profit to pay dividend. If we assume it as non-cumulative preference shares, then in this case dividend amount will be lower of PAT and amount of preference dividend.

ii) The choice of the financing plan will depend on the state of economic conditions. If the company's sales are increasing, the EPS will be maximum under Plan II: Debt - Equity Mix. Under favorable economic conditions, debt financing gives more benefit due to tax shield availability than equity or preference financing.

iii) EBIT - EPS Indifference Point : Plan I and Plan II:

$$\frac{(EBIT\ *)\,x(1-T_C)}{N_1} = \frac{(EBIT\ *-Interest\ )x(1-T_C)}{N_2}$$

$$\frac{EBIT\ *(1-0.40)}{3,12,500} = \frac{(EBIT\ *-1,25,000)x(1-0.40)}{1,56,250}$$

$$EBIT\ * = \frac{3,12,500}{3,12,500\ -1,56,250}\ x\ 1,25,00 = Rs.2,50,000$$

EBIT - EPS Indifference Point: Plan I and Plan III

$$\frac{EBIT\ *\,x(1-T_C)}{N_1} = \frac{EBIT\ *(1-T_C)-Pref.Div.}{N_2}$$

$$EBIT\ * = \frac{N_1}{N_1-N_2}x\frac{Pref.Div.}{1-T_C} = \frac{3,12,500}{3,12,500\ -1,56,250}x\frac{1,25,000}{1-0.4} = Rs.4,16,666.67$$

PROBLEM NO: 8

Assumed equity share F.V = Rs.100

Let 'x' be the EBIT at Indifference point

We know that, At I.D.P: $EPS_1 = EPS_2$

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

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

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

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

X = 3x - 21,60,000

2x = 21,60,000

X = Rs.10,80,000

∴ EBIT at I.D.P = Rs.10,80,000

PROBLEM NO: 9

Computation of level of earnings before interest and tax (EBIT)

In case alternative (i) is accepted, then the EPS of the firm would be:

$$\text{EPS Alternative (i)} = \frac{(\text{EBIT - Interest})\,(1 - \text{tax rate})}{\text{No. of equity shares}} = \frac{(\text{EBIT} - 0.12 \times \text{Rs } 4{,}00{,}000)\,(1 - 0.35)}{60{,}000 \text{ shares}}$$

In case the alternative (ii) is accepted, then the EPS of the firm would be

$$\text{EPS Alternative (ii)} = \frac{(\text{EBIT} - 0.12 \times \text{Rs } 4{,}00{,}000)(1 - 0.35) - (0.14 \times \text{Rs } 2{,}00{,}000)}{40{,}000 \text{ shares}}$$

In order to determine the indifference level of EBIT, the EPS under the two alternative plans should be equated as follows:

$$\frac{(\text{EBIT} - 0.12 \times \text{Rs } 4{,}00{,}000)\,(1 - 0.35)}{60{,}000 \text{ shares}} = \frac{(\text{EBIT} - 0.12 \times \text{Rs } 4{,}00{,}000)\,(1 - 0.35) - (0.14 \times \text{Rs } 2{,}00{,}000)}{40{,}000 \text{ shares}}$$

$$\text{Or } \frac{0.65\,\text{EBIT} - \text{Rs } 31{,}200}{3} = \frac{0.65\,\text{EBIT} - \text{Rs } 59{,}200}{2}$$

Or 1.30 EBIT - Rs 62,400 = 1.95 EBIT - Rs 1,77,600

Or (1.95 - 1.30) EBIT = Rs 1,77,600 - Rs 62,400 = Rs 1,15,200

$$\text{Or EBIT} = \frac{\text{Rs } 1{,}15{,}200}{0.65}$$

Or EBIT = Rs 1,77,231

PROBLEM NO: 10

a) Estimation of Earnings per share

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/-
b) EBIT for Financial Break Even Point $\left[\text{Int} + \frac{\text{P.D}}{1-\text{Tax}}\right]$	0	2,00,000	4,00,000 $\left(\frac{2,00,000}{0.5}\right)$

c) Range of EBIT among various plans:

i) 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

ii) 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

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

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

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

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

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: 11

i) Computation of Higher EPS from the Expected EBIT

Particulars	Debt (Rs.)	Equity (Rs.)
Expected earnings before Interest and tax	15,000	15,000
Less: Interest (12% of Rs.50,000)	6,000	
Earnings Before Tax	9,000	15,000
Less: Tax @ 46% of EBT (Rs.9,000 x 46%)	4,140	6,900
Earnings Available to Equity Holders: (A)	4,860	8,100
Number of Shares Issued: (B) **(W.N.)**	10,000	12,500
Earnings Per Share	0.486	0.648

Conclusion: EPS is higher when the company raises additional funds by issue of Equity Shares.

Working Note:

Number of Shares to be issued:

Amount Required: (i) Rs.50,000

Market Price Per Share: (ii) Rs.20/-

No of New Shares to be issued (i)/(ii) (iii) 2,500

ii) Computation of Indifference Level of EBIT for the two alternatives

$$\frac{(EBIT - Rs.6,000)(1-0.46)}{10,000\ Shares} = \frac{EBIT(1-0.46)}{12,500\ Shares}$$

EBIT = Rs.30,000

There fore, the Indifference Level of EBIT for two alternatives is Rs. 30,000/-.

iii) The EPS for the EBIT at the Indifference Level.

$$EPS = \frac{Rs.30,000(1-0.46)}{12,500\ Shares}$$

EPS = Rs.1.296/- per share.

PROBLEM NO: 12

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:

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

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 - B

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

PROBLEM NO: 13

i) Market value of Debt (25,000 x 150) = 37,50,000

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

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) $= \frac{EBIT}{\text{Market Value of Firm}} = \frac{20,00,000}{1,29,68,750} = 15.42\%$

PROBLEM NO: 14

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 = $\frac{EBIT}{k_o}$	$= \frac{Rs.\ 5,00,000}{0.15}$
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: $\frac{EAESH}{\text{Market Value of Equity}} = \frac{\text{Rs. } 3,50,000}{\text{Rs. } 18,33,333} \times 100 = 19.09\%$

PROBLEM NO: 15

Value of a firm (V) = EBIT / Overall cost of capital (K_o) or, Rs 9,00,000 / 0.12 = Rs 75,00,000

Market Value of equity (S) = Market Value of firm (V) - Market Value of Debt (D)

= Rs. 75,00,000 - Rs. 30,00,000 = Rs 45,00,000

Calculation of Cost of Equity:

Overall Cost of Capital (k_o) = k_e (S/V) + k_d (D/V)

Or, $k_o \times V = (k_e \times S) + (k_d \times D)$ Or, $k_e = \frac{(k_o \text{ x } V) - (k_d \text{ x } D)}{S}$

Or, $= \frac{(0.12 \text{ x Rs.}75,00,000) - (0.10 \text{ x Rs.}30,00,000)}{\text{Rs. } 45,00,000} = \frac{\text{Rs. } 9,00,000 - \text{Rs. } 3,00,000}{\text{Rs. } 45,00,000} = 0.1333 \text{ or } 13.33\%$

PROBLEM NO: 16

Given Information, EBIT = Rs. 12,00,000; k_d = 15%

Alternative 1: Since Capital Structure has 100% Equity

$K_e = k_o = 24\%$

Market Value of Firm = Market Value of Equity

EBIT = EAESH = 12,00,000

Estimation of k_o, $k_e = \frac{\text{EAESH}}{\text{Market Value of Firm}} = \frac{\text{Rs. } 12,00,000}{\text{Rs. } 50,00,000} = 24\%$

Alternative 2: Market Value of Equity = Rs. 25,00,000

Market Value of debt = Rs. 25,00,000

Market Value of Firm = Market Value of Equity + Market Value of Debt

= Rs. 25,00,000 + Rs. 25,00,000 = Rs. 50,00,000

$K_o = \frac{\text{EBIT}}{\text{Market Value of Firm}} = 24\%$

$k_e = \frac{\text{EAESH}}{\text{Market Value of Equity}} = \frac{\text{Rs. } 12,00,000 - \text{Rs. } 3,75,000}{\text{Rs. } 25,00,000} \text{ x } 100 = 33\%$

Verification: $k_o = 33\% \left(\frac{25,00,000}{50,00,000}\right) + 15\% \left(\frac{25,00,000}{50,00,000}\right) = 24\%$

Alternative 3: Market Value of Debt = Rs. 37,50,000 ⟶ (1)

Market Value of Equity = Rs. 12,50,000 ⟶ (2)

Market Value of Firm = (1) + (2) = Rs. 50,00,000

$K_o = \frac{\text{EBIT}}{\text{Market Value of Firm}} = \frac{\text{Rs. } 12,00,000}{\text{Rs. } 50,00,000} = 24\%$

$K_e = \frac{\text{EAESH}}{\text{Market Value of Equity}} = \frac{\text{Rs. } 12,00,000 - \text{Rs. } 5,62,500}{\text{Rs. } 12,50,000} = 51\%$

Verification: $k_o = 51\% \left(\frac{12,50,000}{50,00,000}\right) + 15\% \left(\frac{37,50,000}{50,00,000}\right) = 24\%$

Note: under NOI approach every capital structure is an optimum capital structure.

PROBLEM NO: 17

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*10%+12*90%=11.4%
20%	80%	6%	12%	6*20%+12*80%=10.8%
30%	70%	6.5%	13%	6.5*30%+13*70%=11.05%
40%	60%	7%	15%	7*40%+15*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: 18

Calculation of M.V of Firm & K_o

Particulars	Existing	Prop I	Prop II
i) M.V of Debt	0	6,00,000	10,00,000
ii) M.V of Equity	18,75,000 $\left[\frac{3,00,000}{16\%}\right]$	14,11,764 $\left[\frac{3,00,000-60,000}{17\%}\right]$	9,00,000 $\left[\frac{3,00,000-1,20,000}{20\%}\right]$
iii) M.V of Firm (i + ii)	18,75,000	20,11,764	19,00,000
iv) Over all COC (K_0)	16% $\left[\frac{18,75,000}{18,75,000}x16\%+0\right]$	14.91% $\left[\frac{6,00,000}{20,11,764}(10\%)+\frac{14,11,764}{20,11,764}(17\%)\right]$	15.78% $\left[\frac{10L}{19L}(12\%)+\frac{9L}{19L}(20\%)\right]$

PROBLEM NO: 19

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

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

Market Value of 'B Ltd.' (Levered)

$V_g = V_u + TB$

= Rs. 8,75,000 + (Rs. 10,00,000 × 0.30)

= Rs. 8,75,000 + Rs. 3,00,000 = 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.'

Particulars	Amount (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% × 0.7 = 8.4%

WACC = 14.90%

PROBLEM NO: 20

Here we are assuming that MM Approach 1958: without tax. Where capital structure has no relevance with the value of company and accordingly overall cost of capital of both levered as well as unlevered company is same. Therefore, the two companies should have similar WACC's. Because Samsui Limited is all equity financed, its WACC is the same as its cost of equity finance, i.e. 16 percent. It follows that Sanghmani Limited should have WACC equal to 16 percent also.

Therefore, Cost of equity in Sanghmani Ltd. (levered company) will be calculated as follows:

$K_o = \frac{2}{3} \times k_e + \frac{1}{3} \times k_d = 16\%$ (i.e. equal to WACC of Samsui Ltd.0

Or, $16\% = \frac{2}{3} \times k_e + \frac{1}{3} \times 10\%$ Or, $k_e = 19\%$

PROBLEM NO: 21

Part-I: Calculation of market values of firm A & Firm B

Market value of unlevered firm (Firm A)

Profit Statement:

Particulars	Amount (Rs.)
EBIT	40,000
Less: Interest	0
EBT	40,000
Less: Tax @ 40%	16,000
EAESH	24,000

MV of equity = $\frac{EAESH}{k_e} = \frac{24,000}{0.10} = 2,40,000$

Since it is an unlevered company, MV of firm will be equal to MV of Equity.

Market value of levered firm (Firm B)

Market value of levered firm = MV of unlevered firm + tax shield on debt

= 2,40,000 + (2,00,000 x 40%)

= 2,40,000 + 80,000 = 3,20,000

Part-II: Given that, market value of firm B is Rs.3,60,000, whereas market value of firm A is only Rs.2,40,000. Therefore, market values of these 2 firms do not represent equilibrium position.

Market values of these 2 firms will come to equilibrium position through the process of Arbitrage.

PROBLEM NO: 22

Statement of calculation of earnings available to equity holders and debt holders

Particulars	Company	
	A	B
Net operating income	15,00,000	15,00,000
Less: Interest on Debt (11% of Rs.7,00,000) (i)	-	77,000
Profit before taxes	15,00,000	14,23,000
Less: Tax @ 25%	3,75,000	3,55,750
Profit after tax/Earnings available in equity holders (ii)	11,25,000	10,67,250
Total earnings available to equity holders + Debt holders [(i) + (ii)]	11,25,000	11,44,250

As we can see that the earnings in case of Company B is more than the earnings of Company A because of tax shield available to shareholders of Company B due to the presence of debt structure in Company B. The interest is deducted from EBIT without tax deduction at the corporate level; equity holders also get their income after tax deduction due to which income of both the investors increase to the extent of tax saving on the interest paid i.e. tax shield i.e.25% × 77,000 = 19,250 i.e. difference in the income of two companies' earnings i.e. 11,44,250 - 11,25,000 = Rs. 19,250.

PROBLEM NO: 23

SHIFTING FROM LEVERED COMPANY Y TO UNLEVERED COMPANY X

Step-1: Calculation of Earnings of the investors in company Y.

Profit Statement

Particulars	Amount (Rs.)
EBIT	1,50,000
Less: Interest	60,000
EAESH	90,000

Investors percentage of holding of shares in Company Y = 5%

Earnings in company Y = 90,000 x 5% = Rs.4,500

Step- 2: Arbitrage

Particulars	Amount
Net Sale Proceeds on sale of shares in Company Y (4,50,000 x 5%)	22,500
Add: Personal Loan to be taken @ 10% (6,00,000 x 5%)	30,000
	52,500
Less: Amount required to purchase 5% shares in Company X	50,000
Surplus Funds	**2,500**

Through the process of arbitrage the investor can reduce his investment to the extent of Rs.2,500

Step-3: Earnings in Company X

Particulars	Amount
Total amount of earnings in Company 'X' (E/A/ESH)	1,50,000
Earnings of the investor holding 5% shares (1,50,000 x 5%)	7,500
Less: Interest on Personal Loan (30,000 x 10%)	3,000
	4,500

The market values of two firms with similar risk class must be equal. In the given case market value of the Company Y is more than that of Company X. So there is scope for Arbitrage.

Some investors of Company Y will sell their holding and will shift to Company X. Eventually the market value of Company Y will decrease and market value of Company X will increase. After reaching equilibrium stage then there will not be any scope for arbitrage.

PROBLEM NO: 24

Particulars	Firms	
	N	M
NOI/EBIT	Rs.20,000	Rs.20,000
Debt	-	Rs.1,00,000
Ke	10%	11.50%
Kd	-	7%

$$\text{Value of equity (S)} = \frac{\text{NOI} - \text{interest}}{\text{cost of equity}}$$

$$s_n = \frac{20,000}{10\%} = \text{Rs.2,00,000}, \quad s_m = \frac{20,000 - 7,000}{11.50\%} = \text{Rs.1,13,043}$$

V_n = Rs.2,00,000

V_m = 1,13,043 + 1,00,000 {V = S + D} = Rs.2,13,043

Assume you have 10% share of levered company. i.e. M. Therefore, investment in 10% of equity of levered company = 10% × 1,13,043 = Rs.11,304.3

Return will be 10% of (20,000 - 7,000) = Rs.1,300.

Alternate Strategy will be:

Sell your 10% share of levered firm for Rs. 11,304.3 and borrow 10% of levered firms debt i.e.10% of Rs.1,00,000 and invest the money i.e. 10% in unlevered firms stock:

Total resources /Money we have = 11,304.3 + 10,000 = 21,304.3 and you invest 10% of 2,00,000 = Rs. 20,000

Surplus cash available with you is = 21,304.3 - 20,000 = Rs. 1,304.3

Your return = 10% EBIT of unlevered firm - Interest to be paid on borrowed funds

i.e. = 10% of Rs. 20,000 - 7% of Rs. 10,000 = 2,000 - 700 = Rs. 1,300

i.e. your return is same i.e. Rs. 1,300 which you are getting from 'N' company before investing in 'M' company. But still you have Rs. 1,304.3 excess money available with you. Hence, you are better off by doing arbitrage.

PROBLEM NO: 25

Particulars	Firms	
	U	L
NOI/EBIT	Rs. 20,000	Rs. 20,000
Debt	-	Rs. 1,00,000
K_e	10%	18%
K_d	-	7%

Value of equity capital (s) = $\left[\frac{EBIT - Interest}{K_e}\right] = \frac{20,000}{0.10} = \frac{20,000 - 7,000}{0.18}$ = Rs. 2,00,000 = Rs. 72,222

Total value of the firm

V = S + D

Rs. 2,00,000 +Rs. 72,222 + 1,00,000 = Rs. 1,72,222

Assume you have 10% shares of unlevered firm i.e. investment of 10% of Rs. 2,00,000 = Rs. 20,000 and Return @ 10% on Rs. 20,000. Investment will be 10% of earnings available for equity i.e. 10% × 20,000 = Rs. 2,000.

Alternative strategy:

Sell your shares in unlevered firm for Rs. 20,000 and buy 10% shares of levered firm's equity plus debt

i.e. 10% equity of levered firm = 7,222

10% debt of levered firm = 10,000

Total investment = 17,222

Your resources are Rs. 20,000

Surplus cash available = Surplus - Investment = 20,000 - 17,222 = Rs. 2,778

Your return on investment is:

7% on debt of Rs. 10,000 700

10% on equity i.e. 10% of earnings available for equity holders i.e. (10% × 13,000) 1,300

Total return 2,000

i.e. in both the cases the return received is Rs. 2,000 and still you have excess cash of Rs. 2,778.

Hence, you are better off i.e. you will start selling unlevered company shares and buy levered company's shares thereby pushing down the value of shares of unlevered firm and increasing the value of levered firm till equilibrium is reached.

THE END