4. CAPITAL STRUCTURE

PROBLEM NO: 1

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. Pref shares	-	-	-	-
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. Pref 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 companyRs.s 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: 2

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: 3

Working Note – 1 (Calculation of Interest)

Particulars	Option-I (50%)	Option-II (60%)	Option-III (40%)
a. upto 40L	(40Lx15%) = 6L	(40Lx15%) = 6L	(40Lx15%) = 6L
b. 40L-50L	(10Lx16%) = 1.6L	(10Lx16%) = 1.6L	-
c. above 50L	-	(10Lx18%) = 1.8%	-
Total	7.6L	9.4L	6L

Evaluation of financial plans (basing on EPS) Amt in 00,000

Particulars	Option-I	Option-II	Option-III
a. EBIT	22	22	22
b. Interest	(7.6)	(9.4)	(6)
c. EBT (a-b)	14.4	12.6	16
d. Tax @ 50%	(7.2)	(6.3)	(8)
e. EAT / EAESH (c-d)	7.2	6.3	8
f. No. of equity shares	50/40 = 1.25	60/40 = 1.5	40/32 = 1.25
g. EPS (e/f)	5.76	4.2	6.4

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: 4

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
1,00,000@8%	8,000
3,00,000@12%	36,000
Total	44,000

Interest calculation, Alternative III

Particulars	Amount
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: 5

Firm	Expected EPS	P/E multiple	Value of share
A	Rs. 5.00	8.3	41.5
B	7.50	12.5	93.75
C	3.00	15.2	45.60
D	4.00	11.5	46
E	8.50	22.0	187

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/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: 7

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)	12.00	15	15	15
	(100 x 12%)	(125 x 12%)	(125 x 12%)	(125 x 12%)
Less: Interest	1.75	1.75	1.75	3.75
	(25 x 7%)			(1.75 + 25 x 8%)

EBT **Less:** Tax @ 50%	10.25 5.125	13.25 6.625	13.25 6.625	11.25 5.625
EAT **Less:** Preference dividend	5.125 2.25 (25 x 9%)	6.625 2.25	6.625 4.75 (2.25 + 25 x 10%)	5.625 2.25
EAESH (A)	2.875	4.375	1.875	3.375
No. of equity shares (Lakhs) Existing New	 0.40 -	 0.40 0.20	 0.40 -	 0.40 -
Number of Equity shares (B)	0.40	0.60	0.40	0.40
EPS (Rs.) (A/B) PE ratio Market price (EPS X PE ratio)	7.19 - -	7.29 20 146	4.69 17 80	8.44 16 135

W.N-1: Calculation of EBIT

EBIT = 12% 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

Rs.1,00,00,000

Capital employed (After expansion) = 1,00,00,000 + Additional Debt of Rs.25,00,000 = Rs. 1,25,00,000

EBIT, before expansion = 1,00,00,000 x 12% = Rs. 12,00,000

EBIT, after expansion = 1,25,00,000 x 12% = Rs. 15,00,000

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 12%. It is assumed that the same rate of return will be maintained on additional investment also.

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

Conclusion: If EBIT is 45 lakhs then EPS will be same under both the options i.e., Rs. 9.75 per share.

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

$EPS_1 = EPS_2$

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

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

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

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

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: 10

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

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

$$\text{EPS Alternative (i)} = \frac{(\text{EBIT - Interest})\ (1-\text{tax rate})}{\text{No. of equity shares}}$$

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

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

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

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

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

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

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: 11

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: 12

(i) Amount = Rs 80,00,000

Plan I = Equity of Rs 60,00,000 + Debt of Rs 20,00,000

Plan II = Equity of Rs 40,00,000 + 12% Debentures of Rs 40,00,000

Plan I: Interest Payable on Loan

= 12% × Rs 20,00,000 = Rs 2,40,000

Plan II: Interest Payable on Debentures

= 12% × Rs 40,00,000 = Rs 4,80,000

Computation of Point of Indifference

$$\frac{(EBIT-I_1)(1-t)}{E_1} = \frac{(EBIT-I_2)(1-t)}{E_2}$$

$$\frac{(EBIT - Rs2,40,000)(1-0.3)}{60,000} = \frac{(EBIT - Rs4,80,000)(1-0.3)}{40,000}$$

2 (EBIT – Rs 2,40,000) = 3 (EBIT – Rs 4,80,000)

2 EBIT – Rs 4,80,000 = 3 EBIT – Rs 14,40,000

2 EBIT – 3 EBIT = - Rs 14,40,000 + Rs 4,80,000

EBIT = Rs 9,60,000

(ii) Earnings per share (EPS) under Two Situations for both the Plans

Situation A (EBIT is assumed to be Rs **9,50,000)**

Particulars	Plan I	Plan II
EBIT	9,50,000	9,50,000
Less: Interest @ 12%	(2,40,000)	(4,80,000)
EBT	7,10,000	4,70,000
Less: Taxes @ 30%	(2,13,000)	(1,41,000)
EAT	4,97,000	3,29,000
No. of Equity Shares	60,000	40,000
EPS	8.28	8.23

Comment: In Situation A, when expected EBIT is less than the EBIT at indifference point then, Plan I is more viable as it has higher EPS. The advantage of EPS would be available from the use of equity capital and not debt capital.

Situation B (EBIT is assumed to be Rs 9,70,000)

Particulars	Plan I	Plan II
EBIT	9,70,000	9,70,000
Less: Interest @ 12%	(2,40,000)	(4,80,000)
EBT	7,30,000	4,90,000
Less: Taxes @ 30%	(2,19,000)	(1,47,000)
EAT	5,11,000	3,43,000
No. of Equity Shares	60,000	40,000
EPS	8.52	8.58

Comment: In Situation B, when expected EBIT is more than the EBIT at indifference point then, Plan II is more viable as it has higher EPS. The use of fixed-cost source of funds would be beneficial from the EPS viewpoint. In this case, financial leverage would be favourable.

(Note: The problem can also be worked out assuming any other figure of EBIT which is more than 9,60,000 and any other figure less than 9,60,000. Alternatively, the answer may also be based on the factors/governing the capital structure like the cost, risk, control, etc. Principles).

PROBLEM NO: 13

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

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

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

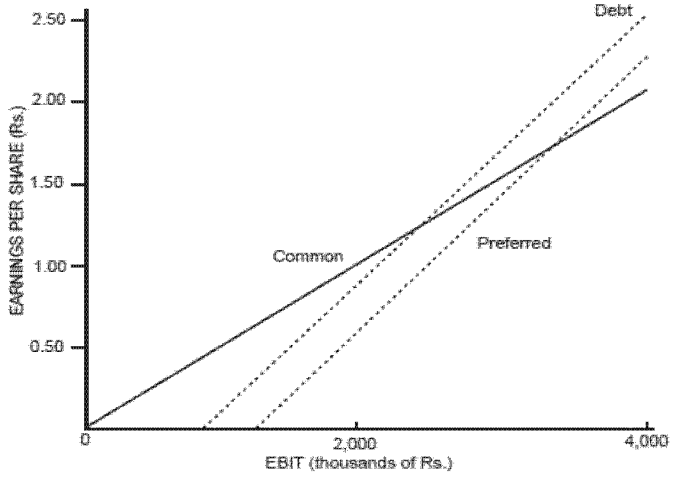
$$X = \frac{2{,}00{,}000}{0.25} = \text{Rs.}8{,}00{,}000$$

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: 14

(a)

Particulars	Alternatives		
	Alternative–I : Take additional Debt	Alternative-II : Issue 11% Preference Shares	Alternative-III : Issue further Equity Shares
	(Rs)	(Rs)	(Rs)
EBIT	15,00,000	15,00,000	15,00,000
Interest on Debts:			
- on existing debt @10%	(3,60,000)	(3,60,000)	(3,60,000)
- on new debt @ 12%	(4,80,000)	---	---
Profit before taxes	6,60,000	11,40,000	11,40,000
Taxes @ 40%	(2,64,000)	(4,56,000)	(4,56,000)
Profit after taxes	3,96,000	6,84,000	6,84,000
Preference shares dividend	---	(4,40,000)	---
Earnings available to equity Shareholders	3,96,000	2,44,000	6,84,000
Number of shares	8,00,000	8,00,000	10,50,000
Earnings per share	0.495	0.305	0.651



(b) Approximate indifference points: Debt and equity shares, Rs 24 lakhs, preference and equity shares, Rs 33 lakhs in EBIT; Debt dominates preferred by the same margin throughout, there is no difference point. Mathematically, the indifference point between debt and equity shares is (in thousands):

$$\frac{\text{EBIT}^* - \text{Rs}\,840}{800} = \frac{\text{EBIT}^* - \text{Rs}\,360}{1{,}050}$$

EBIT* (1,050) – Rs.840(1,050) = EBIT* (800) – Rs.360 (800)

250EBIT* = Rs.5,94,000

EBIT* = Rs.2,376

Note that for the debt alternative, the total before-tax interest is Rs.840, and this is the intercept on the horizontal axis. For the preferred stock alternative, we divide Rs.440 by (1−0.40) to get Rs733. When this is added to Rs360 in interest on existing debt, the intercept becomes Rs.1,093.

(c) For the present EBIT level, equity shares is clearly preferable. EBIT would need to increase by Rs.2,376 − Rs.1,500 = Rs.876 before an indifference point with debt is reached. One would want to be comfortably above this indifference point before a strong case for debt should be made. The lower the probability that actual EBIT will fall below the

PROBLEM NO: 15

Computation of Expected EPS for the Expected Earnings Before Interest and Tax for the Expected EBIT		
	Debt	**Equity**
	Rs.	**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.9000 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: 16

Given information,

Capital investment = 4.50 cr.

Rate of interest = 12%

Corporate tax = 50%

Company has 2 options:

Option-I : To arrange the entire amount by issuing equity shares

Option-II : To arrange the amount by means of debt & equity in the ratio of 2:1 i.e. 3 Cr. of Debt & 1.5 Cr. of equity.

Estimation of Indifference Point:

Let, X represents the level of EBIT at which EPS is same under both the options.

$$\Rightarrow \frac{(EBIT - Int.)(1-tax) - pref.div}{No.\ of\ equity\ shares} = \frac{(EBIT - int.)(1-tax) - pref.div}{No.\ of\ equity\ shares}$$

$$\Rightarrow \frac{(x - Int.)(1-tax)}{No.\ of\ equity\ shares} = \frac{(x - int.)(1-tax)}{No.\ of\ equity\ shares}$$

$$\Rightarrow \frac{(x-0)(1-0.5)}{45\,lakhs} = \frac{(x - 36\,lakhs)(1-0.5)}{15\,lakhs}$$

$$\Rightarrow \frac{0.5x}{45\,lakhs} = \frac{0.5x - 18\,lakhs}{15\,lakhs}$$

$\Rightarrow 0.5x = 1.5x - 54$ lakhs

$\Rightarrow 1x = 54$ lakhs

$\Rightarrow x = 54$ lakhs

$\therefore$ EBIT = 54 lakhs

If EBIT is Rs.54 lakhs then EPS will be same under both options. i.e., 0.6 per share.

Assumption: Face value of equity shares is assumed Rs.10 per share.

PROBLEM NO: 17

(i) Calculation of total value of the firm

	(Rs)
a) EBIT	1,00,000
b) ***Less:*** Interest (@10% on Rs 5,00,000)	50,000
c) Earnings available for equity holders	50,000
d) Equity capitalization rate i.e. K_e	15%

Value of equity holders $= \frac{\text{Earnings available for equity holders}}{k_e}$ = 50,000 / 0.15 = Rs 3,33,333

Value of Debt (given) D 5,00,000

Total value of the firm V = D + S (5,00,000 + 3,33,333) 8,33,333

(ii) Overall cost of capital = $K_o = K_e (S/V) + K_d (D/V)$ or EBIT / V

= 0.15 (3,33,333 / 8,33,333) + 0.10 (5,00,000 / 8,33,333)

$$= \frac{1}{8,33,333}[50,000 + 50,000] = 12.00\%$$

PROBLEM NO: 18

i) Market value of Debt (25000 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) = $\frac{EBIT}{M.V\ of\ Firm} = \frac{2000000}{12968750} = 15.42\%$

PROBLEM NO: 19

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) = Value of the firm (V) – Value of Debts (D)

= Rs75,00,000 – Rs30,00,000 = Rs 45,00,000

Calculation of Cost of Equity

Overall Cost of Capital (K_0) = $K_e(S/V) + K_d(D/V)$

Or, $K_0 \times V = (K_e \times S) + (K_d \times D)$ Or, $K_e = \frac{(K_0 x V) - (K_d x D)}{S}$

Or, $= \frac{(0.12 x Rs75,00,000) - (0.10 x Rs30,00,000)}{Rs45,00,000} = \frac{Rs9,00,000 - Rs3,00,000}{Rs45,00,000} = 0.1333$ or 13.33%

PROBLEM NO: 20

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: 21

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: 22

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

Market Value of 'A Ltd' (Unlevered)

$V_u = \frac{EBIT(1-t)}{K_e} = \frac{Rs2,50,000\,(1-0.30)}{20\%} = \frac{Rs1,75,000}{20\%} = Rs8,75,000$

Market Value of 'B Ltd.' (Levered)

$V_g = V_u + TB$

= Rs 8,75,000 + (Rs10,00,000 × 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.'

	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% × 0.7 = 8.4%

WACC = 14.90%

PROBLEM NO: 23

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

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

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

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% of2,00,000 = 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: 24

Particulars	Firms	
	U	L
NOI/EBIT	Rs. 20,000	Rs. 20,000
Debt	–	Rs. 1,00,000
Ke	10%	18%
Kd	–	7%

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

PROBLEM NO: 25

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)	-	77,000
Profit before taxes		14,23,000

Less: Tax @ 25%	15,00,000	3,55,750
Profit after tax/Earnings available in equity holders	3,75,000	10,67,250
Total earnings available to equity holders + Debt holders	11,25,000	10,67,250+77,000
	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: 26

Calculation of Value of Firms P and Q according to MM Hypothesis

Market Value of Firm P (Unlevered)

$$V_u = \frac{EBIT(1-t)}{K_e} = \frac{Rs2,60,000\,(1-0.30)}{10\%} = \frac{Rs1,82,000}{10\%} = Rs18,20,000$$

Market Value of Firm Q (Levered)

$V_g = V_u + TB$

= Rs18,20,000 + (Rs 8,00,000 × 0.30) = Rs18,20,000 + Rs 2,40,000 = Rs 20,60,000

THE END