3. COST OF CAPITAL

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

Calculation of K_d:

From the given information

Face value	=	100
NSP	=	97.75
Redemption value	=	105
Rate of Interest	=	15%
No of yrs (N)	=	7 yrs
Tax Rate	=	55%

We Know that:

$$K_d = \frac{\text{Interest}(1-\text{Tax}) + \left(\dfrac{RV - NSP}{N}\right)}{\left(\dfrac{RV + NSP}{2}\right)} \times 100 = \frac{15(1-0.55) + \left(\dfrac{105 - 97.75}{7}\right)}{\left(\dfrac{105 + 97.75}{2}\right)} \times 100 = \frac{6.75 + 1.0357}{101.375} \times 100 = 7.68\%$$

PROBLEM NO: 2

Calculation of K_d:

Face value	=	100
NSP	=	90
Redemption value	=	105
Rate of Interest	=	12%
No of years (N)	=	5yrs
Tax Rate	=	35%

We Know That:

$$K_d = \frac{\text{Interest}(1-\text{Tax}) + \left(\dfrac{RV - NSP}{N}\right)}{\left(\dfrac{RV + NSP}{2}\right)} \times 100 = \frac{12(1-0.35) + \left(\dfrac{105 - 90}{5}\right)}{\left(\dfrac{105 + 90}{2}\right)} \times 100 = \frac{7.8 + 3}{97.5} \times 100 = 11.07\%$$

PROBLEM NO: 3

Given Information,

Face Value	=	1,000	
Coupon Rate	=	15%	
Redeemable period	=	10 years	Net proceeds = 1,000 - 50 - 25 = 925
Discount	=	5%	
Floatation Cost	=	2.5%	

Assume Face Value = Reedemable Value

$$K_d = \frac{\text{Interest}(1-\text{Tax}) + \left(\dfrac{RV - NSP}{N}\right)}{\left(\dfrac{RV + NSP}{2}\right)} \times 100 = \frac{150(1-0.35) + \left(\dfrac{1,000 - 925}{10}\right)}{\left(\dfrac{1,000 + 925}{2}\right)} \times 100 = 10.9\%$$

Assumption: In the absence of information at what price debt/debentures are going to be redeem, it is assumed that redeemable at face value.

PROBLEM NO: 4

Given information,

Face Value	=	100
Coupon Rate	=	15%
Redeemable period	=	7 years Net proceeds = 100 - 5 + 1 = 96
Discount	=	5%
Floatation Cost	=	1%
Tax Rate	=	50%

$$K_d = \frac{\text{Interest}(1-\text{Tax})+\left(\dfrac{RV-NSP}{N}\right)}{\left(\dfrac{RV+NSP}{2}\right)} \times 100 = \frac{15(1-0.5)+\left(\dfrac{100-96}{7}\right)}{\left(\dfrac{100+96}{2}\right)} \times 100 = 8.61\%$$

PROBLEM NO: 5

Calculation of K_d:

I	= Interest on debenture = 10% of Rs.100		= Rs.10
NP	= Current market price		= Rs.80
RV	= Redemption value		= Rs.100
n	= Period of debenture		= 5 years
t	= Tax rate = 35% or 0.35		

$$K_d = \frac{\text{Interest}(1-\text{Tax})+\left(\dfrac{RV-NSP}{N}\right)}{\left(\dfrac{RV+NSP}{2}\right)} \times 100 = \frac{10(1-0.35)+\left(\dfrac{100-80}{5}\right)}{\left(\dfrac{100+80}{2}\right)} \times 100$$

$$= \frac{10 \times 0.65 + 4}{\text{Rs. }90} = \frac{\text{Rs.}10.5}{\text{Rs. }90} = 0.1166 \text{ (or) } 11.67\%$$

PROBLEM NO: 6

Calculation of post tax cost of debentures

Step-1: Identification of cash flows in different years

Year	Repayment		Total	Tax Shield on interest @ 50%	Post Tax Net cash Outflows
	Principal	Interest			
1	200	150	350	75	275
2	200	120	320	60	260
3	200	90	290	45	245
4	200	60	260	30	230
5	200	80	230	15	215

Net sale proceeds on issue of each debenture = 1,000-100 = Rs.900

Step-2: Calculation of Post Tax cost of debenture

Year	Cash flow	NPV @ 10%		NPV @ 12%	
		PVF	Present Value	PVF	Present Value
0	900	1	900	1	900

1	275	0.909	(249.98)	0.893	(245.58)
2	260	0.826	(214.76)	0.797	(207.22)
3	245	0.751	(183.90)	0.712	(174.44)
4	230	0.683	(157.09)	0.636	(146.28)
5	215	0.621	(133.52)	0.567	(121.91)
			(39.34)		**4.58**

Using Interpolation,

$$IRR = I_1 + \frac{NPV@I_1}{NPV@I_2 - NPV@I_1} \times (I_2 - I_1) = 10 + \frac{39.34}{4.58 + 39.34} \times (12 - 10)$$

IRR = 11.79%

PROBLEM NO: 7

Preference dividend (DPS)   = 100 x 15% = Rs.15

Flotation cost   = 100 x 4% = Rs. 4

Net sale proceeds   = 100 - 4 = 96

Cost of preference shares $(K_P) = \dfrac{DPS}{MP_0} = \dfrac{15}{96} = 0.1562 = 15.62\%$

PROBLEM NO: 8

Particulars	5% discount	5% premium
Face value	100	100
issue price	95	105
Preference dividend per share	10	10

Cost of preference share $(K_P) = \dfrac{DPS}{MP_0}$

a) 10/95 = 10.5%   **b)** 10/105 = 9.5%

PROBLEM NO: 9

Given information,

Face value   = 100

Coupon rate   = 14%

Floatation cost = 5%

NP = FV - FC   = 100-5 = 95

K_p when issued at par

$K_p = \dfrac{14}{95} \times 100$ = 14.73%

K_p when issued @ 10% premium,

$K_p = \dfrac{14}{104.5} \times 100$ = 13.39%

NP = 110-5.5   = 104.5

K_p when issue made @ 5% discount

$K_p = \dfrac{14}{90.25} \times 100$ = 15.51%

NP = 110-5-4.75 = 90.25

PROBLEM NO: 10

Given information,

Face Value   = 100

Coupon rate   = 15%

Floatation Cost   = 4% (Net Proceeds (Redeemable Value) = Face value - Floatation Cost = 100 - 4 = 96)

Redeemable Period   = 10 years

Assumption: Face Value = Redeemable Value

Using Shortcut Method;

$$K_p = \frac{\text{Preference dividend} + \left(\dfrac{\text{Re deemable Value} - \text{Net Pr oceeds}}{\text{Re deemable Period}}\right)}{\left(\dfrac{RV + NP}{2}\right)} \times 100$$

$$= \frac{15 + \left(\dfrac{100 - 96}{10}\right)}{\left(\dfrac{100 + 96}{2}\right)} \times 100 \quad = 15.71\%$$

PROBLEM NO: 11

Given information;

Face Value   = 100

Coupon Rate   = 10%

Net Proceeds (Redeemable Value) = Face Value - Floatation Cost = 100 - 2 = 98

Floatation Cost   = 2%

Redeemable Period   = 10 years

Assumption: Face Value = Redeemable Value

$$K_p = \frac{\text{Preference dividend} + \left(\dfrac{\text{Re deemable Value} - \text{Net Pr oceeds}}{\text{Re deemable Period}}\right)}{\left(\dfrac{RV + NP}{2}\right)} \times 100 = \frac{10 + \left(\dfrac{100 - 98}{10}\right)}{\left(\dfrac{100 + 98}{2}\right)} \times 100 = 10.3\%$$

PROBLEM NO: 12

a) Given, Dividend at the end of 1st year (DPS_1)   =   Rs.12

Cost of equity share capital (K_e)   =   10%

Given that, the company is expected to pay the same dividend of Rs.12 forever.

Therefore, growth rate = 0

We know that, $K_e = \dfrac{DPS_1}{MP_0}$, $MP_0 = \dfrac{DPS_1}{k_e} = \dfrac{12}{0.1} = Rs.120$

PROBLEM NO: 13

Market price as on today (MP_0)   = 168

Dividend per share as on today   = 100 X 15% = Rs.15

Growth rate in dividends (g)   = 12%

Cost of equity share capital (K_e) $= \dfrac{DPS_1}{MP_0} + g$

$= \dfrac{15 \times 112\%}{168} + 0.12$ $= \dfrac{16.8}{168} + 0.12$ $= 0.1 + 0.12 = 0.22 = 22\%$

PROBLEM NO: 14

Given information,

$DPS_1 = 1.4$ $MP_0 = 19.5$ Growth Rate = 12%

$K_e = \dfrac{DPS_1}{MP_0} + g = \dfrac{1.4}{19.5} + 0.12 = 19.17\%$

PROBLEM NO: 15

Given information,

DPS_0 = 4.5

Growth Rate = 7%   Net Proceeds = MP - FC = 95 - 5 = 90

MP_0 = Rs. 95   Floatation Costs = Rs. 5

$K_e = \dfrac{DPS_0 (1+g)}{NP} + g = \dfrac{4.5 (1+0.07)}{90} + 0.07 = 12.35\%$

Note: In the absence of information, whether it is DPS_0 or DPS_1, it is assumed that DPS_0

PROBLEM NO: 16

Given information,

DPS_0 = Rs. 10 K_e = 15%

g = - 8% MP_0 = ?

$MP_0 = \dfrac{DPS_0 (1+g)}{K_e - g} = \dfrac{10 (1 + (-0.08))}{0.15 - (-0.08)} = \dfrac{10 (0.92)}{0.23} = 40$

PROBLEM NO: 17

From the given information it is not possible to calculate cost of equity capital directly. So let us calculate IRR from investors' point of view.

Year	Particulars	Cash flow	PVF@11%	P.V	PVF @ 12%	P.V
01-01-1990	Purchase of shares	(318)	1	(318)	1	(318)
31-12-1990	Dividend	20	0.900	18	0.892	17.84
31-12-1991	Dividend	20	0.812	16.24	0.797	15.94
31-12-1992	Dividend	20	0.731	16.082	0.711	15.642
31-12-1993	Dividend	22.25	0.658	14.6405	0.636	14.151
31-12-1993	Sale of shares	400	0.658	263.2	0.636	254.4
				10.1625		0.027

Using interpolation,

$IRR = L_1 + \dfrac{NPV@L_1}{NPV@L_1 - NPV@L_2} \times (L_2 - L_1) = 11 + \dfrac{10.1625}{10.1625 + 0.027} \times (12 - 11) = 11 + \dfrac{10.1625}{10.1895} = 11.99\%$

PROBLEM NO: 18

Given information,

Face Value   =   Rs. 10

DPS_0 =   Re. 1

Growth Rate   =   10% = 0.1

MP_0 = Rs. 55

$K_e = \dfrac{DPS_0\,(1+g)}{MP_0} + g = \dfrac{1(1+0.1)}{55} + 0.1 = 0.12 \times 100 = 12\%$

PROBLEM NO: 19

Computation of existing cost of equity (Historical Cost of Equity Share Capital):

Dividend paid at the end of 1st year (DPS_1)   =   Rs.4

M.P per share as on today (MP_0)   =   Rs.50

Growth rate in dividends (g %)   =   8%   = 0.08

We know that, Cost of Equity capital (K_e)   = $\dfrac{DPS_1}{MP} + g$ $= \dfrac{4}{50} + 0.08 = 0.16 = 16\%$

Computation of cost of new equity shares:

From the given information,

Underpricing of equity share   =   Rs. 1

Miscellaneous expenses   =   0.50

Therefore, Net proceeds   =   50 - 1 - 0.50   = Rs.48.50

Given that, dividend rate and growth rate are not expected to change

Cost of equity share capital (K_e)   = $\dfrac{DPS_1}{MP} + g$ $= \dfrac{4}{48.50} + 0.08 = 16.25\%$

PROBLEM NO: 20

Calculation of EPS = Rs. 9,60,000 / 50,000 Equity shares = Rs. 19.20

Ke = E / M = Rs. 19.20 / Rs. 45 = 0.4267 or 42.67%

PROBLEM NO: 21

Given information,

IERR = Total yield = 18%

DPS_0 = 2

Growth rate   = 10%

mp_0 = 40

1) Dividend yield = $\dfrac{DPS_0\,(1+g)}{mp} \times 100 = \dfrac{2 \times 110\%}{40} \times 100$

     = 5.5%

2) Capital gain yield = Total yield - Dividend yield

          = 18% - 5.5% = 12.5%

PROBLEM NO: 22

Given information,

R_f =   8%

R_m =   13%

Beta (β)   =   1.6

K_e =   ?

According to CAPM approach, $K_e = R_f + \beta\,(R_m - R_f) = 8\% + 1.6\,(13\% - 8\%) = 16\%$

PROBLEM NO: 23

Given information,

R_f = 9% R_m = 18%

Beta (β) = 1.5 K_e = ?

$K_e = R_f + \beta (R_m - R_f) = 9\% + 1.5 (0.18 - 0.09) = 22.5\%$

Now, estimation of MP_0 as on today

We know that, $MP_0 = \dfrac{DPS_1}{K_e - g} = \dfrac{3}{0.225 - 0.08} = 20.68$ (or) 21

PROBLEM NO: 24

According to CAPM Approach,
$K_s = R_f + \beta (R_m - R_f) = 7\% + 1.20 (6\%) = 7\% + 7.20 = 14.2\%$

PROBLEM NO: 25

Calculation of Weighted Average Cost of Capital (WACC)

Source	Amount (Rs.)	Weight	Cost of Capital after tax	WACC
Equity Capital	65,00,000	0.619	0.163	0.1009
12% Preference Capital	12,00,000	0.114	0.120	0.0137
15% Redeemable Debentures	20,00,000	0.190	0.105*	0.020
10% Convertible Debentures	8,00,000	0.076	0.07**	0.0053
Total	1,05,00,000	1.0000		0.1399

* Cost of Debentures (after tax) = 15 (1 - 0.30) = 10.5% = 0.105

** Cost of Debentures (after tax) = 10 (1 - 0.30) = 7% = 0.07

Weighted Average Cost of Capital = 0.1399 = 13.99%

(**Note:** In the above solution, the Cost of Debentures has been computed in the above manner without considering the impact of special features i.e. redeemability and convertibility in absence of requisite information.)

PROBLEM NO: 26

PART - A

Step 1: Specific cost of capital: $K_e = \dfrac{DPS_1}{MP_0} + g = \dfrac{9}{102} + 0.05 = 13.82$, $K_P = 9\%$, $K_d = 10\% (1 - 0.50) = 5\%$

Step 2: WACC $= 13.82 \left(\dfrac{5,00,000}{10,00,000}\right) + 9\left(\dfrac{2,00,000}{10,00,000}\right) + 5\left(\dfrac{3,00,000}{10,00,000}\right) = 10.21\%$

PART - B

Step 1: Specific cost of capital

$K_e = \dfrac{DPS_1}{MP_0} + g = \dfrac{9}{96} + 0.05 = 14.375$

$K_P = 9\%, K_d = 10\% (1 - 0.5) = 5\%$

Cost of term loan = 12% (1-0.5) = 6%

Step 2: WACC $= 14.375 \left(\dfrac{5L}{15L}\right) + 9\left(\dfrac{2L}{15L}\right) + 5\left(\dfrac{3L}{15L}\right) + 6\left(\dfrac{5L}{15L}\right) = 8.99 =$ nearly 9%

PROBLEM NO: 27

Part - A

Step-1: Calculation of Specific Cost of Capital

Cost of equity capital (K_e) = $\dfrac{DPS_1}{MP_0} + g$ = $\dfrac{(10 \times 20\%) \times 105\%}{80} + 0.05$ = $\dfrac{2 \times 1.05}{80} + 0.05$ = $\dfrac{2.1}{80} + 0.05$

= 7.625%

Cost of reserves (K_r)   = Cost of equity = 7.625%

Cost of debentures (K_d)   = K_i (1-t) = 14% (1-50%) = 7%

Step-2: Calculation of WACC

WACC   = $7.625\% \left(\dfrac{10L}{15L}\right) + 7\% \left(\dfrac{3L}{15L}\right) + 7.625\% \left(\dfrac{2L}{15L}\right)$ = 7.5%

Therefore K_o = 7.5%

Part - B

Step-1: Calculation of Specific Cost of Capital

Cost of equity capital (Ke)   = $\dfrac{DPS_1}{MP_0} + g$ = $\dfrac{(10 \times 20\%) \times 105\%}{50} + 0.05$ = 9.2%

Cost of reserves (K_r)   = 9.2%

Cost of 14% debentures (K_d)   = K_d (1-t) = 14% (1-0.5) = 7% (After tax)

Cost of 16% long term loan   = 16% (1 - 0.5)   = 8%

Step-2: Calculation of Weighted Average Cost of Capital (WACC)

WACC = $9.2\% \left(\dfrac{10L}{20L}\right) + 9.2\% \left(\dfrac{2L}{20L}\right) + 7\% \left(\dfrac{3L}{20L}\right) + 8\% \left(\dfrac{5L}{20L}\right)$ = 8.57%

Therefore, K_o = 8.57%

PROBLEM NO: 28

Part A - Calculation of weighted average cost of capital

Step 1: Estimation of specific cost of capital

a) Cost of debt   = I (1 - t) = 12 (1 - 0.5) = 6%

b) Cost of preference (K_p)   = $\dfrac{PD}{MP_0} = \dfrac{10}{100} = 10\%$

c) Cost of equity (K_e)   = $\dfrac{DPS_1}{MP_0} + g = \dfrac{10}{110} + 0.06$ = 15.09%

Step 2: Calculation of weighted average cost of capital

K_0 = Weighted average cost of capital $= \dfrac{6 \times 6,00,000}{20,00,000} + \dfrac{10 \times 4,00,000}{20,00,000} + \dfrac{15.09 \times 10,00,000}{20,00,000}$ = 11.34%

Part B - Calculation of revised weighted average cost of capital when company makes additional borrowings amounting to 10,00,000.

Step I: Calculation of specific cost of capital

a) $k_e = \dfrac{DPS_1}{MP_0} + g$ = $\dfrac{12}{105} + 0.06$ = 17.42%

b) Cost of old debt   = 6%

c) Cost of preference =   10%

d) Cost of new debt   =   Where rate of interest = 14%

   $K_d = I(1 - t)$ =   14 (1 - 0.5) = 7%

Step II: Calculation of weighted average cost of capital

$$K_0 \text{ or WACC} = 6\% \left(\frac{6,00,000}{30,00,000}\right) + 7\% \left(\frac{10,00,000}{30,00,000}\right) + 10\% \left(\frac{4,00,000}{30,00,000}\right) + 17.42\% \left(\frac{10,00,000}{30,00,000}\right) = 10.67\%$$

Note: Total capital after raising new debt

Equity	10,00,000
10% preference shares	4,00,000
12% debentures	6,00,000
14% new debentures	10,00,000
	30,00,000

PROBLEM NO: 29

i) Cost of Equity Capital (K_e):

$$K_e = \frac{\text{Expected dividend per share } (D_1)}{\text{Market Price per Share } (P_0)} + \text{Growth rate (g)} = \frac{\text{Rs. } 2 \times 1.06}{\text{Rs. } 25} + 0.06 = 0.1448 \text{ or } 14.48\%$$

ii) Indicated market price per share when growth rate is 8% p.a.:

$$K_e = \frac{\text{Expected dividend per share } (D_1)}{\text{Market Price per Share } (P_0)} + \text{Growth rate (g)}$$ **(Or)**

$$P_0 = \frac{\text{Expected dividend per share } (D_1)}{\text{Cost of equity } (K_e) - \text{Growth rate (g)}}$$

$$P_0 = \frac{\text{Rs. } 2 \times 1.08}{0.1448 - 0.08} \text{ Or, } P_0 = \frac{\text{Rs. } 2.16}{0.0648} = \text{Rs. } 33.33$$

iii) Cost of Debenture (K_d): (Using approximation method)

$$K_d = \frac{\text{Interest } (1 - \text{tax rate}) + \left(\dfrac{RV - NP}{12 \text{ Years}}\right)}{\left(\dfrac{RV + NP}{2}\right)}$$

Where, Tax rate   = 50%

Net Proceeds (NP)   = Rs. 96

Redeemable Value (RV)   = Rs. 100 (1.12) = Rs. 112

$$K_d = \frac{10\% \text{ of Rs. } 100 \, (1 - 0.5) + \left(\dfrac{\text{Rs. } 112 - 96}{12 \text{ Years}}\right)}{\left(\dfrac{\text{Rs. } 112 + \text{Rs. } 96}{2}\right)} = \frac{5 + 1.33}{\text{Rs. } 104} = 0.0608 \text{ or } 6.08\%$$

OR

(Using Present Value method or YTM)

Identification of relevant cash flows

Year	Cash flows
0	Current market price (P0) = Rs. 96
1 to 12	Interest net of tax [I (1-t)] = 10% of Rs. 100 (1 - 0.5) = Rs. 5
12	Redemption value (RV) = Rs. 100 (1.12) = Rs. 112

Calculation of Net Present Values (NPV) at two discount rates:

Year	Cash flows	Discount factor @ 5%(L)	Present Value	Discount factor @ 10% (H)	Present Value
0	96	1.000	(96.00)	1.000	(96.00)
1 to 12	5	8.863	44.32	6.814	34.07
12	112	0.557	62.38	0.319	35.73
NPV			+10.7		-26.2

Calculation of IRR

$$IRR = L_1 + \frac{NPV@L_1}{NPV@L_1 - NPV@L_2} X(L_2 - L_1) = 5\% + \frac{10.7}{10.7 - (-26.2)} X(10\% - 5\%) = 6.45\%$$

Therefore, $K_d = 6.45\%$

[Any other low and high rate as discount factor may also be used.]

PROBLEM NO.30

WN - 1: Calculation of Specific Cost of Capital

Cost of equity capital (K_e) $\quad = \dfrac{DPS_1}{NP_0} + g = \dfrac{1 \times 1.05}{24 - 4} + 0.05 = \dfrac{1.05}{20} + 0.05 = 10.25\%$

(Here Net Proceeds = Market Price - Floatation Cost = 24 - 4 = 20)

Cost of Preference Shares $(K_p) = \dfrac{PD + \left(\dfrac{RV - NP}{n}\right)}{\left(\dfrac{RV + NP}{2}\right)} = \dfrac{5\% \text{ of } 100 + \left(\dfrac{100 - 98}{10}\right)}{\left(\dfrac{100 + 98}{2}\right)} = 5.25\%$

Cost of debt (K_d) $\quad = \dfrac{\text{Interest}(1 - tax) + \left(\dfrac{RV - NP}{n}\right)}{\left(\dfrac{RV + NP}{2}\right)} = \dfrac{(10\% \text{ of } 100)(1 - 0.5) + \left(\dfrac{100 - 96}{10}\right)}{\left(\dfrac{100 + 96}{2}\right)} = 5.51\%$

Part - A: Calculation of WACC by using Book Value Weights

$$WACC = 10.25\% \left(\frac{10 \text{ L}}{20 \text{ L}}\right) + 5.25\% \left(\frac{5 \text{ L}}{20 \text{ L}}\right) + 5.51\% \left(\frac{5 \text{ L}}{20 \text{ L}}\right) = 7.815\% \cong 7.82\%$$

Part - B: Calculation of WACC by using Market Value Weights

WN - 2: Calculation of Total Market Value of Company

Equity	$\left(\dfrac{10,00,000}{10} \times 24\right)$	= 24,00,000
Debentures	$\left(\dfrac{5,00,000}{100} \times 105\right)$	= 5,25,000
Preference Shares	$\left(\dfrac{5,00,000}{100} \times 110\right)$	= 5,50,000
		= 34,75,000

PROBLEM NO: 31

i) Calculation of Cost of Capital for each source of Capital

a) Cost of equity Ke $\quad = \dfrac{D_0(1+g)}{\text{Market Price per share}} + g = \dfrac{25\% \times \text{Rs. } 100(1+0.05)}{\text{Rs. } 200} + 0.05$

$\quad = \dfrac{\text{Rs. } 26.25}{\text{Rs. } 200} + 0.05 = 0.18125 \text{ (or) } 18.125\%$

b) Cost of Preference share Capital (K_P) = 9%

c) Cost of debentures (K_d)   = r (1 - t) = 11% (1 - 0.3) = 7.7%

d) Cost of Retained Earnings (K_s)   = K_e (1 - t_p) = 18.125 (1 - 0.2) = 14.5%

ii) Calculation of weighted average cost of capital by using Book Value Weights:

Source	Amount (Rs.)	Weights (a)	After tax Cost of Capital (%) (b)	WACC (%) (c) = (a) x (b)
Equity shares	80,00,000	0.40	18.125	7.25
9% Preference shares	20,00,000	0.10	9.000	0.90
11% Debentures	60,00,000	0.30	7.700	2.31
Retained earnings	40,00,000	0.20	14.500	2.90
	2,00,00,000	1.00		13.36

iii) Calculation of weighted marginal cost of capital of company by using Market Value Weights:

Source	Amount (Rs.)	Weights (a)	After tax Cost of Capital (%) (b)	WACC (%) (c) = (a) x (b)
Equity share	1,60,00,000	0.640	18.125	11.60
9% Preference share	24,00,000	0.096	9.000	0.864
11% Debentures	66,00,000	0.264	7.700	2.033
	2,50,00,000	1.000		14.497

PROBLEM NO: 32

Working Notes:

Determination of specific costs

i) Cost of debentures before Tax (K_d):

$$K_d = \frac{I(1-Tax)+\left(\dfrac{RV-IP}{N}\right)}{\left(\dfrac{RV+IP}{2}\right)} = \frac{8(1-0.50)+\left(\dfrac{100-96}{20}\right)}{\left(\dfrac{100+96}{2}\right)} = 4.29\%$$

ii) Cost of preference shares K_p $= \dfrac{Dividend+\left(\dfrac{RV-IP}{N}\right)}{\left(\dfrac{RV+IP}{2}\right)} = \dfrac{10+\left(\dfrac{100-95}{15}\right)}{\left(\dfrac{100+95}{2}\right)} = 10.59\%$

iii) Cost of equity = $K_e = \dfrac{D}{P_0} + g = \dfrac{2}{22-2} + 0.05 = \dfrac{2}{20} + 0.05 = 15\%$

Computation of WACC bared on Book value weights:

Source of capital	Book value	Weight to capital	Specific cost	Total cost
Debentures (Rs.100 per debentures	8,00,000	0.40	0.0418	0.0167
Preference shares (Rs.100 per share)	2,00,000	0.10	0.1059	0.0106
Equity shares (Rs.10 per share)	10,00,000	0.50	0.1500	0.0750
	20,00,000	1		0.1023

WACC   : 10.23%

Computation of WACC based on Market value weights:

Source of capital	Market value	Weight to capital	Specific cost	Total cost
Debentures (Rs.110 per debentures	8,80,000	0.2651	0.0418	0.01108
Preference shares (Rs.120 per share)	2,40,000	0.0723	0.1059	0.00766
Equity shares	22,00,000	0.6626	0.1500	0.09939
	33,20,000	1		0.11813

WACC   : 11.81%

PROBLEM NO: 33

Source of capital	Market value	Specific cost	Total cost
Equity	26,00,000	11%	2,86,000
Preference	5,00,000	8.5%	42,500
9% Debentures	14,10,000	4.7%	66,270
	45,10,000		3,94,770

$$K_o = \frac{\sum wx}{\sum w} = \frac{3,94,770}{45,10,000} \times 100 = 8.75\%$$

WN 1: Cost of debt:

Coupon rate = 9%; FV = 100; Tax Rate = 50%

$$K_d = \frac{9(1-0.5)}{94} \times 100 = 4.78\%$$

Note: finding of tax rate:

Before tax interest = 15,00,000 x 9%   = 1,35,000

After tax interest   = 15,00,000 x 4.5% =   67,500

Tax rate   = 67,500/1,35,000 =   50%

PROBLEM NO: 34

Part .i

a) **Statement showing the Computation of Weighted Average Cost of Capital (Using Book Value proportions)**

Source of Finance	Book Value (Rs. In crores)	Book Value Weight	Cost of Capital	Weighted Cost of Capital
A	B	C	D	E = C x D
Equity Capital	15.0	0.256	0.16	0.04096
11% Preference Capital	1.0	0.017	0.1543	0.00262
Retained Earnings	20.0	0.342	0.16	0.05472
13.5% Debentures	10.0	0.171	0.127	0.02172
15% Term Loans	12.5	0.214	0.09	0.01926
	58.5	1.000		0.13928
			Weighted Average Cost of Capital **13.93%**	

b) **Statement showing the Computation of Weighted Average Cost of Capital (Using Market Value proportions)**

Source of Finance	Market Value (Rs. In crores)	Market Value Weight	Cost of Capital	Weighted Cost of Capital
A	B	C	D	E = C x D
Equity Capital	60.00 (Rs. 1.5 crores x Rs. 40)	0.739	0.16	0.11824
11% Preference Capital	0.75 (Rs. 1 lakh x Rs. 75)	0.009	0.1543	0.00138
13.5% Debentures	8.00 (Rs. 10 lakhs x Rs. 80)	0.098	0.127	0.01245
15% Term Loans	12.50	0.154	0.09	0.01386
	81.25			0.14593
			Weighted Average Cost of Capital = **14.59%**	

Note: Since the market value of the equity share to represents the combined market value of equity shares and retained earnings, the separate market value of retained earnings has not been worked out.

Part .ii
Statement showing Weighted Marginal Cost of Capital Schedule for the company (when it raises Rs. 10 crores next year) (Using Book Value proportions)

Source of Finance	(Rs. In crores)	Weight	Cost of Capital	Weighted Cost of Capital
A	B	C	D	E = C x D
Retained Earnings	1.5	0.15	0.16	0.024
15% Debt	2.5	0.25	0.09	0.0225
Equity Shares	3.5	0.35	0.1825	0.063875
16% Debt	2.5	0.25	0.096	0.024
				0.134375
			Weighted Average Cost of Capital = **13.4375%**	

Working Notes:

i)   Cost of Equity Capital and Retained Earnings (K_e): $K_e = \dfrac{D_1}{P_0} + g = \dfrac{Rs.3.60}{Rs.40} + 0.07 = 16\%$

ii) Cost of Preference Capital: $K_p = \dfrac{D + (RV - SP)/N}{(RV + SP)/2} = \dfrac{11 + (Rs.100 - Rs.75)/10}{(Rs.100 + Rs.75)/2} \times 100 = 15.43\%$

iii) Cost of Debentures: $K_d = \dfrac{r(1-t) + (RV - SP)/N}{(RV + SP)/2} = \dfrac{13.5(1 - 0.40) + (Rs.100 - Rs.80)/6}{(Rs.100 + Rs.80)/2} \times 100 = 12.7\%$

iv) Cost of Term Loans (K_t): $K_t = r(1 - t) = 15\%(1 - 0.40) = 9\%$

v)   Cost of New Equity Share (K_e): $K_e = \dfrac{D_1}{P} + g = \dfrac{Rs.3.60}{Rs.32} + 0.07 = 18.25\%$

vi) Cost of New Debt (K_d): K_d (For first Rs. 2.5 crores) $= r(1 - t) = 15\%(1 - 40\%) = 9\%$
     K_d (For first Rs. 2.5 crores) $= 16\%(1 - 40\%) = 9.6\%$

PROBLEM NO.35

Computation of Cost of Equity

Particulars	A	B	C
a) Dividend Per Share	2.70	4	2.88
b) Market Price	15	20	12
c) Cost of Equity (Ke)(a/b)	18%	20%	24%

Computation of Cost of Debt

Particulars	A	B	C
a) Interest	-	100 X 10% =10	100 X 8% = 8
b) Market Price	-	125	80
c) Cost of Debt (Kd)(a/b)	-	8%	10%

Computation of Weighted Average Cost of Capital

Particulars	A	B	C
WACC	18% x 4/4	(20% x 2.50/3.50) + (8% x 1/3.50)	(24% x 5/7.50) + (10% x 2.50/7.50)
	18%	16.56%	19.33%

PROBLEM NO.36

Step - 1: Calculation of Present Value of Cash Outflows

Cost of 100 equity shares   = Rs.3,000

Step - 2: Calculation of Present Value of Operating Cash Inflows

Year ending	Dividend	Tax @ 20%	Dividend after Tax	PVF @ 10	Present Value
31st March 1988	100	20	80	0.909	72.72
31st March 1989	100	20	80	0.826	66.08

31st March 1990	100	20	80	0.751	60.08
31st March 1991	140	28	112	0.683	76.496
31st March 1992	140	28	112	0.621	69.552
Present Value of Operating Cash Inflows					**345**

Step - 3: Calculation of Present Value of Terminal Cash Inflows

Particulars	Amount
a) Gross Sale Proceeds (GSP) (140 x 50)	7,000
b) Cost of acquisition of shares	3,000
c) Capital gains **(a-b)**	4,000
d) Tax @ 15%	600
e) Net Sale Proceeds (NSP) **(a-d)**	6,400

Present Value thereof =   6,400 [PVF (5y, 10%)] =   6,400 X 0.621 = Rs. 3,974

Step - 4: Calculation of NPV

NPV   =   PV of cash inflows - PV of cash outflows

=   PV of Operating Cash Inflows +PV of Terminal Cash Inflows - PV of Cash Outflows

=   3,974 + 345 - 3,000 = Rs. 1,319

Conclusion: Since NPV is positive it is clear that the return being enjoyed by the investor is > 10%.

THE END

MASTER MINDS