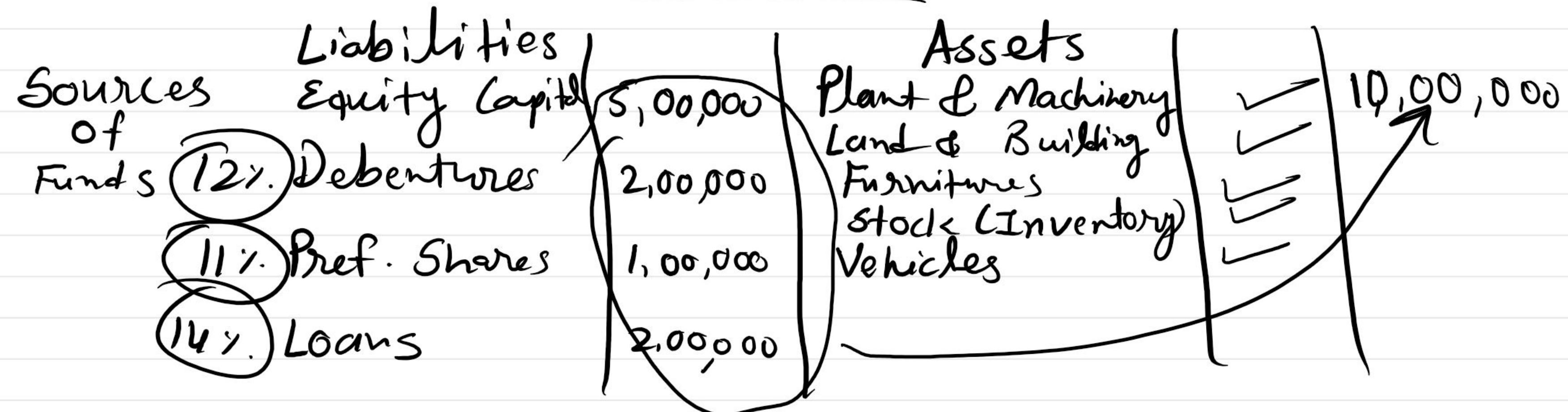


* Cost of Capital (COC)

- COC is the minimum required rate of returns on funds which are invested in the project, and this minimum rate depends on risk of the project / cash flows.
- Each project has a different risk and will have different cost of capital.

Balance Sheet



* Cost of Debentures (K_d)

→ Cost of Irredeemable Debt. (Perpetuity)

$$K_d = \left[\frac{\text{Int.} (1-t)}{V} \right] \times 100$$

Int. = Interest in ₹
= Coupon Rate \times Face Value.

V = Issue Price at Par / Premium / Discount

t = Tax rate.

→ Cost of Redeemable Debt. (Redeemed at Maturity)

$$K_d = \left[\frac{\text{Int.} (1-t) + \frac{F-P}{n}}{\frac{F+P}{2}} \right] \times 100$$

Int. = Int. in Rs.
t = Tax, Pmt.

F: Redemption Value at
Par Premium / Discount.

n = No. of Years.

P = Market Price.

* Cost of Term Loan (k_f)

$$k_f = \text{Int. Rate} (1-t)$$

* Cost of Pref. Shares (k_p)

→ Irredeemable Pref. Shares.

$$k_p = \frac{\text{Div.}}{P_0} \times 100$$

$$D_0 = \text{Div. Rate} \times \text{Face Value}$$

P_0 = Price at Par (Premium) Discount

→ Redeemable Pref. Shares

$$k_p = \left[\frac{\text{Div.} + \frac{F-P}{n}}{\frac{F+P}{2}} \right] \times 100$$

F = Redemption value

P = Mkt. Price
 n = No. of Years.

* Cost of Equity (K_e)

* Dividend Model.

$$K_e = \left[\frac{D_1}{P_0} + g \right] \times 100$$

D_1 = Expected Dividend (Next yr)

$$D_1 = D_0 \downarrow (1+g)$$

P_0 = Share Price.

g = growth Rate (in Decimals)

* Earnings Model

$$K_e = \frac{\text{EPS}}{P_0} \times 100$$

EPS = Earnings Per Share = $\frac{\text{Profit After Tax}}{\text{No. of Eq. Shares}}$

P_0 = Price of the Share.

* CAP Model.

$$K_e = R_f + \beta (R_m - R_f)$$

R_f = Risk-free rate

R_m = Market Return

β = β - Co-efficient.

* Concept of Floation cost

- Floation cost is the cost incurred by a company while issuing securities.
- It is a one-time cost incurred at the time of issue.
- Examples
 - Underwriting Commission
 - Brokerage
 - Issue charges etc.
- This floatation cost (f) if given, is to be subtracted from Price of a security.

$$\text{Debentures} = V - f$$

$$\text{Pref. Shares} = \text{Issue Price} - f$$

$$\text{Equity shares} = P_0 - f$$

1. Cost of Debt (K_d) = 10%

2. 15% Irredeemable Debentures (Perpetual) No. of Debentures = 10,000

V = Face Value = 100 ₹ $t = 50\% = 0.50$

Commission = 1.5%

Brokerage = 0.5%

Other charges = ₹ 10,000

$$\text{Int} = 15\% \times 100 = ₹ 15$$

↑
Face Value

Floating Costs = Commission = $1.5\% \times 100 = ₹ 1.5$
Brokerage = $0.5\% \times 100 = ₹ 0.5$
Other charges = $10,000 / 10,000 = ₹ 1$

1. Issued at Par

$$K_d = \left[\frac{\text{Int} \cdot (1-t)}{V-f} \right] \times 100$$

$$= \left(\frac{15(1-0.5)}{100-3} \right) \times 100$$

~~$K_d = 7.73\%$~~

2. Issued @ 10% Disc.

$$V = 100 - 10\% \downarrow = 90$$

$$K_d = \left(\frac{15(1-0.5)}{90-3} \right) \times 100$$

$$K_d = 8.62\%$$

$$f = ₹ 3$$

3. Issued @ 10% Prem.

$$V = 100 + 10\% = 110$$

$$K_d = \left(\frac{15(1-0.5)}{110-3} \right) \times 100$$

$$K_d = 7.10\%$$

3. Face Value / Redemption at Par = ₹ 100

$$\text{Int} = 10\% = 10\% \times 100 = 10 \text{ ₹}$$

$$n = 7 \text{ yrs}$$

$$P = 93$$

$$t = 50\% = 0.5$$

$$K_d = \left[\frac{\text{Int.}(1-t) + \frac{F-P}{n}}{\frac{F+P}{2}} \right] \times 100$$

$$= \left[\frac{10(1-0.5) + \frac{100-93}{7}}{\frac{100+93}{2}} \right] \times 100$$

$$K_d = 6.22\%$$

S. Irredeemable Pref. Shares.

10% Pref. Share @ ₹ 100 par

$$\therefore \text{Div} = 10\% \times 100 = 10 \text{ ₹}$$

Floating cost = 4%

$$P = 100 - 4\% = 100(1 - 0.04) = 96$$

$i) K_p = \frac{\text{Div.}}{P_0} \times 100$ $= \frac{10}{96} \times 100$ $\boxed{= 10.42\%}$	$(ii) 5\% \text{ prem.}$ $P = \frac{(100 + 5\%)}{100.8} \times (1 - 0.04)$ $K_p = \frac{10}{100.8} \times 100$ $\boxed{= 9.92\%}$	$(iii) 5\% \text{ Disc.}$ $P = (100 - 5\%) \times (1 - 0.04)$ $= 91.2$ $K_p = \frac{10}{91.2} \times 100$ $\boxed{= 10.96\%}$
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6. Redeemable Pref. Sh

$$\text{Div.} = 11\% \text{ of } 100 = 11 \text{ ₹}$$

$n = 10 \text{ yrs.}$

$$F = 100 - 5\% \text{ Disc.} = 95 \text{ ₹}$$

$$P = 95 - 3(\text{floatation cost}) = 92$$

Flotation costs = 3000 ₹ for 1,000 shares = 3 ₹ / share.

$$k_p = \left[\frac{\text{Div.} + \frac{F-P}{n}}{\frac{F+P}{2}} \right] \times 100$$

$$= \left[\frac{11 + \frac{95-92}{10}}{\frac{95+92}{2}} \right] \times 100$$

$$k_p = [12.09\%]$$

(b) Irredeemable Pref. Sh.

$$k_p = \frac{\text{Div}}{P} \times 100$$

$$= \frac{11}{92} \times 100$$

$$= 11.96\%$$

$$7. P_0 = 50 \quad D_1 = 2 \quad g = 8\%$$

$$K_E = \left[\frac{D_1}{P_0} + g \right] \times 100 = \left[\frac{2}{50} + 0.08 \right] \times 100 = 12\% = K_E$$

9. Earnings of the Company = 3,60,000
 No. of shares = 30,000
 $P_0 = 100$

New equity of ₹ 9,00,000
 at 10% Disc. @ ₹ 90/-

(100 - 10%)

$$\text{New shares} = \frac{90,000}{90} = 10,000$$

$$EPS = \frac{\text{Earnings (PAT)}}{\text{No. of Eq. sh.}} = \frac{3,60,000}{40,000} = 9$$

$$K_E = \frac{EPS}{P_0} \times 100 = \frac{9}{84.6} \times 100 = 10.64\%$$

$$P_0 = 90 \times (1 - 0.06) = 84.6$$

$$10. P_0 = 120 \quad g = 5\% = 0.05 \quad D_0 = 30$$

$$K_e = \left[\frac{D_1}{P_0} + g \right] \times 100$$

$$\begin{aligned} D_1 &= D_0 (1+g) \\ &= 30 (1.05) = \underline{\underline{31.5}} \end{aligned}$$

$$= \left[\frac{31.5}{120} + 0.05 \right] \times 100 = \boxed{31.25\%}$$

12 = Cost of Retained Earnings
(K_{sr})

$$11. R_f = 8.5\% \quad \beta = 2 \quad R_m = 15\%$$

$$K_e = R_f + \beta (R_m - R_f)$$

$$\begin{aligned} &= 8.5 + 2 (15 - 8.5) \\ &= \boxed{21.5\%} \end{aligned}$$

$$\begin{aligned} K_{sr} &= K_e (1-f) \times (1-t) \\ &= 10\% \times (1 - 0.03) \times (1 - 0.3) \\ &= 9.7 \times 0.7 \\ K_{sr} &= \boxed{6.79\%} \end{aligned}$$

* Weightage Average Cost of Capital (WACC)

7. WACC as per Book Value Weights

Source	Amount	Weights	Cost of Cap.	Weighted Cost (Weights × Cost)
Pref. shares	2,00,000	$\frac{2,00,000}{10,00,000} = 0.20$	12%	2.4%
Eq. sh. cap.	3,00,000	0.30	15%	4.5%
Retained Earnings	1,50,000	0.15	15%	2.25%
Debentures	3,50,000	0.35	10%	3.5%
	<u>10,00,000</u>	<u>1</u>		<u>12.65%</u> \Rightarrow WACC

8.

a) Calculation of WACC as Per Book Value (BV)

&c

Equity Dividend = 20%. Face value = 100 tax Rate = 50% = 0.5
= $20\% \times 100 = 20\text{₹}$

$$k_e = -\frac{D_1}{P_0} \times 100 = \frac{20}{100} \times 100 \\ = 20\%$$

$$k_d = \text{Int. Rate} (1-t) \\ = 12\% (1-0.5) \\ = 6\%$$

$$k_f = \text{Int.} (1-t) \\ = 16\% (1-0.5) \\ = 8\%$$

<u>WACC</u>	Amount	Weights	Cost	Weighted Cost
Eq. cap.	400	$4/20 = 0.2$	20%	4%
12% Debentures	600	$6/20 = 0.3$	6%	1.8%
16% Term loan	1,000	$10/20 = 0.5$	8%	4%
	2,000			<u>9.8%</u> \Rightarrow WACC as per BV Weights

8. b & c

$$P_0 = 150$$

$$K_e = \frac{D_1}{P_0} \times 100 = \frac{20}{150} \times 100 = 13.33\%$$

$$K_d = 6\%$$

$$k_f = 8\%$$

WACC	Amount	weights	Cost	Weighted Cost
Eq. Cap	400	0.2	13.33%	2.67%
12% Debentures	600	0.3	6%	1.80%
16% Term Loan	<u>1,000</u>	0.5	8%	4.00%
	<u>2,000</u>			<u>8.47%</u>

11. WACC as per Book Value.

Source	Amount	Weights	Cost	Weighted Cost
Equity Cap.	5,00,000	0.5	13.57%	6.785%
9% Pref. sh.	1,50,000	0.15	9%	1.35%
12% Deb.	<u>3,50,000</u>	0.35	6%	<u>2.1%</u>
	<u>10,00,000</u>			<u>10.235%</u>

\downarrow
WAcc

$K_d = \frac{\text{Int.} (1-t)}{12 \times (1-0.5)} = 6\%$

$$\begin{aligned}
 D_1 &= 9 \\
 P_0 &= 105 \quad g = 5\% = 0.05 \\
 K_e &= \left(\frac{D_1}{P_0} + g \right) \times 100 \\
 &= \left(\frac{9}{105} + 0.05 \right) \times 100 \\
 &= \boxed{13.57\%}
 \end{aligned}$$

(b) Adding Loan for Expansion.

Source	Amount	Weights	Cost	WAcc	Cost of Loan
Eq. Cap.	5,00,000	0.33	13.57%		
9% Pref. sh.	1,50,000	0.10	9%		
12% Deb.	3,50,000	0.23	6%		
10% Loan	5,00,000	0.34	5%		
	<u>15,00,000</u>	1.00		<u>8.458%</u>	

$$\begin{aligned}
 K_f &= \text{Int.} (1-t) \\
 &= 10\% \cdot (1-0.5) \\
 &= \boxed{5\%}
 \end{aligned}$$

12. a WACC

Source	Amount	Weights	Cost	Weighted Cost
Equity Cap.	40,00,000	0.4	33%	13.2%
8% Pref. sh.	20,00,000	0.2	8%	1.6%
10% Deb.	40,00,000	0.4	5%	2%
	1,00,00,000			
			WAcc =	16.8%

$$D_1 = 5$$

$$P_0 = 20 \quad g = 8\%$$

$$k_e = \left(\frac{D_1}{P_0} + g \right) \times 100$$

$$= \left(\frac{5}{20} + 0.08 \right) \times 100$$

$$\approx \boxed{33\%}$$

$$k_d = 10\% \cdot (1 - 0.5)$$

$$\boxed{I = 5\%}$$

Additional Questions.

(i) WACC on Book Value Weights.

$$\text{Div.} = 20\% = 20\% \times 10 = 2\text{₹}$$

$$\text{F.V.} = 10\text{₹}$$

$$P = 25$$

$$g = 10\%$$

$$K_e = \left(\frac{D_1}{P_0} + g \right) \times 100$$

$$= \left(\frac{2}{25} + 0.10 \right) \times 100$$

$$= (0.08 + 0.10) \times 100 \quad [= 18\%]$$

* WACC

Eq. Cap.	10,00,000
Pref. sh.	2,00,000
Retained ear.	18,00,000
Deb.	20,00,000
	50,00,000

k_r (Cost of Retained Earnings)

$$k_{rg} = k_e - 3\%$$

$$= 18 - 3$$

$$[= 15\%]$$

$$k_d = \text{Int} (1-t)$$

$$= 15 (1-0.6)$$

$$= 15 (0.4)$$

$$k_d [= 6\%]$$

Face Val.

$$k_p = \text{Div. Rate} = \frac{11\%}{100} \times 100 = 11\text{₹}$$

$$= \frac{\text{Div}}{P_0} \times 100 = \frac{11}{100} \times 100$$

$$[= 11\%]$$

Weights	Cost	Weighted Cost
0.20	18%	3.6%
0.04	11%	0.44%
0.36	15%	5.4%
0.40	6%	2.4%
		11.84%
		WACC

* WACC on Mkt. Value Basis

Equity Capital (₹ 10 each) = 10,00,000

$$\text{No. of Equity shares} = \frac{10,00,000}{10}$$

$$= 1,00,000 \rightarrow M.P. = 25$$

M.V. of Eq. = $1,00,000 \times 25$

Includes ^{Capital}
R.E. \rightarrow ₹ 25,00,000

Pref. shares (₹ 100 each) = 2,00,000

$$\text{No. of Pref. shares} = \frac{2,00,000}{100}$$

$$= 2,000 \rightarrow M.P. = 60$$

M.V. of Pref. shares
 $= 2,000 \times 60$

₹ 1,20,000

Debentures (₹ 100 each) = $\frac{20,00,000}{100}$

$$= 20,000 \rightarrow M.P. = 69$$

M.V. of Debentures
 $20,000 \times 69$

₹ 1,380,000

WACC using Market Value Weights Contd... .

		Weights	Costs	
Equity Capital	25,00,000	0.625	18%	11.25%
Pref. sh.	1,20,000	0.03	11%	0.33%
Debentures	13,80,000	0.345	6%	2.07%
<hr/>				
	40,00,000			

$$K_p = \frac{\cancel{Div.}}{P_0} \times 100$$

13.65%



WACC as per
M.V. weights.