Qn:)

The details of the company's capital structure are as follows:

Type of Capital	Book Value	Market Value	Specific Cost
Equity Capital	100000	180000	15%
Preference Capital	50000	120000	12%
Debentures	60000	100000	6%
Retained Earnings	40000	—	15%

Calculate the weighted average cost of capital using —

A. Book Value as weights

B. Market Value as weights

Answer:

Total Book Value = 100000 + 50000 + 60000 + 40000
= 250000

Total Market Value = 180000 + 120000 + 100000
= 400000

A. Weighted Average Cost of Capital (WACC) using Book Value Weights —

$$WACC = \left(\frac{100000}{250000} \times 15\%\right) + \left(\frac{50000}{250000} \times 12\%\right) + \left(\frac{60000}{250000} \times 6\%\right) + \left(\frac{40000}{250000} \times 15\%\right)$$

$$= (0.4 \times 15\%) + (0.2 \times 12\%) + (0.24 \times 6\%) + (0.16 \times 15\%)$$

$$= 6\% + 2.4\% + 1.44\% + 2.4\%$$

$$= 12.24\%$$ (Ans)

B. WACC using Market Value Weights

$$WACC = \left(\frac{180000}{400000} \times 15\%\right) + \left(\frac{120000}{400000} \times 12\%\right) + \left(\frac{100000}{400000} \times 6\%\right)$$

$$= (0.45 \times 15\%) + (0.3 \times 12\%) + (0.25 \times 6\%)$$

$$= 6.75\% + 3.6\% + 1.5\%$$

$$= 11.85\% \text{ (Ans)}$$

Qn:)

ABC Ltd. is planning for the most desirable capital structure. The cost of debt (after tax) and equity capital at various levels of debt and equity mix is estimated as follows:

Debt as % of total Capital employed	Cost of debt (%)	Cost of equity (%)
0	10	15
20	10	15
40	12	15
50	13	18
60	14	20

Determine the composite cost of capital for each level of debt and equity and identify the optimum capital structure.

Answer:

$$WACC = \left(\frac{D}{V}\right) \times K_d + \left(\frac{E}{V}\right) \times K_e$$

where,

D = Debt proportion

E = Equity proportion (i.e., $E = 1 - D$)

V = Total capital (Debt + Equity = 100%)

K_d = Cost of debt

K_e = Cost of equity

Debt = 0%

$$WACC = \left(\frac{0}{100}\right) \times 10\% + \left(\frac{100}{100}\right) \times 15\%$$

$$= 0 + 15\% = 15\%$$

Debt = 20%

$$WACC = \left(\frac{20}{100}\right) \times 10\% + \left(\frac{80}{100}\right) \times 15\%$$

$$= 2\% + 12\% = 14\%$$

Debt = 40%

$$WACC = \left(\frac{40}{100}\right) \times 12\% + \left(\frac{60}{100}\right) \times 15\%$$

$$= 4.8\% + 9\% = 13.8\%$$

Debt = 50%

$$WACC = \left(\frac{50}{100}\right) \times 13\% + \left(\frac{50}{100}\right) \times 18\%$$

$$= 6.5\% + 9\% = 15.5\%$$

Debt = 60%

$$WACC = \left(\frac{60}{100}\right) \times 14\% + \left(\frac{40}{100}\right) \times 20\%$$

$$= 8.4\% + 8\% = 16.4\%$$

The lowest WACC is 13.8% at 40% debt. Hence, 40% debt is the optimal capital structure as it minimizes the cost of capital.