Cost Of Capital

Source of capital (Long term funds)

Debt (K_p / K_t) (debentures & term loan)

- Term Loan

$K_t = I(1-t)$

- Irredeemable Deb

$K_d = \frac{I(1-t)}{NP} \times 100$

- Redeemable Deb

(Approximation Method)

$K_d = \frac{I(1-t) + (RV-NP)/n}{(RV+NP)/2}$

(Yield to maturity)

$K_d = LR + \frac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} \times (H-L)$

- Convertible Deb

RV = Higher of cash or equity value

- Zero Coupon bond / Deep Discount bond

$K_d = \left(\frac{RV}{IP}\right)^{1/n} - 1$

Preference Share (K_p) Capital

- Irredeemable PS

$K_p = \frac{D}{NP/MP} \times 100$

- Redeemable PS

(Approximation method)

$K_p = \frac{D + (RV-NP)/n}{(RV+NP)/2}$

(yield to maturity)

$K_d = LR + \frac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} \times (H-L)$

Equity Share (K_e) Capital

- Dividend yield Approach

$K_e = \frac{D}{P_0} \times 100$ & $K_e = \frac{D}{NP} \times 100$

(existing issue) (new issue)

- Earning yield approach

$K_e = \frac{E}{P_0} \times 100$ & $K_e = \frac{E}{NP} \times 100$

(existing issue) (new issue)

- Dividend Growth model

$K_e = \frac{D_1}{P_0} + g$ & $K_e = \frac{D_1}{NP} + g$

(existing issue) (new issue)

$g = b \times r$

$g = \left(\frac{FV}{PV}\right)^n - 1$

- Realised Yield Approach

- CAPM Model

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

- K_e v/s K_{re}

$K_e = \frac{D_1}{IP - f_{(NP)}} \times 100$ & $K_{re} = \frac{D_1}{P_0} \times 100$

$K_{re} = K_e(1-t_p)(1-g)$

Retained (K_{re}) Earnings

① Cost of term loan

$$K_t = I(1-t)$$

I = Interest rate

t = Corporate tax rate

② Cost of Irredeemable Debenture

$$K_d = \frac{I(1-t)}{NP}$$

I = Interest ⇒ Coupon rate × face value

T = Corporate tax rate

NP =

face value of debenture	-
- Discount at the time of issue	-
+ Premium at the time of issue	-
Issue Price	-
- Flotation Cost	-
Net Proceeds	=

Key points to remember

- Assume face value as Rs 100, if not given
- flotation cost in percentage will be computed on Issue Price if question is silent
- If IP or RV not given, assume face value as issue price

(3) Cost of Redeemable Debentures (Approximation Method)

$$K_d = \frac{I(1-t) + \frac{(RV - NP)}{n}}{\left(\frac{RV + NP}{2}\right)}$$

n = number of years

RV = Redemption value

In case tax benefit is available on both Interest & Premium [Not Preferable]

$$K_d = \left[\frac{I + (RV - NP)/n}{(RV + NP)/2}\right](1-t)$$

Key points to remember

- If question is silent, use approximation method
- This method can also be used when there is one time repayment (lump-sum)
- If market price is given, use it instead of net proceeds

(4) Cost of Redeemable Debentures (Yield to maturity)

Step 1 - Identify all cash flows along with time period

Step 2 - Use the discount rate to determine present value of cash flows

Step 3 - Select the rate at which NPV = 0

ie. PVCO - PVCI = 0

PVCO = PVCI

Step 4 - If no direct rate can be found. Identify two rates at which NPV is positive & negative. Apply Interpolation

$$Kd = \text{Lower Rate} + \frac{NPV_L}{NPV_L - NPV_H} \times (H - L)$$

Key points to remember

- The gap b/w two rates should not exceed 5%
- In case yearly cash flows are same, use cumulative PVF ie Annuity factor

(5) Cost of zero coupon bond / Deep Discount bond

$$Kd = \left[\frac{RV}{IP}\right]^{1/n} - 1$$

(6) Cost of convertible debentures

The key point is to find redemption value.
Then we can apply approximation or YTM as prescribed

RV = Higher of

Cash value

OR

Convertible equity value

future equity value can be derived basis below approach

(i) $P_n = P_0 (1+r)^n$

P_n = Share price at n^{th} year
P_0 = Todays share price
r = Growth rate of share price

(ii) $P_n = \frac{D_0 (1+g)^{n+1}}{K_e - g}$

(7) Cost of Irredeemable Preference Shares

$$K_p = \frac{D}{NP} \times 100 \quad \text{or} \quad \frac{D}{MP} \times 100$$

D = Constant Dividend on Preference Shares

MP = Market price

(8) Cost of redeemable Preference Shares

$$K_p = \frac{D + (RV - NP)/n}{(RV + NP)/2}$$

Key points to remember

- If issue price or Redemption value not given assume at par value
- If market price given in question, consider it instead of Issue Price
- Price of preference shares should be ex-dividend

  Ex-dividend Price = Cum dividend Price - Dividend

(9) Cost of redeemable Preference Shares (YTM)

Similar to Cost of Debt (YTM)

(10) Cost of equity shares (Dividend Price/Yield Method)

$$Ke = \frac{D}{P_0} \times 100$$

Dividend will remain constant

D = Current or expected dividend

P_0 = Market price

(11) Cost of equity shares (Earning Price/Yield Approach)

$$Ke = \frac{E}{P_0} \times 100$$

Earnings will remain constant E = Current/expected earnings

⇒ P/E ratio = $\frac{MPS}{EPS}$ which is exactly reverse of ke

$$\therefore Ke = \frac{1}{P/E \text{ ratio}}$$

(12) Cost of equity shares (Dividend Growth Model)

$$Ke = \frac{D_1}{P_0} + g$$

D_1 = Expected Dividend or $D_0(1+g)$

P_0 = Current Market Price

g = Constant growth rate of dividend

Key points to remember

- If issue price not given assume at par value
- If there is fresh issue, use net proceeds instead of MP
- Price of share must be ex-dividend

(13) Estimation of growth rate

i) Gordon Model

$$g = b \times r$$

b = retention ratio of earnings

r = rate of return

ii) Average method

$$g = \left(\frac{D_0}{D_n}\right)^{1/n} - 1$$

D_0 = Current Dividend

D_n = Dividend in n years ago

(14) Cost of equity (Realised yield approach)

i) YTM

$$K_e = \text{Lower Rate} + \frac{NPV_L}{NPV_L - NPV_H}(H-L)$$

ii) Geometric Mean Method

$$K_e = \left[(1+y_1)\times(1+y_2)\times(1+y_3)\times \cdots \times(1+y_n)\right]^{1/n} - 1$$

$$1+y = \frac{D_1 + P_1}{P_0}$$

D_1 = Expected Dividend at the end of the year

P_1 = Expected Market price at the end of the year

(15) Cost of equity (Capital Asset Pricing Model)

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

R_f : Risk free rate of return

β = Beta coefficient of the company

R_m = Rate of return on market portfolio

$R_m - R_f$ = Risk Premium

(16) Cost of retained earnings

Generally $K_e = K_{re}$

But there are two exception to it

i) when personal tax & brokerage is given

$$K_{re} = K_e(1-t_p)(1-B)$$

tp = Personal tax rate

B = Brokerage

ii) When we have flotation cost

$$K_e = \frac{D_1}{P_0 - f} + g \quad \text{but} \quad K_{re} = \frac{D_1}{P_0} + g$$

(16) Overall cost of capital (Basis Book value) (WACC)

Weighted Avg cost of capital of all sources of fund

Source	Book Value	Weight	Cost	Weighted cost
Equity				
Retained earning				
Preference Share				
Debts				
Loans				
		1		WACC

(17) Overall cost of capital (Basis Market value) (WACC)

Source	Market value	Weight	Cost	Weighted cost
Equity				
Retained earning				
Preference Share				
Debts / Loan				
		1		WACC

Market value can be computed as

MV = No. of shares x Market price per share

Key points to remember

- Distribute market value of equity into ESC & RE basis Book value ratio

(18) Marginal cost of capital (MCC)

It is the WACC of only ADDITIONAL funds raised by the company