Example – 3 : A company issued 10,000, 15% Convertible debentures of ₹100 each with a maturity period of 5 years. At maturity, the debenture holders will have an option to convert the debentures into equity shares of the company in the ratio of 1:10 (10 shares for each debenture). The current market price of the equity shares is ₹12 each and historically the growth rate of the shares is 5% per annum. Compute the cost of debentures assuming 35% tax rate.

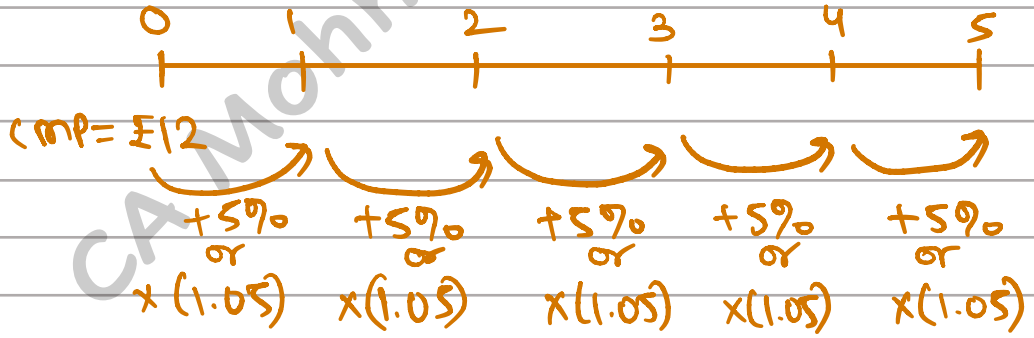
Convertible Debentures → At Maturity (At the end of 5th year) → OR
- 1 Deb → 10 eq Sh.
- Cash → ₹100

Solution:

i) **Calculation of R.V.**

- R.V. will be, the higher of –
  - i) value of equity shares at maturity
  - or
  - ii) cash to be received at maturity.

- **Value of equity shares at maturity**



FV of 1 Equity share at end of 5th year
$= 12 \times (1+0.05)^5$
$= 12 \times 1.276$
$= ₹15.32$

FV of 10 eq Share at end of 5th yr $= 10 \times 15.32$
$= ₹153.20$

∴ value of 10 eq shares is greater than the cash to be received on maturity, thus R.V. = ₹ 153.20

iii) Calculation of cost of Conv. Deb. using approximation method

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

$$= \frac{15(1-0.35) + \left(\frac{153.20 - 100}{5}\right)}{\left(\frac{153.20 + 100}{2}\right)}$$

$$\Rightarrow K_d = 16.10\%$$

COST OF PREFERENCE SHARE CAPITAL [K_P]

→ Preference shareholders are paid dividend at a specified (fixed) rate on the F.V.

→ Pref. sh. are given priority over equity sh. in payment of dividend.

→ However, payment of dividend is NOT tax-deductible. It is treated as appropriation of profits.

K_P

Cost of Irredeemable Pref. Shares

$$K_P = \frac{P_D}{NP} \times 100$$

where,
- NP = I.P. – I.E.
- If CMP is given, then I.P. = C.M.P.
- If I.E. are not give in Qⁿ, then assume "0".

Cost of Redeemable Pref. Shares

1) $$K_P = \frac{P_D + \left(\frac{RV - NP}{n}\right)}{\left(\frac{RV + NP}{2}\right)} \times 100$$

where,
- If R.V. is not given in Qⁿ, then assume F.V. = R.V.

2) YTM/IRR method can also be used. [If Qⁿ mentions]

COST OF EQUITY SHARE CAPITAL [Ke]

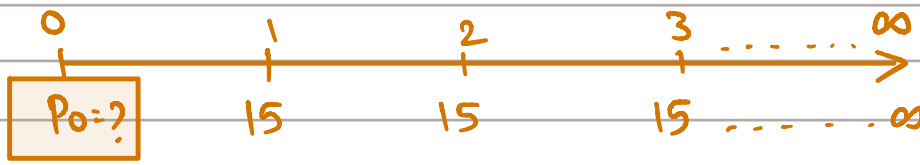
→ Cost of Equity = Returns expected by equity shareholders.

→ Equity dividend is uncertain. [No fixed rate]

→ Methods of calculating Ke
- i) Dividend Price Approach
- ii) Earnings Price Approach
- iii) Growth Approach or Gordon's Model
- iv) Capital Asset Pricing Model [CAPM]
- v) Realised Yield Approach.

iv) Dividend Price Approach

→ Here, we assume the amount of dividend to be constant. [till infinity → going concern]



Ke = 10%

$P_0 = \frac{15}{10\%} = ₹150$ $\left[P_0 = \frac{D}{Ke}\right]$

$\therefore$ $Ke = \frac{D}{P_0}$

* we have to use "Ex-Dividend" Prices for calculation of Ke or Kr

Ex-Div Price = Cum-Div Price − Dividend Per Share

v) Earnings Price Approach

→ Here, we assume the amount of E.P.S. to be constant. [till infinity → going concern]

$Ke = \frac{E.P.S}{P_0}$

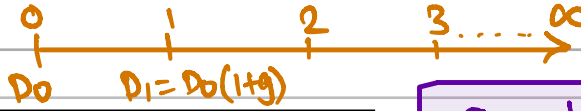
vi) Growth Approach or Gordon's Model

→ Here we assume that earnings & dividend are growing at a constant rate. [till infinity]

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

where,

D_1 = Dividend at the end of Yr 1.



$g = b \times r$

* If F.C. [I.E.] is given in Qn, then subtract it from P_0, in above formulas. [$P_0 - F.C.$]

iv) Capital Asset Pricing Model [CAPM]

→ Here, Ke is calculated based on risk.

→ Higher the risk, higher the Ke.
CAPM describes the linear relationship between risk & return for securities.

$$Ke = Rf + \beta (Rm - Rf)$$

where, Rf = Risk free Rate
Rm = Market Rate of Return
β = Beta [measure of Systematic Risk]
[Rm − Rf] = Market Risk Premium
[β (Rm − Rf)] = Security Risk Premium.

Ke = Rf + β (Market Risk Premium)

→ Ke = Rf + Security Risk Premium.

→ The risks to which a security is exposed to, can be classified into-

Unsystematic Risk	Systematic Risk
• Company specific risk. • Related to finance, business & insolvency. Eg- not obtaining proper copyright/trademark, sub-optimal capital structure, liquidity issues, data breath, litigation risk etc.	• Macro-Economic or Market specific risk. • Related to inflation, changes in interest rate, recession, natural disaster, govt. policy etc.

Unsystematic Risk	Systematic Risk
• Aka. Diversifiable Risk	• Aka. Non-Diversifiable Risk.
• It can be reduced by diversification.	• It cannot be reduced by diversification.
	• It is measured using "Beta" [β]

Since, systematic risk cannot be eliminated, thus a company is expected to pay additional return for this type of risk.

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* **Beta co-efficient [β]**

Beta measures the sensitivity of a share to changes in the market.

Example (No Question in Exam → from below Eg)

a) β = 3, Sensex → 2% Increase
CMP = ₹50. Calculate new MP.

Soln:

If Market	MP of share
2% ↑	2% × 3 = 6% ↑

Beta times respond leverage

New MP = CMP + 6% = ₹53

b) If in above que, β = −1.50

Market	MP of shares
2% ↑	2% × (−1.50) = −3% ↓

New MP = 50 − 3% = 48.50

v) Realised Yield Approach

→ When it is difficult to forecast future returns, then this method is used, which uses the past record of dividends actually received by equity shareholders.

→ **Unrealistic Assumptions**

a) Risks faced by the company will remain same.
b) Shareholders will continue to expect same return.
c) Re-investment opportunity cost (rate) of shareholders is same as the realised yield.

→ If earnings of the company are not stable, then this method is not practical.

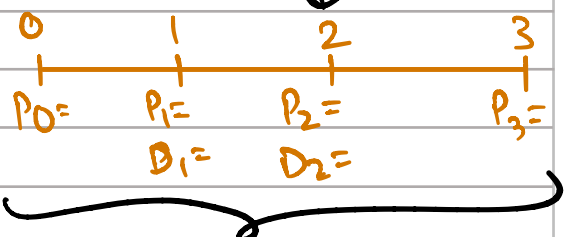
→ 2 ways to calculate "Ke" as per this methods

OR

If Qⁿ mentions opening price & closing price (at maturity) & dividend payments every year.

Calculate Ke by using "YTM/IRR" Method [I11U 10]

If Qⁿ mentions op. & cl. Price of every year along with dividend payments every year



i) Calculate returns of each year → $1+r_1 = \frac{P_1+D_1}{P_0}$

$1+r_2 = \frac{P_2+D_2}{P_1}$

ii) $Ke = \left[\sqrt[n]{(1+r_1)\times(1+r_2)\ldots\times(1+r_n)}\right] - 1$

[Geometric Mean]

* IMPORTANT NOTES

1) Growth Rate (g) = Retention Ratio (b) × Return on Invt. (r)

Retention Ratio (b) → EFES → isme se kitna % retain kiya.

Return on Invt. (r) → Return earned on funds invested in business.

Eg:	A Ltd	B Ltd
Capital Employed	50,00,000	50,00,000
ROI (r)	20%	20%
Earnings of Yr 1	10,00,000	10,00,000
(-) Dividend	10,00,000	4,00,000
Retained Earnings	0	6,00,000
Op. Capital Emp.	50,00,000	56,00,000
ROI (r)	20%	20%
Earning of Yr 2	10,00,000	11,20,000
Growth in Earnings from Yr 1 to Yr 2	0 [10L − 10L]	1.20L [11.20L − 10L]
Growth Rate [(Yr 2 − Yr 1)/Yr 1 × 100]	0	12% [(11.20L − 10L)/10L × 100]

In Co. B

Retention Ratio [b] = R.E./Earnings = 6L/10L = 60%

Growth Rate = b × r

= 60% × 20%

= 12%

2) Dirty Power / Hill Climb Method
[When power (index) is in fraction]

m^n = ?

Steps on calculator
Step 1: "m" → "√" 12 times
Step 2: "−1"
Step 3: Multiply by power "n"
Step 4: "+1"
Step 5: "x =" → 12 times.

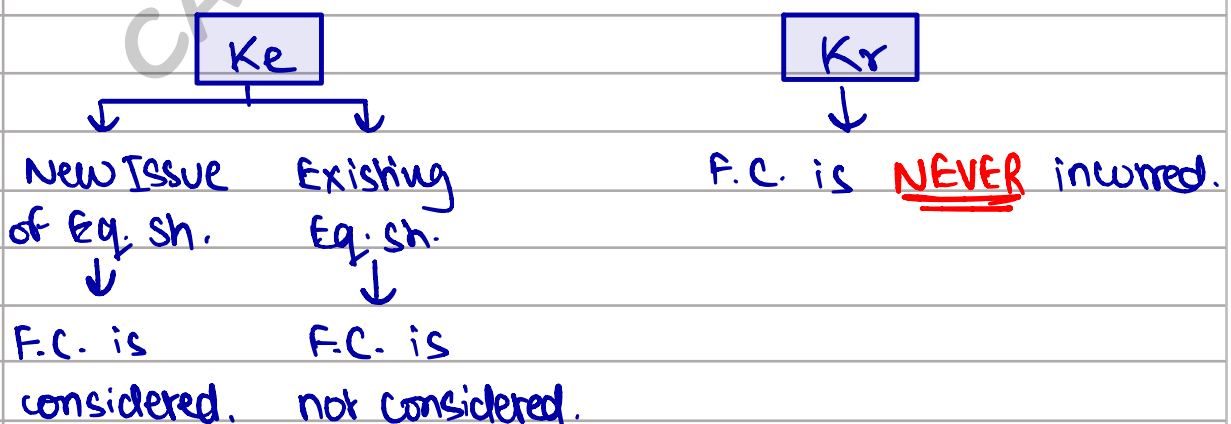
COST OF RETAINED EARNINGS [Kr]

→ Kr = Opportunity cost of dividends foregone by equity shareholders

→ Generally, Ke = Kr

However, difference comes when floation cost & personal tax exists.

→



K_r

Dividend Price Approach	Earnings Price Approach	Gordon's Model	CAPM
$K_r = \frac{D_1}{P_0}$	$K_r = \frac{EPS_1}{P_0}$	$K_r = \frac{D_1}{P_0} + g$	$K_r = R_f + \beta(R_m - R_f)$

---

* If Personal Tax [t_p] is given in question

$$K_r = K_e (1 - FC)(1 - t_p)$$

* If we have to calculate both K_e & K_r & On mentions → Issue Price, F.C. & CMP. [Illu 13]

For K_e [New issue of eq. shares]	For K_r
P_0 = Issue Price − F.C.	P_0 = C.M.P.

WEIGHTED AVERAGE COST OF CAPITAL (WACC) OR OVERALL COST OF CAPITAL [K_o]

→ In order to balance

Financial Risk | Control | Cost of Capital

A company usually does not procure funds only from a single source & tries to use a mix of various sources of finance.

WACC = K_o = Weighted Average cost of Capital of all sources of finance

* General format for calculating WACC

Sources of finance	Amt	weight (w_i)	Cost of capital (K_i)	$w_i \times k_i$
ESC	xxx	w_e	k_e	$w_e \times k_e$
R.E.	xxx	w_r	k_r	$w_r \times k_r$
PSC	xxx	w_p	k_p	$w_p \times k_p$
LTD	xxx	w_d	k_d	$w_d \times k_d$
	Total capital			WACC

* CHOICE OF WEIGHTS

BOOK VALUE

MARKET VALUE

- No seperate MV of R&S
- Thus, MV of Equity Shares is to be divided as per BV of ESC to BV of R&S

MV of ESC

MV of Eq. Sh. $\times \left[\frac{\text{BV of ESC}}{\text{BV of ESC} + \text{BV of R\&S}}\right]$

MV of R&S

MV of Eq. Sh $\times \left[\frac{\text{BV of R\&S}}{\text{BV of ESC} + \text{BV of R\&S}}\right]$

* MARGINAL COST OF CAPITAL [MCC]

→ MCC is the cost of raising additional capital.

→ MCC is calculated using Marginal weights. Marginal weights represent the proportion of funds which a firm intends to employ.

⇓

Thus, here there is no problem of choosing between BV & MV weights.

→ When additional (marginal) funds are raised in same proportion as the existing capital structure & if cost of individual sources remain same, then

⇓

WACC = MCC

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* USES of WACC

1) Security analysts use WACC for valuing & selecting investments.

2) In discounted cashflow analysis, WACC is used as the discounting rate for calculating NPV.

3) WACC is used as hurdle rate to assess the return on capital investment.

4) Investors use WACC as a tool to decide whether or not to invest.