

KEY CONCEPTS

- Long term finance ■ Cost of capital ■ Risk free rate ■ Beta ■ Risk premium

Learning Objectives

To understand:

- Factors affecting the cost of capital of a company
- Calculation of cost of capital for different sources of finance
- Calculation of Weighted Average Cost of Capital
- Calculation of Marginal Cost of Capital

Lesson Outline

- Meaning of Cost of Capital
- Factors affecting Cost of Capital
- Measurement of Cost of Capital
- Cost of redeemable debt
- Cost of irredeemable debt
- Cost of irredeemable preference shares
- Cost of redeemable preference shares
- Cost of equity
- Cost of retained earnings
- Weighted Average Cost of Capital
- Marginal Cost of Capital
- Case studies
- Lesson Round-Up
- Glossary
- Test Yourself
- List of Further Readings

INTRODUCTION

The cost of capital is the rate of return a firm must earn on its investments so that the market value of the firm remains unchanged. Thus, it is a yardstick or basis of approval or rejection of an investment. In this way it becomes a target rate of return, cut off rate or hurdle rate or the financial standard of assessment of performance of a project.

Cost of capital is the required rate of return on its investments which belongs to equity, debt and retained earnings. If a firm fails to earn return at the expected rate, the market value of the shares will fall and it will result in the reduction of overall wealth of the shareholders.

The choice of financing makes the cost of capital a crucial variable for every company, as it will determine its capital structure. Companies look for the optimal mix of financing that provides adequate funding and minimizes the cost of capital.

“The cost of capital is the minimum rate of return which a firm requires as a condition for undertaking an investment.”

- *Milton H. Spencer*

“Cost of capital is the minimum required rate of earnings or the cut off rate for capital expenditures.”

- *Solomon Ezra*

“A cut-off rate for the allocation of capital to investment of projects. It is the rate of return on a project that will leave unchanged the market price of the stock”.

- *James C. Van Horne*

“Cost of capital is the rate of return the firm required from investment in order to increase the value of the firm in the market place”

- *John J. Hampton*

IMPORTANCE OF THE CONCEPT OF COST OF CAPITAL

The importance of this concept to modern management is summarized as follows:

i) Designing the Optimal Capital Structure:

This concept is very helpful in designing a sound, optimal and economical capital structure of the firm. Each source of capital involves different cost and different risk. By comparing various specific costs of different sources, the financial manager can select the best and the most economical source of finance.

ii) Helpful in Evaluation of Expansion Projects:

It helps in the evaluation of financial soundness of a given expansion project. An expansion project will be accepted by the management only when the marginal return on investment exceeds the cost of its financing.

iii) Rational Allocation of National Resources:

The concept of cost of capital is important for national economy as well since it provides the basis of optimum allocation of financial resources.

iv) Evaluation of Financial Performance of Top Management:

The cost of capital framework can be used to evaluate the financial performance of top executives. Such an evaluation can be done by comparing the actual profitability of the projects undertaken with the projected overall cost of capital, and an appraisal of the actual costs incurred in raising the required funds.

v) Financing and Dividend Decisions:

This concept is useful in other areas of financial decision making, such as dividend decisions, decisions on capitalization of profits and rights issue, working capital management and capital expenditure control etc.

FACTORS DETERMINING THE FIRM'S COST OF CAPITAL

Cost of capital, like all other costs, is a variable term, subject to changes in a number of factors. The various factors that play a part in determination of cost of capital are described below. There are four main factors which mainly determine the cost of Capital of a firm.

1. General Economic Conditions

General economic conditions determine the demand for and supply of capital within the economy, as well as the level of expected inflation. This economic variable is reflected in the risk less rate of return. This rate represents the rate of return on risk- free investments, such as the interest rate on short-term government securities. In principle, as the demand for money in the economy changes relative to the supply, investors alter their required rate of return. For example, if the demand for money increases without an equivalent increase in the supply, lenders will raise their required interest rate. At the same time, if inflation is expected to deteriorate the purchasing power of money, investors require a higher rate of return to compensate for this anticipated loss.

2. Market Conditions

When an investor purchases a security with significant risk, an opportunity for additional returns is necessary to make the investment attractive. Essentially, as risk increases, the investor requires a higher rate of return. This increase is called a risk premium. When investors increase their required rate of return, the cost of capital rises simultaneously. If the security is not readily marketable when the investor wants to sell, or even if a continuous demand for the security exists but the price varies significantly, an investor will require a relatively high rate of return. Conversely, if a security is readily marketable and its price is reasonably stable, the investor will require a lower rate of return and the company's cost of capital will be lower.

3. Operating and Financing Decisions

Risk, or the variability of returns, also results from decisions made within the company. Risk resulting from these decisions is generally divided into two types: business risk and financial risk. Business risk is the variability in returns on assets and is affected by the company's investment decisions. Financial risk is the increased variability in returns to common stockholders as a result of financing with debt or preferred stock. As business risk and financial risk increase or decrease, the investor's required rate of return (and the cost of capital) will move in the same direction.

4. Amount of Financing

The last factor determining the corporation's cost of funds is the level of financing that the firm requires. As the financing requirements of the firm become larger, the weighted cost of capital increases for several reasons. For instance, as more securities are issued, additional flotation costs, or the cost incurred by the firm from issuing securities, will affect the percentage cost of the funds to the firm. Also, as management approaches the market for large amounts of capital relative to the firm's size, the investors' required rate of return may rise. Suppliers of capital become hesitant to grant relatively large sums without evidence of management's capability to absorb this capital into the business. This is typically "too much too soon". Also, as the size of the issue increases, there is greater difficulty in placing it in the market without reducing the price of the security, which also increases the firm's cost of capital.

MEASUREMENT OF COST OF CAPITAL OR COMPONENTS OF COST OF CAPITAL

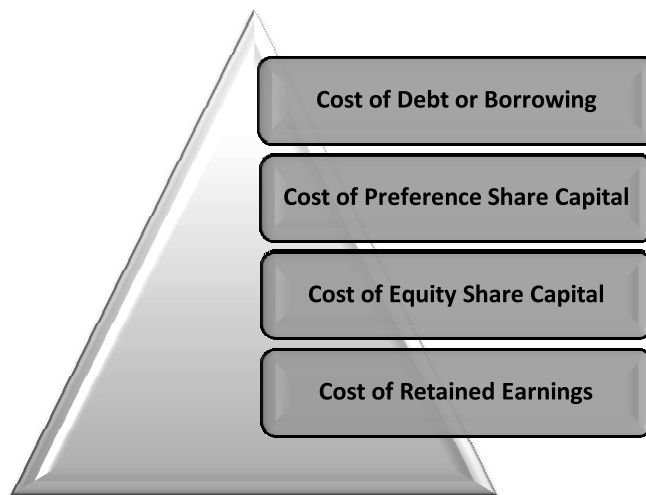
A company receives capital from different sources and cost of each source differs from each other because cost of issue of raising capital from different sources, interest payable (or dividend payable) and degree of corporate tax burden differ. Hence, in order to find out cost of capital of a company, the first step is the calculation of the cost of individual sources of funds (i.e., specific costs) and thereafter weighted average cost of proceeds from different sources of capital is ascertained. This is known as company's cost of capital.

Assumption of Cost of Capital

While computing the cost of capital, the following assumptions are made:

1. The financial and business risks are not affected by investing in new investment in new investment proposals.
2. The firm's capital structure remains unchanged.
3. Cost of each source of capital is determined on an after tax basis.
4. Cost of previously obtained capital is not relevant for computing the cost of capital to be raised from a specific source.

A company has a capital structure with the different components. Each component carries its own importance as well as burden over the firm. This burden is in term of the cost charged over the firm to carry such component; therefore it is required to calculate their cost on individual basis. These are as follows:



1. COST OF DEBT CAPITAL:

Generally, debt may be in form of term loans, bonds and debentures from financial institutions and banks. The debts always carry a fixed rate of interest as a charge for the users which a firm is ready to pay to maximize its profitability and wealth. This rate of interest is called as cost of capital.

The cost of Capital is the amount or a rate of interest which is paid to hire a debt.

The rate adjoined with the debt as generally shown (as 10% Debenture) is the rate of interest to be paid over the Debenture/debt but the actual cost may differ from this rate. To find the actual charge (real cost of debt), it is required to know the relation of interest over the actual amount realized (Net Proceed).

The Net Proceed is that amount which is actually realized after adjusting discount or premium on the face value of loan or debentures after charging floatation costs.

The Net Proceeds will be calculated as follows:

$$\text{Net Proceeds at Par} = \text{Par Value} - \text{Floation Cost}$$

$$\text{Net Proceeds at Premium} = \text{Par Value} + \text{Premium} - \text{Floation Cost}$$

$$\text{Net Proceeds at Discount} = \text{Par Value} - \text{Discount} - \text{Floation Cost}$$

The floatation costs include all types of charges or expenses which incurred to obtain such loan.

The floatation costs include the following expenditures:

- Advertisements Charges
- Postage
- Stationery & Printing
- Stamp duty
- Brokerage
- Underwriting commission etc.

Debt-capital is of two types:

- A) Perpetual or Irredeemable Debt
- B) Redeemable Debt

A) Perpetual or Irredeemable Debt:

These are the debts which are repayable only on the liquidation of the company. For calculating cost of this type of debt-capital, amount of interest payable on it is divided by the net proceeds from its issue.

The formula is:

$$C_d \text{ (or } K_d) = \frac{i}{NP} \times 100$$

where i = Amount of Annual Interest
 NP = Net Proceeds

B) Redeemable Debt:

Mostly debentures are repayable within a stipulated time period. In the calculation of cost of such debts, time period of their redemption is very important.

The formula for calculating the cost of debenture-capital can be adapted as follows:

$$C_d = \frac{i + \frac{MV-NP}{n}}{\frac{MV+NP}{2}} \times 100$$

where, C_d = cost of debt capital
 i = annual interest payment
 MV = maturity value
 NP = net proceeds
 n = number of years to maturity

For calculating after tax cost of debt capital, the amount of interest is to be adjusted as follows:

a) In case of irredeemable debts:

$$C_d \text{ (after tax)} = \frac{i(1-t)}{NP} \times 100$$

or C_d (after tax) = Before tax cost (1 - t)

b) In case of redeemable debts:

$$C_d \text{ (after tax)} = \frac{i(1-t) + \frac{MV-NP}{n}}{\frac{MV+NP}{2}} \times 100$$

Illustration-1:

SK Ltd. issued 10,000, 14% debentures of Rs. 100 each at a discount of 5%. The debentures are irredeemable. Cost of issue is 2% and the rate of tax is 50%. Calculate cost of capital before tax.

Solution:

$$C_d \text{ (before tax)} = \frac{i}{NP} \times 100 = \frac{1,40,000}{9,30,000} \times 100 = 15.05\%$$

Workings: $i = 14\%$ of 10,00,000 = Rs. 1,40,000

$NP = 10,00,000 - (5\% \text{ of } 10,00,000 + 2\% \text{ of } 10,00,000) = \text{Rs. } 9,30,000$

$$C_d \text{ (after tax)} = \frac{i(1-t)}{NP} \times 100 = \frac{1,40,000(1-0.50)}{9,30,000} \times 100 = 7.525\%$$

Illustration-2:

SK Co. is willing to issue 1,000 7% Debentures of Rs. 100 each and for which the company will have to incur the following expenses:

Underwriting commission 1.5% Brokerage 0.5% Printing and Other Expenses Rs. 500. Assuming tax rate at 50% find out the cost of debt capital.

Solution:

$$C_d \text{ (before tax)} = \frac{i}{NP} \times 100 = \frac{7,000}{97,000} \times 100 = 7.18\%$$

Where, i = 7% of 1,00,000 = 7,000

N.P. = (1,00,000 – (1,500 + 500 + 500)) = 97,500

$$C_d \text{ (after tax)} = \frac{i(1-t)}{NP} \times 100 = \frac{7,000(1-0.50)}{97,000} \times 100 = 3.59\%$$

Illustration-3:

SK Company issued 10,000 ten-years 8% Debentures of Rs. 100 each at 4% discount. Under the terms of Debentures Trust, these debentures are to be redeemed after 10 years at 5% premium. The cost of issue is 2%. Assuming tax rate at 50%, Calculate the cost of debt capital.

Solution:

NP = 10,00,000 – 40,000 – 20,000 = Rs. 9,40,000

MV = 10,00,000 + 50,000 = Rs. 10,50,000

i = 8% of 10,00,000 = Rs. 80,000

$$C_d \text{ (before tax)} = \frac{i + \frac{MV - NP}{n}}{\frac{MV + NP}{2}} \times 100 = \frac{80,000 + \frac{10,50,000 - 9,40,000}{10}}{\frac{10,50,000 + 9,40,000}{2}} \times 100$$

$$= \frac{80,000 + 11,000}{9,95,000} \times 100 = 9.15\%$$

$$C_d \text{ (after tax)} = \frac{i(1-t) + \frac{MV - NP}{n}}{\frac{MV + NP}{2}} \times 100$$

$$= \frac{80,000 \times (1-0.50) + \frac{10,50,000 - 9,40,000}{10}}{\frac{10,50,000 + 9,40,000}{2}} \times 100 = 5.126\%$$

Illustration-4:

SK Company issued 1,000 10% debentures of Rs. 100 each at a premium of 5%, with a maturity period of 10 years. The cost of issue is 2%. The tax rate applicable to the firm is 50%. Find out the cost of capital.

Solution:

Net Proceeds (NP) = 1,05,000 – 2% of 1,00,000 = Rs. 1,03,000

$$\begin{aligned}
 C_d(\text{before tax}) &= \frac{i + \frac{MV-NP}{n}}{\frac{MV+NP}{2}} \times 100 = \frac{10,000 + \frac{1,00,000 - 1,03,000}{10}}{\frac{1,00,000 - 1,03,000}{2}} \times 100 \\
 &= \frac{10,000 - 300}{1,01,500} \times 100 = 9.556\% \\
 C_d(\text{after tax}) &= \frac{i(1-t) + \frac{MV-NP}{n}}{\frac{MV+NP}{2}} \times 100 \\
 C_d(\text{after tax}) &= \frac{10,000 \times (1-0.50) + \frac{1,00,000 - 1,03,000}{10}}{\frac{1,00,000 - 1,03,000}{2}} \times 100 \\
 &= \frac{5,000 - 300}{1,01,500} \times 100 = 4.63\%
 \end{aligned}$$

2. COST OF PREFERENCE SHARE CAPITAL:

Preference shares are also fixed cost bearing securities like debentures. The rate of dividend payable on these shares is fixed well in advance at the time of their issue. Since dividend is not an admissible deduction in the computation of taxable income, unlike debentures, cost of preference share capital is 'after tax cost' of capital which may be converted into before tax cost by applying the following formula:

$$C_d(\text{before tax}) = \frac{\text{After tax cost}}{1 - \text{tax rate}}$$

The preference shares may be

- (i) Irredeemable or
- (ii) Redeemable.

Cost of Irredeemable Preference Share Capital:

Cost of such preference shares is the ratio of annual dividend burden on each such share to its net proceeds. As per formula:

$$C_p(\text{or } K_p) = \frac{PD}{NP} \times 100$$

Where, = Cost of preference capital

PD = Preference dividend amount per share

NP = Net Proceeds per share

If dividend tax is paid, the formula will be as follows:

$$C_p = \frac{PD (1 + D_t)}{NP} \times 100$$

Where, D1 = Dividend Tax

Illustration-5:

SK Ltd. has issued 8% 10,000 Preference Shares of Rs. 100 each and has incurred the following expenses: Underwriting Commission 2%, Brokerage 1%, Other Expenses Rs. 5,000. If the present company tax rate is 50%, what will be the cost of capital after tax and before tax?

Also calculate cost of preference capital, if corporate dividend tax is 10%.

Solution:

$$NP = 10,00,000 - 20,000 - 10,000 - 5,000 = \text{Rs. } 9,65,000$$

$$C_p \text{ (after - tax)} = \frac{PD}{NP} \times 100 = \frac{80,000}{9,65,000} \times 100 = 8.29\%$$

$$C_p \text{ (before - tax)} = \text{After tax cost} \frac{1}{1 - t} = 8.29 \frac{1}{1 - 0.5} = 16.58\%$$

If corporate dividend tax is paid:

$$C_p \text{ (after tax)} = \frac{PD (1 + D_t)}{NP} \times 100 = \frac{8 (1 + 0.1)}{95.5} \times 100 = 9.12\%$$

Cost of Redeemable Preference Share Capital:

Such shares are redeemed after a specified period. Cost of such shares is calculated in the same way as discussed in the case redeemable debentures. Necessary adjustments will have to be made for terms of issue, terms of redemption and floatation charges. The following formula may be used for this purpose:

$$C_p = \frac{PD + \frac{MV - NP}{n}}{MV + NP} \times 100$$

Where, PD = amount of annual preference dividend

MV = amount to be paid on maturity

NP = net proceeds

n = number of years after which the preference shares will be repaid

Illustration-6:

SK Ltd. issued at par 10,000 10% Preference Shares of Rs. 100 each. These shares are redeemable after 10 years at a premium of Rs. 5 per share. The cost of issue is Rs. 2 per share. Find out the cost of preference capital. Assume 50% tax rate.

Solution:

$$C_p(\text{after tax}) = \frac{1,00,000 + \frac{10,50,000 - 9,80,000}{10}}{\frac{10,50,000 - 9,80,000}{2}} \times 100$$

$$= \frac{1,00,000 + 7,000}{10,15,000} \times 100 = 10.54\%$$

$$C_p(\text{before tax}) = 10.54 \left(\frac{1}{1 - 0.50} \right) = 21.08\%$$

3. COST OF EQUITY SHARE CAPITAL:

The calculation of cost of equity share capital is relatively difficult task because like preference share capital there is neither any prefixed rate of dividend payable on these shares nor there is any legal obligation to pay dividend on them. But it does not mean that equity share capital is cost-free. The cost of such capital is equal to that expectation of equity shareholders, which they expect to be fulfilled by the management to maintain of their company.

Following are the four approaches of estimating the cost equity share capital:

1) CAPM model

This is a popular approach to estimate the cost of equity. According to the CAPM, the cost of equity capital is:

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

Where:

K_e = Cost of equity

R_f = Risk-free rate

R_m = Equity market required return (expected return on the market portfolio)

β = beta is Systematic Risk Coefficient.

Beta is the measure of market risk. Market risk is the risk that cannot be diversified away.

Illustration-7:

Calculate the cost of equity capital for a company whose Risk-free rate =10%, equity market required return =18% with a beta of 0.5.

Solution

$$K_e = 0.10 + 0.5(0.18 - 0.10)$$

$$= 0.14 \text{ or } 14\%$$

2) Dividend Yield Method:

This is also called as Dividend/Price Ratio Method or D/P Ratio Method. This Method is based on the thinking that when an investor invests his savings in a company, he expects dividend at least at current rate of return.

As such cost of equity capital is calculated on the basis of the future stream of dividends which the shareholders expect to receive from a company. The formula is

$$C_e \text{ (after tax)} = \frac{\text{DPS}}{\text{MP}} \times 100$$

Where, = Cost of Equity Share Capital

DPS = Current Cash Dividend per Share

MP = Market Price per Share.

Illustration-8:

SK Ltd. has issued 20,000 equity shares of Rs. 100 each as fully paid. The present market price of these shares of Rs. 160 per share. The company has paid a dividend of Rs. 8 per share. Find out the cost of equity capital.

Solution:

$$C_e = \frac{\text{DPS}}{\text{MP}} \times 100 = \frac{8}{160} \times 100 = 5\%$$

3) Earnings Yield Method:

This is also known as Earnings/Price Ratio Method or E/P Ratio Method. This method is based on the assumption that market price of the shares is based on earning per share and so shareholders capitalize the expected future earnings (as distinguished from dividends) in order to evaluate their shareholders. Hence, cost of equity capital is found by relating earnings per share with its market price.

The formula is as follows:

$$C_e \text{ (after tax)} = \frac{\text{EPS}}{\text{MP}} \times 100$$

Where, C_e = Cost of Equity Share Capital

EPS = Earnings Per Share

MP = Market Price Per Share.

Illustration-9:

SK Ltd. has issued 1,000 equity shares of Rs. 100 each as fully paid. It has earned a profit of Rs. 10,000 after tax. The market price of these shares is Rs. 160 per share. Find out the cost of equity capital before and after tax assuming a tax rate of 50%.

Solution:

$$C_e \text{ (after tax)} = \frac{\text{EPS}}{\text{MP}} \times 100 = \frac{\text{Rs. } 10,000/1,000}{160} \times 100 = 6.25\%$$

$$C_e \text{ (before tax)} = \frac{\text{After tax cost}}{1 - \text{tax rate}} = \frac{6.25}{1 - 50\%} = \frac{6.25}{1 - 0.5} = 12.5\%$$

4) Dividend Yield + Growth in Dividend Method:

This method is also known as Dividend/Price + Growth in Dividend Method or D/P + G Method. This method is based on the thinking that each equity shareholder is not satisfied with the present rate of dividend only, he wants an increased in it each year based on his expectations of increase in future earnings of the company. In this method, cost of equity share capital is found by making appropriate adjustment in current rate of dividend on the basis of probable rate of increase in future earnings of the company. This rate of increase is termed as growth rate.

i) When dividends are expected to grow at a uniform rate perpetually:

in this case, the yearly growth rate in dividend is added to the cost of equity capital as ascertained in accordance with D/P ratio method. The formula is:

$$C_e(\text{After tax}) = \left(\frac{\text{DPS}}{\text{MP (or NP)}} \times 100 \right) + G$$

Where, C_e = Cost of Equity Share Capital

DPS = Expected Dividend Per Share

MP = Current Market Price Per Share

NP = Net Proceeds per share

G = Growth Rate in expected Dividend (or expected annual percentage rate of increase in future dividends)

Illustration-10:

The average rate of dividend paid by SK Ltd. for the last five years is 21 per cent. The earnings of the company have recorded a growth rate of 3 per cent per annum. The market value of the equity shares is estimated to be Rs. 105. Find out (a) the cost of equity share capital. (b) Determine the estimated market price of the equity shares if the anticipated growth rate of the firm rises to 5%. (c) If the company's cost of capital is 20% and anticipated growth rate is 5%, determine the market price of the share, assuming the same dividend per share.

Solution: (a)

$$C_e(\text{After tax}) = \left(\frac{\text{DPS}}{\text{MP (or NP)}} \times 100 \right) + G = \left(\frac{21}{105} \times 100 \right) + 3 = 23\%$$

(b) Determination of market price of growth rate rises to 5%:

$$C_e = \left(\frac{\text{DPS}}{\text{MP (or NP)}} \times 100 \right) + G$$

$$23 = \left(\frac{21}{\text{MP}} \times 100 \right) + G$$

$$\text{or } 23 - 5 = \frac{2,000}{\text{MP}} \quad \text{or } 18 \text{ MP} = 2,100$$

$$\text{MP} = 2,100 \div 18 = \text{Rs. } 116.67 \text{ per share}$$

(c) Determination of market price if cost of capital is 20%:

$$C_e(\text{After - tax}) = \left(\frac{\text{DPS}}{\text{MP}} \times 100 \right) + G \text{ or } 20 = \left(\frac{21}{\text{MP}} \times 100 \right) + 5$$

$$= 20 - 5 = 2,100 / \text{MP}$$

$$\text{MP} = 2,100 / 15 = \text{Rs. } 140 \text{ per share}$$

ii) When dividends grow at different rates

In such a case, the constant growth equation mentioned above is to be modified to take into account two or more growth rates. For example: if dividends are expected to grow at a super normal growth rate, for any years and thereafter, at a normal perpetual growth rate, beginning in the year n + 1, then the cost of equity share will be determined by applying the following formula:

$$\left(\frac{\text{DPS}}{\text{MP}} \times 100 \right) + G$$

$$\text{MP} = \sum_{t=1}^n \frac{D_0(1+g_n)^{t-1}}{(1+K_e)^t} + \sum_{t=n+1}^{\infty} \frac{D_n(1+g_n)^{t-1}}{(1+K_e)^t}$$

Where, g_n = rate of growth in earlier years.

g_c = constant growth in late years

Instead of applying the above formula, the problem can be solved with the help of present value table as under.

Illustration-11:

The SK Company declared last dividend of Rs. 1.50 last year. The company is likely to have growth rate of 12% in the next two years, 10% in the third year and fourth year and thereafter the growth rate would stabilize at 8%. Find the price at which the share shall be purchased if the shareholders expected rate of return is 16%.

Solution:

In this case, we need to determine the intrinsic value of the shares which will be equal to the present value of the next four dividends + present value of the market price of the share in the fourth year.

Year	Dividend	PV@ 16%	Total PV
0	1.5	Not required	
1	1.68	0.862	1.44
2	1.88	0.743	1.39
3	2.06	0.641	1.32
4	2.27	0.552	<u>1.25</u>
Total			5.40

Price in the fourth year = $P_4 = D_5 / (C_e - g)$

D_5 = Expected dividend = 2.27 (1 + 8%)

D_5 = Expected dividend = 2.45

$$\text{Price at the end of fourth year} = \frac{2.45}{16\% - 8\%}$$

Therefore, price at the end of the fourth year = Rs. 30.62

Present value of the market price at the end of fourth year = $30.62 \times 0.552 = 16.90$

Total Intrinsic Value = Rs. 5.40 + Rs. 16.90 = Rs. 22.30

The share shall not be bought for rupees more than 22.30.

COST OF NEWLY ISSUED EQUITY SHARES:

Cost of newly issued equity shares will be higher than the old shares because the company will have to pay flotation charges on new issue of shares which reduces the net proceeds of the issue. In such a case, for calculating the cost of such newly issued shares, earning per share (or dividend per share) will be divided by the net proceeds per share (and not market price per share). Rest is the same as for existing equity share capital. If cost of equity capital is being estimated by E/P ratio method, the formula will be adjusted as follows:

$$C_e (\text{After - tax}) = \frac{\text{EPS}}{\text{NP}} \times 100 \text{ or } \left(\frac{\text{DPS}}{\text{MP}} \times 100 \right) \text{ or } \left(\frac{\text{DPS}}{\text{NP}} \times 100 \right) + G$$

Where, EPS = Earnings per Share; NP = Net Proceeds

Illustration-12:

Calculate cost of new equity capital issue from the following information:

Face value of share	= Rs. 100
Market value	= Rs 105
Securities premium	= Rs. 3 per share
After-tax net earnings	= Rs. 10.50 per share
Cost of issue	= Rs. 3 per share
Tax Rate	= 50%

Solution:

$$C_e (\text{After - tax}) = \frac{\text{EPS}}{\text{NP}} \times 100 = \frac{10.50}{103 - 3} \times 100 = 10.50\%$$

It must be noted that the present E/P Ratio is

$$C_e (\text{before - tax}) = \frac{\text{After tax cost}}{1 - \text{tax rate}} = \frac{10.50}{1 - 50\%} = 21\%$$

4. COST OF RETAINED EARNINGS:

That part of earnings of a company which remains with it after distribution on dividend among the shareholders is called as 'retained earnings'. They are commonly known as internal equity of the concern. There is no explicit cost of this type of profits because there is no formal or implied obligation on the company to pay any return on this amount. But it is not correct to treat them as cost free. In fact, cost of this source of finance is its opportunity cost. If retained earnings were not retained, they would have been paid out to the shareholders as dividend and

the shareholders should have invested it in some alternative investments and should have earned return. When earnings are retained, the shareholders are forced to forego such return. Hence, the expected return foregone by the shareholders on forgone dividends may be treated as the cost of retained earnings. The following formula will be applied for calculating cost of retained earnings:

$$C_r \text{ (or } K_r) = \frac{DPS (1 - T_i) (1 - B)}{MP (1 - T_e)} \times 100$$

$$C_r \text{ (or } K_r) = \frac{(DPS + G) (1 - T_i) (1 - B)}{MP (1 - T_e)} \times 100$$

Where, C_r = Cost of Retained Earnings

DPS = Dividend Per Share

T_i = Marginal tax rate applicable to individual shareholder

B = Brokerage Cost

MP = Present Market Price per share

T_e = Capital Gains Tax

G = Growth rate of dividends

Notes: Cost of retained earnings calculated by the above formula is after tax cost. It can, however, be converted into before tax cost by applying the following formula:

$$\text{Before tax cost} = \frac{\text{After tax cost}}{1 - \text{tax rate}}$$

Illustration-13:

Find out the cost of retained earnings from the information given below:

Dividend Per Share	= Rs. 10
Personal Income – Tax Rate	= 30%
Personal Capital Gains Tax Rate	= 20%
Corporate Tax Rate	= 50%
Market Price Per Share	= Rs. 100
Brokerage	= 2%

Solution:

$$C_r \text{ (After - tax)} = \frac{DPS (1 - T_i) (1 - B)}{MP (1 - T_e)} \times 100 = \frac{10(1 - .30) (1 - .02)}{100 (1 - .20)} \times 100 = 8.575\%$$

$$C_r \text{ (Before - tax)} = 8.575 \times \left(\frac{1}{1 - .50} \right) = 17.15\%$$

OVERALL COST OF CAPITAL

A company finances its projects by different sources, although the specific cost of each source of finance is different. Some are cheaper and some are dearer. There are two objectives of this policy – firstly, to balance the capital structure, and secondly to increase the return of equity shareholders. These objectives can be achieved only when firm's average cost of financing is lower than its return on investment. This requires the computation of overall or average cost of capital. Overall cost of capital may be defined as the average cost of the specific costs of different sources of financing. This is used as acceptance/ rejection criterion in capital expenditure decisions.

The average can be a simple average or weighted average. However, weighted average is more reasonable and appropriate as it gives due emphasis to different sources of capital in the capital structure of a firm.

Computation of Weighted Average Cost of Capital

It involves the following four steps:

- 1) The computation of specific costs of various sources. It has already been explained in the preceding pages in this chapter.
- 2) Assignment of weights to each type of funds.
- 3) Each specific cost is multiplied by the corresponding weight and in this way weighted cost of each source is determined.
- 4) Finally, weighted cost of all sources of capital as calculated in (3) are added together to get an overall weighted average cost of capital.

Assignment of Weights

This involves the determination of share of each source of capital in the total capital structure of the company. There are three approaches of assigning weights:

i) Historical Weights Approach:

According to this approach, the relative proportions of various sources of capital to the existing capital structure are used to assign weights. The assumption of this approach is that the company's present capital structure is optimum and it will raise additional funds from various sources in proportion to their share in the existing capital structure.

Historical weights can be given on the basis of face or book value of securities or on the basis of their market value.

a) Book Value Weights:

This is most convenient to be used. In this method proportion of each source in total capital structure is determined on the basis of the book value of securities.

Illustration 14:

The capital structure of a company and its specific costs are given below. Find out simple and the weighted average cost of capital of the company.

Source	Amount	Specific Cost (after tax)
Long-term Debts	Rs. 15,00,000	4%
Preference Shares	10,00,000	12%

Equity Shares	20,00,000	15%
Retained Earnings	<u>5,00,000</u>	15%
		<u>50,00,000</u>

Solution:

Calculation of Average Cost of Capital (using historical weights)

Source of Capital	Amount Rs.	Book-Value Weighted		Specific Cost Rate	Weighted Costs
		Percentage	Proportion		
Long-term Debts	15,00,000	30%	0.30	4%	1.20
Preference Shares	10,00,000	20%	0.20	12%	2.40
Equity Shares	20,00,000	40%	0.40	15%	6.00
Retained Earnings	<u>5,00,000</u>	<u>10%</u>	<u>0.10</u>	<u>15%</u>	<u>1.50</u>
Total	50,00,000	100%	1.00	46%	11.10

Thus, weighted average cost of capital is 11.10% while simple average of cost of capital = $46\% / 4 = 11.50\%$.

b) Market Value Weights:

In this method, market value of invested capital funds of each type of security is calculated on the basis of their prevailing market values and proportion of each type of security to the total of market values of all securities is used as weight. This is theoretically more sound and appealing approach since market values of the securities closely approximate the actual rupees to be received from their sale. However, it is more difficult to calculate the market values of a firm's sources of equity financing (i.e., preference shares, equity shares and retained earning) than to use book values.

Illustration-15

In illustration no.14, assume market value of preference shares at 150% equity shares and retained earnings at 160% and debentures at par, calculate average cost of capital.

Solution:

Source of Capital	Market Value	Market Value Weights		Specific Costs	Weighted Costs
		Percentage	Proportion		
Long-term Debts	15,00,000	21.4	.214	4	0.856
Preference Shares	15,00,000	21.4	.214	12	2.568
Equity Shares	32,00,000	45.7	.457	15	6.855
Retained Earnings	<u>8,00,000</u>	<u>11.5</u>	<u>.115</u>	<u>15</u>	<u>1.725</u>
Total	70,00,000	100.0	1.000	46	12.004

Thus, weighted average cost of capital is 12%.

ii) Target Weights Approach:

If a firm has determined the capital structure which it believes most consistent with its goal of owner's wealth maximization and it is directing its financing policies toward achievement of this "optimal" capital structure, then the use of these target capital structure weights may be appropriate.

Illustration-16

If illustration no.14, the firm believed that its optimal capital structure is consisting of 40% debt, 10% preference shares, 35% equity shares and 15% retained earnings, calculate weighted average cost of capital using target weights.

Solution:

Calculation of Weighted Average Cost of Capital (Using Target Weights)

Source	Target Proportions		Specific Cost	Weighted Cost
Long-term Debts	40%	.40	4%	1.60
Preference Shares	10%	.10	12%	1.20
Equity Shares	35%	.35	15%	5.25
Retained Earnings	15%	.15	15%	2.25
Total	100%		1.00	10.30%

iii) Marginal Weights Approach:

According to this approach, specific costs are assigned weights in proportion of funds to be raised from each source to the total funds to be raised. This approach presumes that new project is to be financed wholly by raising fresh capital.

Illustration-17:

A company's cost of capital for specific sources is as under:

Cost of Debentures	5%
Cost of Preference Shares	10%
Cost of Equity Shares	14%
Cost of Retained Earnings	13%

The company wishes to raise Rs. 5,00,000 for the expansion of its plant. It is estimated that Rs. 1,00,000 will be available as retained earnings and the balance of the additional funds will be raised as under:

Debenture issue	Rs. 3,00,000
Preference share issue	Rs. 1,00,000

Using marginal weights, calculate weighted average cost of capital.

Solution:**Calculation of Weighted Average Cost**

Source	Amount	Weights	Specific	Weighted Average
	Rs.		Cost %	Cost %
1. Retained Earnings	1,00,000	.2	13	2.6
2. Debentures	3,00,000	.6	5	3.0
3. Preference Shares	1,00,000	.2	10	2.0
Total	5,00,000	1.0		7.6

Illustration-18:

The capital structure of SK Ltd. is as under:

3,000	12% Debentures of Rs. 100 each	Rs. 3,00,000
2,000	10% Preference shares of Rs. 100 each	2,00,000
4,000	Equity Shares of Rs. 100 each	4,00,000
	Retained Earnings	1,00,000

The earning per share of the company in the past many years have been Rs. 15. The shares of the company are sold in the market at book value. The company tax rate is 50%. The shareholder's tax liability may be assumed as 25%. Find out the Weighted Average Cost of Capital.

Solution:

$$(1) \text{ Cost of Debentures (after- tax)} = \frac{i(1-t)}{NP} \times 100 = \frac{12(1-.05)}{100} \times 100 = 6\%$$

$$(2) \text{ Cost of Preference Share Capital (after- tax)} = \frac{PD}{NP} \times 100 = \frac{10}{100} \times 100 = 10\%$$

$$(3) \text{ Cost of Equity Share Capital (after - tax)} = \frac{EPS}{MP} \times 100 = \frac{15}{125} \times 100 = 12\%$$

$$(4) \text{ Cost of Retained Earnings (after - tax)} = \frac{DPS(1-t_e)}{MP(1-t_e)} \times 100$$

$$= \frac{15(1-.25)}{125(1-0)} \times 100 = \frac{11.25}{125} \times 100 = 9\%$$

Workings:

$$\text{Market Price Per Share} = \frac{4,00,000+1,00,000}{4,000} = \text{Rs.125}$$

In the absence of any information to the contrary, it has been assumed that company's pay-out ratio is 100% and so dividend per share and earnings per share are equal in this company.

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Specific	Weighted Average
	Rs.		Cost %	Cost %
Debentures	3,00,000	.3	6	1.8
Preference Shares	2,00,000	.2	10	2.0
Equity Shares	4,00,000	.4	12	4.8
Retained Earnings	1,00,000	.1	9	0.9
Total	10,00,000	1.0		9.5

Illustration-19:

The capital structure of A Ltd. is as follows:

20,000 Equity shares of Rs. 100 each	Rs. 20,00,000
10% Preference shares of Rs. 100 each	5,00,000
12% Rs. 100 Debentures	15,00,000

The market price of equity shares is Rs. 160.

It is expected that the company will pay a current dividend of Rs. 20 share which will grow at 7.5% for ever. The tax rate may be assumed to be 50%. You are required to calculate:

- Weighted average cost of capital based on existing capital structure.
- The new weighted cost of capital if the company raises an additional Rs. 10,00,000 debt by issuing 14% Debentures. This would result in increasing the dividend rate to Rs. 25 per share and leave the growth rate unchanged but the price of share will fall to Rs. 150 per share.
- The weighted cost of capital if in (b) above, the growth rate rises to 10%.

Solution:

$$(1) \text{ Cost of Equity Share Capital} = C_e = \left(\frac{\text{DPS}}{\text{MP}} \times 100 \right) + g = \frac{20}{160} \times 100 + 7.5 = 20\%$$

$$(2) \text{ Cost of Preference Share Capital} = \frac{\text{PD}}{\text{NP}} \times 100 = \frac{10}{100} \times 100 = 10\%$$

$$(3) \text{ Cost of Debentures (after tax)} = \left(\frac{I(1-t)}{\text{NP}} \times 100 \right) = \left(\frac{12(1-.5)}{100} \times 100 \right) = 6\%$$

Case (a)**Calculation of Weighted Average Cost of Capital**

Source	Amount	Weights	Specific	Weighted Average
	Rs.		Cost %	Cost %
1. Equity Shares	20,00,000	.500	20	10.00
2. Preference Shares	5,00,000	.125	10	1.25
3. Debentures	15,00,000	.375	6	2.25
	40,00,000			13.50

Case (b)

Due to raising additional funds, cost of equity shares and debentures will change as follows:

$$\text{Cost of Equity Share Capital} = \frac{25}{150} \times 100 + 7.35 = 24.75\%$$

$$\text{Cost of New Debentures} = \frac{14(1-0.50)}{100} \times 100 = 7\%$$

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Specific	Weighted Average
	Rs.		Cost %	Cost %
1. Equity Shares	20,00,000	.4	24.17	9.668
2. Preference Shares	5,00,000	.1	10.00	1.000
3. 12 % Debentures	15,00,000	.3	6.00	1.800
4. 14% Debentures	10,00,000	.2	7.00	1.400
	50,00,000			13.868

Case (c)

In this case, the cost of equity shares will change as follows:

$$\text{Cost of Equity Share} = \frac{25}{150} \times 100 + 10\% = 26.67\%$$

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Specific	Weighted Average
	Rs.		Cost %	Cost %
1. Equity Shares	20,00,000	.4	26.67	10.668

2. Preference Shares	5,00,000	.1	10.00	1.000
3. 12% Debentures	15,00,000	.3	6.00	1.800
4. 14% Debentures	10,00,000	.2	7.00	1.400
	50,00,000			14.868

Marginal Cost of Capital (MCC)

MCC can be defined as the cost of additional capital introduced in the capital structure since we have assumed that the capital structure can vary according to changing requirements of the firm.

The following illustration shows how marginal cost of capital can be calculated:

Let us assume that the capital structure of the firm has been expanded by addition to various components. The addition has been Rs. 2,000 lacs for debt, Rs. 1,000 lacs for preference capital, Rs. 2,000 lacs for equity capital and Rs. 6,000 lacs for retained earnings. The cost of each component of the capital structure after addition would be the weighted average of the old and new values of the component:

(Rs. in lakhs)

Component	Existing Value	Cost(%)	Additional Value	Cost(%)	Weighted average Cost (%)
Debt	4,000	14	2,000	16	14.6
Preference Capital	1,000	9	1,000	12	10.5
Equity Capital	1,000	15	2,000	20	18.34
Retained Earnings	4,000	18	6,000	18	18.00

Having calculated the weighted cost of each component, we calculate the weighted average cost of the entire capital structure now:

Component	Weight (%)	Cost (%)	Weighted cost
Debt	28.57	14.6	$14.6 \times 0.29 = 4.23$
Preference capital	9.52	10.5	$10.5 \times 0.0952 = 1.00$
Equity capital	14.28	18.34	$18.34 \times 0.1428 = 2.62$
Retained earnings	47.62	18	$18 \times 0.4762 = 8.57$
Total	WACC = $4.23 + 1.00 + 2.62 + 8.57 = 16.42\%$		

Marginal cost of addition is $16.42 - 15.2 = 1.22\%$. The return on investment has to be more than the revised weighted average cost of capital in order to ensure that the investors stay invested.

CASE STUDIES

Question 1 - The capital structure of a firm consists of equity of Rs. 80 lakhs; 10% preference shares 20 lakhs and 14% debentures of Rs. 60 lakhs. At present its equity share is selling for Rs. 25. It is expected that the company will pay a dividend of Rs. 2. It has been growing @ 7% p.a. If the company is subject to 50% tax rate, determine its weighted average cost of capital.

Solution:-

Cost of Debt (after tax)

$$K_d = 14 (1 - .5) = 7\%$$

Cost of Equity Share Capital

$$\begin{aligned} K_e &= \text{DPS/MP} + g \\ &= \text{Rs. } 2/\text{Rs. } 25 + 0.7 \\ &= .08 + .07 = 15\% \end{aligned}$$

Calculation of Weighted Average Cost of Capital (WACC)

Source	Amount Rs.	Weight	Specific cost of capital	Weight x Cost of capital
Equity Share Capital	80,000	.500	.15	.07500
10% Pref. Share Capital	20,00,000	.125	.10	.01250
14% Debentures	60,00,000	.375	.07	.01625
	1,60,000			.11375

Question 2 - Calculate weighted average cost of capital from the following information:

4,000 Equity Shares (fully paid up)	4, 00,000
3,000 6% Debentures	3, 00,000
2,000 6% Preference Shares	2, 00,000
Retained Earnings	1, 00,000

Earning per equity share has been Rs. 10 during the past year and equity shares are being sold in the market at par. Assume corporate tax at 50 per cent and shareholders' personal tax liability 10%.

Solution: -

(A) Specific Cost of Various Components of Capital

i) Cost of Equity share Capital

$$K_e (\text{after tax}) = \text{EPS/MP} \times 100 = 10/100 \times 100 = 10\%$$

ii) Cost of Retained Earnings

$$K_r (\text{after tax}) = E(1 - t_p) / \text{MP} \times 100 = 10 \times (1 - .10) / 100 \times 100 = 9\%$$

iii) Cost of Preference share Capital

$$K_p (\text{after tax}) = \text{DPS} / \text{NP} \times 100 = 6/100 \times 100 = 6\%$$

iv) Cost of Debentures

$$\begin{aligned} K_d (\text{after tax}) &= R \times 100 (1 - t) / \text{NP} = 6 \times 100(1 - .50) / 100 \\ &= 6 \times .50 = 3\% \end{aligned}$$

(B) Computation of Weighted Average Cost of Capital

Source (1)	Amount Rs. (2)	Weight (3)	Cost of Capital (4)	Weighted Average Cost (5) = (3) x (4)
Equity Share Capital	4,00,000	.4	.10	.040
Debentures	3,00,000	.3	.03	.009
Pref. Share Capital	2,00,000	.2	.06	.012
Retained Earnings	1,00,000	.1	.09	.009
Weighted Average Cost of Capital				.070 or 7 %

Question 3- The Capital structure of Vandana Ltd. is as under:

	Rs.
2,000 6% Debentures of Rs. 100 each (first issue)	2, 00,000
1,000 7% Debentures of Rs. 100 each (second issue)	1, 00,000
2,000 8% Cumulative Preference Shares of Rs. 100 each	2, 00,000
4,000 Equity Shares of Rs. 100 each	4, 00,000
Retained Earnings	1, 00,000

The earnings per share of the company in the past many years has been Rs. 15. The shares of the company are sold in the market at book value. The company's tax rate is 50% and shareholders' personal tax liability is 10%. Find out the weighted average cost of capital.

Solution: -

i) Cost of Equity Capital

$$K_e (\text{after tax}) = \text{EPS} / \text{MP} \times 100 = 15/125 \times 100 = 12\%$$

$$\text{MP} = (\text{Rs. } 4, 00,000 + \text{Rs. } 1, 00,000) / 4,000 = \text{Rs. } 125$$

ii) Cost of Debentures (first issue)

$$\begin{aligned} K_d (\text{after tax}) &= R / \text{NP} \times 100(1-t) \\ &= 6 / 100 \times 100(1 - .50) \\ &= 6 \times .50 = 3\% \end{aligned}$$

iii) Cost of Debentures (second issue)

$$\begin{aligned} K_d (\text{after tax}) &= R / \text{NP} \times 100(1 - t) \\ &= 7/100 \times 100(1 - .50) = 6 \times .50 = 3.5\% \end{aligned}$$

iv) Cost of Preference Share Capital

$$\begin{aligned} K_p (\text{after tax}) &= \text{DPS} / \text{NP} \times 100 \\ &= 8/100 \times 100 = 8\% \end{aligned}$$

v) Cost of Retained Earnings

$$K_r (\text{after tax}) = E (1-t_p) / \text{MP} \times 100$$

$$= 15 \times (1 - .10) / 100 \times 100$$

$$= 10.8\%$$

Weighted Average Cost

Source (1)	Amount Rs. (2)	Weight (3)	Cost of Capital (4)	Weighted Average Cost (5) = (3) x (4)
Equity Share Capital	4,00,000	.4	.12	.0480
Debentures(first issue)	2,00,000	.2	.03	.0060
Debentures (second issue)	1,00,000	.1	.035	.0035
Pref. Share Capital	2,00,000	.2	.08	.0160
Retained Earnings	1,00,000	.1	.108	.0108
Weighted Average Cost of Capital				.0843 or 8.43 %

Question 4 - A company has obtained capital from the following sources, the specific costs are also noted down against them:

Source of Capital	Book Value Rs.	Market Value Rs.	Cost of Capital
Debentures	4,00,000	3,80,000	5%
Preference Shares	1,00,000	1,10,000	8%
Equity Shares	6,00,000	12,00,000	13%
Retained Earnings	2,00,000	--	9%

You are required to calculate weighted average cost of capital using (i) book value weights, and (ii) market value weights.

Solution

Weighted Average Cost

(Book Value Weights)

Source (1)	Amount Rs. (2)	Weight (3)	Cost of Capital (%) (4)	Weighted Average Cost (5) = (3) x (4)
Debentures	4,00,000	.308	5	1.540
Preference Share	1,00,000	.007	8	0.616
Equity Shares	6,00,000	.461	13	5.993
Retained Earnings	2,00,000	.154	9	1.386
Total	13,00,000	1.000		9.535

**Weighted Average Cost
(Market Value Weights)**

Source (1)	Amount Rs. (2)	Weight (3)	Cost of Capital (%) (4)	Weighted Average Cost (5) = (3) x (4)
Debentures	3,80,000	.225	5	1.125
Preference Share	1,10,000	.065	8	0.520
Equity Shares	9,00,000	.533	13	6.929
Retained Earnings	3,00,000	.177	9	1.593
Total	13,00,000	1.000		10.167

Working Note: - The Market value of equity share capital and retained earnings has been ascertained as follows:

Market Value of Retained Earnings = $(12,00,000 \times 2,00,000) / 8,00,000 = \text{Rs. } 3,00,000$

Market Value of Equity Share = $(12,00,000 \times 6,00,000) / 8,00,000 = \text{Rs. } 9,00,000$

LESSON ROUND-UP

- The cost of capital is a term used in the field of financial investment to refer to the cost of a company's funds (both debt and equity), or, from an investor's point of view "the shareholder's required return on a portfolio company's existing securities"
- Cost of capital is used to evaluate new projects of a company and it is the minimum return that investors expect for providing capital to the company.
- For an investment to be worthwhile, the expected return on capital must be greater than the cost of capital. The cost of capital is the rate of return that capital could be expected to earn in an alternative investment of equivalent risk.
- There are four main factors which mainly determine the cost of Capital of a firm. General economic conditions, the marketability of the firm's securities (market conditions), operating and financing conditions within the company, and the amount of financing needed for new investments.
- There are factors affecting cost of capital that the company has control over and includes Capital Structure Policy, Dividend Policy, Investment Policy etc.
- There are some factors affecting cost of capital that these factors includes Level of Interest Rates, Tax Rates etc.
- The weighted average cost of capital (WACC), as the name implies, is the weighted average of the costs of different components of the capital structure of a firm. WACC is calculated after assigning different weights to the components according to the proportion of that component in the capital structure.
- Marginal Cost of Capital (MCC) can be defined as the cost of additional capital introduced in the capital

GLOSSARY

Component Cost and Composite Cost: Component cost refers to the cost of individual components of capital viz., equity shares, preference shares, debentures and so on. Composite cost of capital refers to the combined or weighted average cost of capital of the various individual components. For capital budgeting decisions, it is the composite cost of capital which is considered.

Average Cost and Marginal Cost: The average cost refers to the weighted average cost of capital. Marginal cost refers to the incremental cost attached with new funds raised by the company.

Explicit Cost and Implicit Cost: Explicit cost is the one which is attached with the source of capital explicit or apparently. Implicit cost is the hidden cost which is not incurred directly. E.g. In case of the debt capital, the interest which the company is required to pay on the same is explicit cost of capital.

Risk-free Interest Rate: The risk free interest rate is the interest rate on the risk free and default-free securities. For example, the securities issued by the Government of India are taken as risk free and default free in respect of payment of periodic interest as well as principal repayment on maturity.

Real Interest Rate: The real interest rate is the interest rate payable to the lender for supplying the funds or in other words, for surrendering the funds for a particular period.

Business Risk: Another factor affecting the cost of capital is the risk associated with the firm's promise to pay interest and dividends to its investors. The business risk is related to the response of the firm's Earnings before Interest and Taxes, EBIT, to change in sales revenue. Every project has its effect on the business risk of the firm. If a firm accepts a proposal which is more risky than average present risk, the investor will probably raise the cost of funds so as to be compensated for the increased risk.

Financial Risk: The financial risk is an other type of risk which can affect the cost of capital of the firm. The particular composition and mixing of different sources of finance, known as the financial plan or the capital structure, can affect the return available to the investors. The financial risk is often defined as the likelihood that the firm would not be able to meet its fixed financial charges. It is related to the response of the firm's earning per share to a variation in EBIT.

TEST YOURSELF

OBJECTIVE TYPE QUESTIONS

TRUE / FALSE

- | | |
|---|--------------|
| 1. The minimum rate of return, which a company should get on its investment, is known as cost of capital. | True |
| 2. Retained earning is free of cost. | False |
| 3. In the Weighted Average cost of capital the weights are assigned randomly. | False |
| 4. Debt is cheaper than Equity. | True |
| 5. All sources of capital have the same cost. | False |
| 6. Book value and Market value cannot be same. | False |
| 7. Both NI and NOI approach are contributed by Durand. | True |

- | | |
|---|--------------|
| 8. Capital structure is the mix of Equity and Preference share capital. | False |
| 9. Increased use of debt increases the financial risk of equity shareholders. | True |
| 10. High capital on gearing and Trading on equity both are same. | True |

MULTIPLE CHOICE QUESTIONS

1. When Debt capital exceeds owned capital, it is:

- | | |
|------------------------|-------------------------|
| A) Low capital gearing | B) High capital gearing |
| C) Over capitalization | D) Under capitalization |

ANS- B

2. Capital structure technique does not include:

- | | |
|--------------------|----------------------|
| A) Cost of capital | B) Capital Budgeting |
| C) Capital gearing | D) Trading on equity |

ANS- B

3. Which of the following is not a source of long term finance?

- | | |
|-----------------|---------------------|
| A) Equity share | B) Preference share |
| C) Debenture | D) Cash credit |

ANS- D

4. The maximum period of Redeemable Debenture is:

- | | |
|-------------|-------------|
| A) 5 Years | B) 10 Years |
| C) 15 Years | D) 20 Years |

ANS- D

5. Cost of capital depends upon:

- | | |
|----------------------|----------------------|
| A) Source of capital | B) Volume of capital |
| C) Time for capital | D) All of the above |

ANS- B

6. Which of the following statement is true?

- A) The cost of retained earning is always less than the cost of external equity.
- B) The cost of retained earning is lower than the cost of external equity in the presence of floatation costs.
- C) The cost of external equity is always less than the cost of retained earnings.
- D) None of the above

ANS- B

7. A ltd. Issued 1,000 10% Preference shares of Rs. 100 each at 2% discount. Cost of issue is Rs. 2 per share. Cost of preference capital is:

- | | |
|-----------|-----------|
| A) 10% | B) 10.64% |
| C) 10.56% | D) 9.9% |

ANS- B

ESSAY TYPE QUESTIONS

1. Explain the concept of cost of capital as a device for establishing a cutoff point of capital investment proposals. Explain its relevance in corporate investment and financing decisions.
2. Explain the different types of cost of capital.
3. Define Weighted Average Cost of Capital and its implications.
4. "Retained earning is not a cost free source of capital", Explain. How is the cost of retained earnings determined?
5. How overall cost of capital is calculated? Explain various approaches for calculation of cost of equity.

PRACTICAL TYPE QUESTIONS

Question 1. SK company has issued 12% perpetual debt for Rs. 5,00,000. The company is in tax bracket of 35%. Find after tax cost of debt if the debt is issued:

- (1) At par
- (2) At a discount of 10%
- (3) at a premium of 10%.

Answer: (1) 7.8%, (2) 8.6%, (3) 7%

Question 2. A Co. issues Rs. 2,00,000 10% redeemable debentures of Rs. 100 each at par. The cost of flotation is Rs. 5,000. The debentures are redeemable after 10 years. Find out before tax and after tax cost of debt capital assuming a tax rate of 50%.

Answer: 10.38% & 5.19%

Question 3. SK Co. Ltd. wishes to issue 1,000, 10% Debentures of Rs. 500 each for which the company will be required to incur the following expenses:

- (a) Underwriting commission 2%,
- (b) Brokerage 0.5%,
- (c) Printing and other expenses Rs.7,500.

Calculate cost of capital (before tax as well as after tax) assuming the debt is issued:

- (i) at 10% discount repayable after 10 years and
- (ii) at 10% premium repayable after 10 years.

The tax rate is 45%.

Answer: (i) 12.26%, 7.419% (ii) 9.13%, 4.757%

Question 4. SK Company issued 10,000 10% Debentures of Rs. 100 each at a discount of 5%. The cost of issue is 2%. These debentures are redeemable after 10 years at a premium of 3%. Assuming corporate tax rate at 50%, calculate before tax and after tax cost of debt capital.

Answer: Before tax cost = 11.224%, After tax cost = 6.122%

Question 5. SK Ltd. issued 5,000 12% debentures of Rs. 100 each at par, redeemable after 10 years at 10% premium. Cost of issue included administrative and other expenses Rs. 5,000 and commission 2%. Calculate cost of capital before and after tax (Tax Rate 40%).

Answer: Before tax rate 12.85%, After tax rate 8.21%

Question 6. AR Ltd. issued 10,000, 10% preference shares of Rs. 100 each. Cost of issue is Rs. 2 per share. Calculate cost of preference capital if these shares are issued:

(i) at par, (ii) at 10% premium and (iii) at 10% discount.

Answer: (i) 10.20% (ii) 9.26%, (iii) 11.36%

Question 7. AR Ltd. issued at par 4,000, 12% preference shares of Rs. 100 each. These shares are redeemable after 10 years at a premium of Rs. 5 per share. The cost of issue is Rs. 3 per share. Find out the after tax cost of preference share capital.

Answer: 12.67%

Question 8. SK Company Limited has issued, 10,000 8% preference shares of Rs. 200 each. Cost of issue is 5%. Calculate cost of capital before tax and after tax if these shares are issued: (a) 5% discount and (b) at 10% premium. Company tax rate is 50%.

Answer: (a) 17.78%, 8.89% (b) 15.24%, 7.62%

Question 9. SK Ltd. issued 20,000 equity shares of Rs. 10 each at a premium of Rs. 2 per share. The company has been paying a dividend of 20% on its equity shares. Market price of such shares is Rs. 16 per share. Tax rate is 40%. Calculate cost of capital before and after tax.

Answer: After tax 12.50%, Before tax 20.83%

Question 10. Calculate the cost of retained earnings from the following information obtained from SK Limited.

Current market price of a share	Rs. 140
Expected dividend per share	Rs. 14
Growth in expected dividends	5%
Brokerage per share	3% on market value
Tax rate on income distributed as dividends	30%

Answer: 10.185%

Question 11. The capital structure of a SK's firm is as follows:

Source	Amount Rs.	After Tax specific Cost Rate (%)
1. Debt	3,00,000	8
2. Preference Capital	2,00,000	14
3. Equity Capital	5,00,000	17

Calculate the weighted average cost of capital.

Answer: 13.7%

Question 12. The capital structure of SK Ltd. and after tax cost of capital of each source is as under:

<i>Source</i>	<i>Amount (Rs.)</i>	<i>Cost of Capital</i>
Equity Capital	4,00,000	12%
Preference Capital	3,00,000	10%
Debentures	2,00,000	6%
Retained ESKnings	1,00,000	8%

Find out the weighted average cost of capital.

Answer: 9.8%

Question 13. SK Company has on its books the following amounts and specific costs of each type of capital:

<i>Type of Capital</i>	<i>Book Value</i>	<i>Market Value</i>	<i>Specific Costs (%)</i>
Debt	8,00,000	7,60,000	5
Preference Capital	2,00,000	2,20,000	8
Equity Capital	12,00,000	18,00,000	15
Retained Earnings	4,00,000	6,00,000	13
	26,00,000	33,80,000	

Determine the weighted average cost of capital using (a) Book value weights and (b) Market value weights. How are they different? Can you think of a situation where the average cost of capital would be the same using either of the weights?

Answer: (a) 11.1% (b) 11.9%

Question 14. SK Company has after tax cost of capital for specific sources is as under:

Cost of Debentures	5%
Cost of Preference Shares	10%
Cost of Equity Shares	14%
Cost of Retained Earnings	13%

The company wishes to raise Rs. 5,00,000 for the expansion of its plant. It is estimated that Rs. 1,00,000 will be available as retained earnings and the balance of the additional funds will be raised as under:

Debenture issue	Rs. 3,00,000
Preference Shares issue	Rs. 1,00,000

Calculate Weighted Average Cost of Capital.

Answer: 7.6%

