



RANI CHANNAMMA UNIVERSITY

B.Com – 4th Semester

Financial Management

UNIT – 4: COST OF CAPITAL

Meaning and Definition:

The cost of capital is the minimum rate of return expected by its investors. It is the weighted average cost of various sources of finance used by a firm. The capital used by a firm may be in the form of debt, preference capital, retained earnings and equity shares.

A decision to invest in a particular project depends upon the cost of capital of the firm or the cut off rate which is the minimum rate of return expected by the investors. In case the firm is not able to achieve even the cut off rate, the market value of its shares will fall.

In fact, cost of capital is the minimum rate of return expected by its investors which will maintain the market value of shares at its present level. Hence, to achieve the objective of wealth maximisation, a firm must earn a rate of return more than its cost of capital. Further, optimal capital structure maximizes the value of the firm and hence the wealth of its owners and minimizes the firm's cost of capital. Cost of capital of a firm or the minimum rate of return expected by its investors has a direct relation with the risk involved in the firm. Generally, higher the risk involved in a firm, higher is the cost of capital.

Classification of Cost of Capital:

- a. Historical and Future
 - b. Specific and Composite Cost
 - c. Average and Marginal Cost
 - d. Explicit and Implicit
- a. Historical and Future Cost:** Historical cost refers to the existing cost structure of the firm. It refers to the cost the firm has to incur on existing capital structure, i.e. interest paid on debt and dividend on shares. Future Cost refers to the cost the firm has to incur in future. Firms can estimate future cost based on historical cost.
- b. Specific and Composite Cost:** Specific cost refers to cost to be incurred on specific source of fund. Eg. Cost of debt is fixed rate of interest and cost of equity is dividend payable on equity. Composite cost is total cost of capital. It is the combined cost of different source of funds. It is called as weighted average cost of capital (WACC) as it is calculated by assigning weights to each source of funds in total funds.
- c. Average and Marginal Cost:** Average cost is weighted average cost of capital. Such WACC is ascertained by assigning weights to each source of fund in total capital and multiplied by its specific cost. Marginal cost of capital is also weighted average cost of capital, but it refers to marginal increase or decrease in weighted cost due to change in capital structure. In other words marginal cost of capital refers to the average cost of capital which has to be incurred to obtain additional funds required by a firm.
- d. Explicit and Implicit Cost:** Explicit cost refers to the difference between inflow and outflow of cash on an investment proposal. A firm will have inflow of cash when funds are raised

through shares or debentures. Subsequently firm will have annual outflow as it has to pay interest or dividend at the end of each year.

Implicit Cost refers to the earning opportunities lost due to selection of particular portion. Retained earnings have no explicit cost, but have implicit or opportunity cost. That is if the surplus is paid to equity holders as dividend, he would reinvest it in other securities. On such re-investment he would have earned further income. Opportunity of earning such income is lost due to nonpayment of dividend and use of surplus by the company. Implicit cost of retained earnings is the income that is lost by equity holders on its re-investment.

Computation of Specific Cost of Capital:

Funds can be raised from different sources like debt, preference, equity and retained earnings. Cost to be incurred on each of these sources is calculated as follows:

A. Cost of Debt:

A company's debt is usually a mixture of loans, bonds and other securities. A company's Cost of Debt is the interest rate that a company pays on its debt. It is important to note that the interest a company pays is a tax deductible expense (exempt from tax.) Debts are of two types;

- a. Irredeemable debt and
- b. Redeemable debt.

a. Irredeemable Debt: Irredeemable does not mean it is not repayable. It's time of redemption is not fixed. They are also called perpetual debt. Cost of irredeemable debt can be calculated as below;

I. Cost of debt before tax:

$$K_d = \frac{I}{P}$$

II. Cost of debt after tax:

$$K_d = \frac{I}{P}(1 - T)$$

Where:

K_d = Cost of Debt

P = Par / Face value or Net proceeds raised on issue of debt

I = Interest Rate and T = Tax Rate

Example 1:

X company issues debentures of Rs. 100 at par carrying 10% interest. The tax rate applicable is 30%. Calculate cost of debt both before and after tax.

Cost of Debt (before tax)

$$K_d = \frac{I}{P} = \frac{10}{100} \times 100 = 10\%$$

Cost of Debt (after tax)

$$\begin{aligned} K_d &= \frac{I}{P}(1 - T) = \frac{10}{100} \times 100(1 - \frac{30}{100}) \\ &= 10(1 - 0.30) = 10(0.7) = 7\% \end{aligned}$$

Example 2:

X Company issues debentures of Rs. 100, carrying 10% interest. The tax rate applicable is 20%. Calculate the cost of debt if the debentures are issued

- a. At par
- b. At 10% premium
- c. At 10% discount.

Solution:

a. At par:

$$Kd = \frac{I}{P}(1-T)$$

$$= \frac{10}{100} \times 100 \left(1 - \frac{20}{100}\right)$$

$$= 10(1 - 0.20)$$

$$= 10(0.8) = 8\%$$

b. At 10% premium:

$$= Kd = \frac{I}{P}(1-T)$$

Where:

P = Net proceeds = Face Value + Premium = Rs. 100+ Rs. 10 = Rs. 110

I = Interest Rate = 10%

T = Tax Rate = 20%

$$= \frac{10}{110} \times 100 \left(1 - \frac{20}{100}\right)$$

$$= \frac{10}{110} \times 100(0.8)$$

$$= 7.27\%$$

c. At a discount of 10%

$$= Kd = \frac{I}{P}(1-T)$$

Where:

P = Net proceeds = Face Value - Discount = Rs. 100- Rs. 10 = Rs. 90

I = Interest Rate = 10%

T = Tax Rate = 20%

$$= \frac{10}{90} \times 100 \left(1 - \frac{20}{100}\right)$$

$$= \frac{10}{90} \times 100(0.8) = \mathbf{8.89\%}$$

b. Cost of Redeemable Debt:

In case of redeemable debt, redemption period is fixed in advance. Cost of redeemable debt considers redemption value along with other features like money borrowed, interest obligation etc. It is calculated by following equation.

Cost of Debt Before Tax:

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

Where:

Kdrb = Cost of debt before tax.

I = Interest, n = Period of debt,

NP = Net proceeds i.e., net amount raised from debt.

RV = Redemption value i.e., money payable on repayment.

Cost of Debt After Tax (Kdra) = Kdrb (1-t)

Example 1. X Co., issues 10% debentures of Rs. 100 each, redeemable after 10 years. Tax rate is 30%. Calculate Kdrb and Kdra.

Solution:

A. Cost of Debt Before Tax:

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

Where:

I = 10% on Rs. 100 = Rs. 10,

n = 10 years,

NP = Rs. 100, and RV = Rs. 100

RV = Redemption value i.e., money payable on repayment.

$$= \frac{10 + \frac{1}{10}(100 - 100)}{\frac{1}{2}(100 + 100)} = \frac{10 + 0.10(0)}{\frac{1}{2}(200)} = \frac{10}{100} = 0.1 \text{ or } 10\%$$

Kdrb = 10%

Cost of Debt After Tax (Kdra) = Kdrb (1-t):

$$\begin{aligned} Kdra &= 0.10(1-30\%) \\ &= 0.10 \times 0.70 \\ &= 0.07 \text{ or } 7\% \end{aligned}$$

Example 2:

10% Debentures of Rs. 100, issued @ 10% Premium. Issue expenses are 2%. Redeemable after 5 years.

Solution:

P = Rs. 100, n = 5 years

Interest = 10% of Rs. 100 = Rs. 10,

Issue expenses 2% on Rs. 100 = Rs. 2,

NP = Par value + Premium – Issue expenses,
= 100 + 10 – 2
= Rs. 108.

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

$$= \frac{10 + \frac{1}{5}(100 - 108)}{\frac{1}{2}(100 + 108)} = \frac{10 + 0.20(-8)}{\frac{1}{2}(208)} = \frac{10 - 1.6}{104} = \frac{8.4}{104} = 0.80 \text{ or } 8\%$$

$$\mathbf{Kdrb = 8\%}$$

B. Cost of Preference Share Capital:

Preference share capital carries fixed rate of dividend. It is fixed at the time of issue. Such rate of dividend becomes payable when firm makes adequate profits. Unlike debt capital it does not have benefit of tax exemption. Costs of preference shares are rate of dividend due on these shares. Preference shares are either redeemable or irredeemable.

I. Cost of Irredeemable Preference Shares:

Irredeemable preference share does not mean it is not payable, but period of redemption is not fixed. Cost on it is calculated by application of following equation.

$$K_p = \frac{D}{P} =$$

Where,

K_p = Cost of preference shares, D = Dividend payable,

P = Value of preference,

P can be par value or NP,

i.e., Net proceeds collected by issue or Market price (MP)

Example 1:

A firm issues 14% preference shares of Rs. 10 each. Calculate K_p.

$$K_p = \frac{D}{P}, \text{ (D = 14\% of Rs. 10 = Rs. 1.40) and P = Rs. 10.}$$

$$= \frac{1.4}{10} \times 100 = 14\%$$

$$\mathbf{K_p = 14\%}$$

Cost of Preference Shares Before Tax (Grossing up of Preference Dividend):

Unlike debt capital preference shares do not enjoy the privilege of tax. But tax liability of a company is paid before the payment of preference dividend. Dividend rate or dividend paid is calculated after tax. Grossing up of dividend means proportionate share of tax on preference dividend is added to preference dividend. This becomes preference dividend before tax.

It can be calculated by using following equation.

$$K_{pb} = \frac{PD}{(1-t)} \text{ (Kpb = cost of preference before tax)}$$

Example 2:

A firm issues 14% preference shares of Rs. 100 each. Tax rate applicable is 30%. Calculate K_p before and after tax.

Solution:

$$K_{pa} = \frac{D}{P}, \text{ (D is 14\% of Rs. 100 = Rs. 14) and P = Rs. 100.}$$

$$= \frac{14}{100} \times 100 = 14\% \text{ or Rs. 14 per share.}$$

$$K_{pb} = \frac{PD}{(1-t)} = \frac{14}{(1-t)} = \frac{14}{(1-30\%)} = \frac{14}{(1-0.3)} = \frac{14}{0.7} = 0.20 \text{ or } 20\%,$$

Example 3:

A firm issues 14% preference shares of Rs. 100 each, at a premium of Rs. 10 per share. Calculate Kp.

Solution:

$$K_p = \frac{D}{NP}, \text{ (D is 14\% of Rs. 100 = Rs. 14) and}$$

$$NP = \text{Par value} + \text{Premium} = \text{Rs. 100} + 10 = \text{Rs. 110.}$$

$$= \frac{14}{110} = 0.1272 \text{ or } 12.72\%.$$

Example 4:

A firm issues 12% preference shares of Rs. 100 each at a discount of 5%. Issue expenses are 1%, calculate Kpa.

Solution:

$$D = 12\% \text{ on Rs. 100} = \text{Rs. 12 per share.}$$

$$NP = \text{Par value} - (\text{Discount} + \text{issue expenses}) \\ = 100 - (5 + 1) = \text{Rs. 94.}$$

$$K_p = \frac{D}{NP} = \frac{12}{94} = 0.1277 \text{ or } 12.77\%.$$

II. Cost of Redeemable Preference Shares:

In this category of shares period of redemption is fixed at the time of issue. Kp considers dividend paid, amount raised and to be repaid. It is calculated by applying the following equation.

$$K_{pr} =$$

$$\frac{D + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)}$$

Where:

D = Dividend payable,

N = Life of preference shares,

NP = Money realized or raised on issue of preference shares,

RV = Money payable on redemption.

Example 1:

A Company issues 12% preference shares of Rs. 100 each at a discount of 10%. Issue expenses are 2%. These shares are redeemable after 5 years at a premium of 5%. Calculate Kp.

Solution:

$$D = 12\% \text{ of Rs. 100} = \text{Rs. 12 per share,}$$

$$n = 5 \text{ years}$$

$$NP = \text{Par value} - (\text{Discount} + \text{Issue expenses}) \\ = 100 - (10\% \text{ of Rs. 100} + 2\% \text{ of Rs. 100}) \\ = 100 - (10 + 2) = 100 - 12 \\ = \text{Rs. 88.}$$

$$RV = \text{Par value} + 5\% \text{ Premium}$$

$$= 100 + 5\% \text{ of Rs. } 100 = 100 + 5$$

$$= \text{Rs. } 105.$$

$$\text{Kpr} = \frac{D + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)}$$

$$= \frac{12 + \frac{1}{5}(105 - 88)}{\frac{1}{2}(105 + 88)} = \frac{12 + \frac{1}{5}(17)}{\frac{1}{2}(193)} = \frac{12 + \frac{17}{5}}{96.5} = \frac{12 + 3.4}{96.5} = \frac{15.4}{96.5} = 15.96\%$$

C. Cost of Equity Share Capital:

One school of thought is of the opinion that equity capital has no cost. This argument is based on the following points.

- There is no fixed rate of dividend.
- There is no obligation to pay dividend.
- Board of directors has the power to declare or not to declare the dividend.

Other school of thought is of the opinion that people invest in equity of a company with expectation of competitive rate of dividend. If such dividend is not declared, investor may shift his investment to the firms that pay dividend. To attract equity investment and hold them in a company, firms must be capable of paying expected competitive dividend.

"Cos of equity capital is the minimum rate of return that a firm must earn on the equity investment in order to leave unchanged the market price of shares".

Cost of equity is the dividend expected by the equity shareholders. Following are the methods of calculating cost of equity.

I. Dividend Yield Method:

Cost of equity can be calculated by applying the following equation.

$$K_e = \frac{D}{P}, \text{ Where, } D = \text{Dividend paid, } P = \text{MP or NP or P}$$

Example 1:

A firm issues equity shares of Rs. 100 each at a premium of 10%. Flotation cost amount to 1%. Company has been paying dividend of 10%. Calculate K_e .

$$K_e = \frac{D}{NP}, \text{ Where, } D = \text{Rs. } 10. \quad NP = 100 + (10 - 1) = \text{Rs. } 109.$$

$$= \frac{10}{109} = 0.0917 \text{ or } 9.17\%$$

Example 2: A firm has 10,000 equity shares of Rs. 100 each. It has been paying dividend at the rate of 15%. The present market price of equity is Rs. 175. Calculate K_e .

$$K_e = \frac{D}{MP} = \frac{15}{175} = 0.0857 \text{ or } 8.57\%$$

II. Dividend Yield Plus Growth Model:

Equity holders expect constant growth in their earnings. This growth method not only considers dividends payable, but also expected growth rate in dividend, K_e as per this method is calculated as follows.

Solution:

$$K_e = \frac{D}{P} + g$$

Where;

D = Dividend paid

P = MP or NP or P

g = Expected growth rate in dividend.

Example 1:

A firm issues 10,000 equity shares of Rs. 100 each at a premium of Rs. 50 per share. Flotation costs are 2%. Firm is paying dividend of 10%, and it is expected to grow @ 5% p.a.

Solution:

D = 10% of Rs. 100 = Rs. 10.

NP = Par value + premium – Flotation cost.

$$= 100 + 50 - 2 = \text{Rs. } 148.$$

$$\begin{aligned} K_e &= \frac{D}{NP} + g = \frac{10}{148} + 5\% = \frac{10}{148} + 0.05 \\ &= 0.0675 + 0.05 \\ &= 0.1175 \text{ or } 11.75\% \end{aligned}$$

Example 2:

A firm has issued equity shares of Rs. 100. It has paid dividend of Rs. 10 per share which is expected to grow annually at the rate of 10%. Current market price of the equity is Rs. 175. Calculate K_e .

Solution:

Where:

D = Rs. 10,

MP = Rs. 175,

g = 10% or 0.10,

$$K_e = \frac{D}{MP} + g = \frac{10}{175} + 10\% = 0.0571 + 0.10 = 0.1571 = \mathbf{15.71\%}$$

III. Earning Yield method:

This method is based on earnings available to equity shareholders. It is calculated by applying the following equation.

$$K_e = \frac{EPS}{MP}$$

Where:

$$EPS = \frac{NI}{\text{No. of equity shares}}$$

MP = Market value of shares

Example 1:

A firm's EBIT is Rs. 5,00,000. It has 10% debentures of Rs. 10,00,000 and 12% preference shares of Rs. 5,00,000. Firm has issued 10,000 equity shares of Rs. 100. Current market price of the shares is Rs. 160. Tax rate applicable to the firm is 30%. Calculate K_e using earning yield method.

Particulars	Rs.
EBIT	5,00,000
Less: Interest of Debentures (10% on 10,00,000)	1,00,000
EBT	4,00,000
Less: Tax @ 30%	1,20,000
EAT	2,80,000
Less: Dividend of Preference shares (12% on 5,00,000)	60,000
NET INCOME	2,20,000
EPS = NI / No. of equity shares	Rs. 22/share

$$EPS = \frac{\text{Net Income}}{\text{No. of equity shares}} = \frac{2,20,000}{10,000} = \text{Rs. 22 per share}$$

$$K_e = \frac{EPS}{MP} = \frac{22}{160} = 0.1375 \text{ or } 13.75\%$$

D. Cost of Retained Earnings (K_r)

Retained earnings refer to undistributed profits of a firm. Out of the total earnings, firms generally distribute only part of them in the form of dividends and the rest will be retained within the firms. Since no dividend is required to be paid on retained earnings, it is stated that 'retained earnings carry no cost'. But this approach is not appropriate. Retained earnings has the opportunity cost of dividends in alternative investment becomes cost if retained earnings. Hence, shareholders expect a return on retained earnings at least equity.

$$K_r = K_e (1-t) (1-b)$$

Example 1:

A firm has 10,000 equity shares of Rs. 100. The present market price of equity is Rs. 165. Firm is paying dividend of 10% and expected to growth rate is 10%. Calculate K_e and also K_r , if tax payable by investors is 40% and brokerage charges are 2%.

Solution:

$$K_r = K_e (1-t) (1-b)$$

$$K_e = \frac{D}{MP} + g = \frac{10}{165} + 10\% = 0.0606 + 0.10 = 0.1606 \text{ or } 16.06\%$$

$$\begin{aligned} K_r &= K_e (1-t) (1-b) \\ &= 0.1606 (1-0.4) (1-0.02) \\ &= 0.1606 (0.6) (0.98) \\ &= 0.094 \text{ or } 9.4\% \end{aligned}$$

$$K_r = 9.4\%$$

OVERALL COST OF CAPITAL:

Overall cost of capital is the combined cost of capital of different sources i.e., debt, preference shares and owners equity. It is also called as Weighted Average of Capital (WACC). WACC is calculated by assigning the weights to each specific source. WACC can be calculated by using

- Book value as weight
- Market value as weight.

a. Book Value as Weight:

Following is the capital structure of a firm.

10% Debentures	-	Rs. 10,00,000
14% Preference shares		Rs. 5,00,000
Reserves	-	Rs. 2,00,000
3000 Eq. Shares of Rs. 100		Rs. 3,00,000

Cost of equity capital is expected to be 15%. Calculate WACC using Balance sheet or Book value method.

Solution:

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	3,00,000	$3/20 = 0.15$	0.15	0.0225
Reserves	2,00,000	$2/20 = 0.10$	0.15	0.0150
Pref.Sh.Cap.	5,00,000	$5/20 = 0.25$	0.14	0.0350
Debentures	10,00,000	$10/20 = 0.50$	0.10	0.0500
	20,00,000	= 1.00	--	0.1225

University Question Papers

Questions carrying 2 marks

- What is weighted average cost of capital? **(2007) ,(2013)**
- Popular company Ltd. Issued 5000, 8% Debentures of Rs.100 each at a premium of 10%. The flotation cost is 2%. The rate of tax applicable to the company is 30%. Compute cost of debt capital. **(2007)**
- Give the formula to calculate cost of Redeemable Preference Shares.**(2008)**
- Vasant Ltd. Issues 12% debentures of Rs. 100 each at Rs. 120. The Company is in 40% tax bracket, Calculate cost of debt.**(2008).**
- Write the formula to calculate cost of Redeemable Preference shares in expanded form.**(2008)**
- What is cost of capital? **(2009). (2011)**
- Calculate Kd from the following:
10% Debentures of Rs. 6, 00,000 issued at par.
Tax slab 50% **(2009)**
- What do you mean by specific cost of capital?**(2010).**
- Bharatesh Ltd. issues 12% debentures of Rs. 5,00,000 at a discount of 10%. Calculate cost of debt (Kd) assuming company is in 50% tax bracket. **(2010).**
- Calculate Kd from the following:
10% Debentures of Rs. 9, 00,000
Issue price at 10% premium
The company is in 50% tax bracket. **(2011)**

11. Ashok Company Ltd., issues 12% debentures, tax rate is 50%. Calculate the cost of debentures. **.(2013).**
12. A company issues 20000, 10% preference shares of Rs. 100 each. Cost of issue is Rs. 2 per share. Calculate cost of preference share capital, if these share issued at par. **(2014) and (2017)**
13. New Life Ltd., issues 90,000, 9% debentures at a discount of 5%. The tax rate applicable to the company is 30%. Calculate the cost of debt. **(2015)**

Questions carrying 5 marks

1. Compute the Weighted Average Cost of Capital of BEEKAY Ltd. From the following information: **(KUD Nov. 2009)**

Source	Amount (Rs.)	Cost After Tax
Equity Share Capital	5,00,000	16%
Reserves and Surplus	2,00,000	12%
Preference Share Capital	1,00,000	11%
Debentures	2,00,000	5%

Solution:

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	5,00,000	0.5	0.16	0.080
Reserves & Surplus	2,00,000	0.2	0.12	0.024
Pref.Sh.Cap.	1,00,000	0.1	0.11	0.011
Debentures	2,00,000	0.2	0.05	0.010
	10,00,000	= 1.00	--	0.125

2. Calculate Weighted Average Cost of Capital of Paras Ltd. from the following. **(2010)**

Source	Amount (Rs.)	Pre-tax cost.
Equity Share Capital	4,50,000	14%
Preference Share Capital	1,00,000	8%
Debentures	3,00,000	14%
Retained Earnings	1,50,000	14%

The tax rate applicable to the company is 50%

Solution:

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	4,50,000	0.45	0.14	0.063
Pref.Sh.Cap.	1,00,000	0.10	0.08	0.008
Debentures	3,00,000	0.30	0.07	0.021
Retained earnings	1,50,000	0.15	0.14	0.021
	10,00,000	= 1.00	--	0.113

$$\text{Cost of Debentures } K_{da} = \frac{I}{P}(1-T) = \frac{14}{100}\left(1 - \frac{50}{100}\right) = 0.14(0.5) = 0.07\%$$

3. X Ltd. issued 20,000, 10% preference shares of Rs. 100 each. The issue cost is 2%. Find out the cost of preference share capital, if
- Issued at par.
 - Issued at premium of 10%
 - Issued at discount of 5% **(2011). And (2016)**

Solution:**Calculation of cost of preference share:****a. If shares are issued at par:**

$$D = 10\% \text{ of Rs. } 100 = \text{Rs. } 10$$

$$P = \text{Rs. } 100 - 2\% \text{ issue cost, } (100 - 2) = \text{Rs. } 98$$

$$K_p = \frac{D}{P} = \frac{10}{98} = 0.1020 \text{ or } \mathbf{10.20\%}$$

b. If shares are issued at a premium of 10%:

$$D = 10\% \text{ of Rs. } 100 = \text{Rs. } 10$$

$$\begin{aligned} P &= \text{Rs. } 100 + (\text{premium } 10\% \text{ of Rs. } 100 - \text{issue cost } 2\% \text{ of Rs. } 100) \\ &= \text{Rs. } 100 + (10 - 2) \\ &= \text{Rs. } 108 \end{aligned}$$

$$K_p = \frac{D}{P} = \frac{10}{108} = 0.926 \text{ or } \mathbf{9.26\%}$$

c. If shares are issued at discount of 5%:

$$D = 10\% \text{ of Rs. } 100 = \text{Rs. } 10$$

$$\begin{aligned} P &= \text{Rs. } 100 - (\text{discount } 5\% + \text{issue cost } 2\%) \\ &= \text{Rs. } 100 - 7 \\ &= \text{Rs. } 93 \end{aligned}$$

$$K_p = \frac{D}{P} = \frac{10}{93} = 0.1075 \text{ or } \mathbf{10.75\%}$$

4. Apex Co. Ltd. has the following capital structure. **(2012)**

Particulars	Amount (Rs.)	Percentage of Cost.
Equity Share Capital	1,20,000	18%
Preference Share Capital	20,000	15%
Debentures	40,000	14%

Calculate Weighted Average Cost of Capital.

Solution:**Calculation of Weighted Average Cost of Capital**

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	1,20,000	0.6667	0.18	0.120
Pref.Sh.Cap.	20,000	0.1111	0.15	0.167
Debentures	40,000	0.2222	0.14	0.311
	1,80,000	= 1.00	--	0.598

5. RCU APRIL/MAY 2014, Q. NO. 6**Calculation of Weighted Average Cost of Capital**

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	2,00,000	0.2857	0.10	0.0286
Reserves	2,00,000	0.2857	0.10	0.0286
Debentures	1,00,000	0.1429	0.15	0.0214
Preference share capital	2,00,000	0.2857	0.14	0.0399
	7,00,000	= 1.00	--	0.1185

6. RCU. APRIL/MAY 2017 -5 Marks**Solution:****Calculation of Weighted Average Cost of Capital**

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	4,00,000	0.32	0.15	0.0480
Pref.Sh.Cap.	1,00,000	0.08	0.12	0.0096
Debentures	6,00,000	0.48	0.06	0.0288
Retained earnings	1,50,000	0.12	0.12	0.0144
	12,50,000	= 1.00	--	0.1008

7. RCU. APRIL/MAY 2008 – 5 Marks

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	15,00,000	0.5	0.20	0.100
Pref.Sh.Cap.	6,00,000	0.2	0.15	0.030
Retained Earnings	3,00,000	0.1	0.10	0.010
Long-term debt	6,00,000	0.2	0.10	0.020
	30,00,000	= 1.00	--	0.160

8. RCU. APRIL/MAY 2018 – 5 Marks:

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	2,40,000	0.67	0.18	0.1206
Pref.Sh.Cap.	40,000	0.11	0.15	0.0165
Debentures	80,000	0.22	0.14	0.0308
	3,60,000	= 1.00	--	0.1679

Questions carrying 15 marks**B. Com. V Sem. KUD. November, 2008 (15 Marks)**

1. a. The current market price of the shares of A Ltd. is Rs. 95. The flotation costs are Rs. 5 per share. Dividend per share amounts to Rs. 4.50 and is expected to grow at a rate of 7%. You are required to calculate the cost of Equity share Capital in percentage.

- b.** A company raises preference share capital of Rs. 1,00,000 by issue of preference shares of Rs. 10 each at a premium of 10%. Calculate the cost of preference share capital.
- c.** A company issues 10% irredeemable debentures of Rs. 1, 00,000. The company is in 55% tax bracket. Calculate the cost of debt after tax, if the debentures are issued at par. **(2008).**

Solution:**a. Calculation of Cost of Equity:**

$$D = 4.50 \text{ per share}$$

$$P = 95.5 \text{ Rs. } 90$$

$$G = 7\%$$

$$K_e = \frac{D}{P} + g = \frac{4.5}{90} + 7\% = \frac{4.5}{90} + 0.07 = 0.05 + 0.07 = 0.12 \text{ or } 12\%$$

b. Calculation of Cost of Preference Share Capital:

$$D = 10\% \text{ of Rs. } 10(\text{face value}) = \text{Rs. } 1$$

$$P = \text{Par value Rs. } 10 + \text{Premium } 10\% \text{ of Rs. } 10)$$

$$= \text{Rs. } 10 + 1 = \text{Rs. } 11$$

$$K_p = \frac{D}{P} = \frac{1}{11} = 0.091 \text{ or } 9.10\%$$

c. Calculation of cost of debt:

$$I = 10$$

$$P = 100$$

$$T = 55\%$$

$$K_d = \frac{I}{P}(1-t) = \frac{10}{100}(1-0.45) = 0.10(0.45) = 0.045 \text{ or } 4.5\%$$

2. B. Com. V Sem. KUD. November, 2009

- a.** The face value of a share is Rs. 100. The current market price of the shares of X Ltd. is Rs 110. The flotation costs are Rs. 10 per share. Dividend per share amounts to Rs. 5 and is expected to grow at a rate of 8%. You are required to calculate the cost of Equity Share Capital in percentage.
- b.** A company raises preference share capital of Rs. 2, 00,000 by issue of 15% preference shares of Rs. 10 each at a premium of 10%. Calculate the cost of preference share capital in percentage.
- c.** A company issues 10% Irredeemable Debentures of Rs. 2, 00,000. The company is in 40% Tax bracket. Calculate cost of debt after tax, if the debentures are issued at par and at a discount of 19 %.(**2009**).

Solution:**a. Calculation of Cost of Equity:**

$$D = \text{Rs. } 5$$

$$P = \text{MP} = \text{Rs. } 110 - \text{floatation cost Rs. } 10 = \text{Rs. } 100$$

$$g = 8\%$$

$$K_e = \frac{D}{P} + g = \frac{5}{100} + 8\% = \frac{5}{100} + 0.08 = 0.05 + 0.08 = 0.13 \text{ or } 13\%$$

b. Calculation of Cost of Preference Share Capital:

$$D = \text{Rs. 1.5 per share}$$

$$P = \text{Rs. 10} + \text{Premium 10\% of Rs. 10} \\ = \text{Rs. 10} + 1 = \text{Rs. 11}$$

$$K_p = \frac{I}{P} = \frac{1.5}{11} = 0.1363 \text{ or } 13.63\%$$

c. Calculation of Cost of Irredeemable Debentures:**I. If Debentures are issued at par:**

$$I = \text{Rs. 10}, \quad P = \text{Rs. 100}, \quad t = 40\%,$$

$$K_d = \frac{I}{P}(1-t) = \frac{10}{100}(1-40\%) = 0.10(0.60) = 0.06 \text{ Or } 6\%$$

II. If Debentures are issued at a discount of 10%:

$$I = \text{Rs. 10}, \quad P = \text{Rs. 10} - 10\% \text{ of Rs. 10} = \text{Rs. 90}, \quad T = 40\%$$

$$K_d = \frac{I}{P}(1-t) = \frac{10}{90}(1-40\%) = 0.11(0.60) = 0.066 \text{ or } 6.6\%$$

3. B. Com. V Sem. KUD. November, 2007:

The capital structure of Jay a foreign company as on 31-3-2007 consisted of.

Particulars	Rs.
Equity share capital (1,00,000 Equity shares of Rs. 20 each)	20,00,000
6% Preference share capital	5,00,000
8% Debentures	15,00,000

It is ascertained that the market price of equity share is Rs. 20. The company has proposed dividend at Rs. 2 per share. Shareholders expect growth rate at 7%. The company is under 30% tax bracket.

- Calculate weighted average cost of capital.
- During the year 2007-08 the company raised additional sum of Rs. 10,00,000 by issuing 10% debentures. This additional investment would result in increase in the expected dividend to Rs.3 per equity share and growth rate will remain same but market price per equity share will increase to Rs. 30.

You are also required to calculate new weighted average cost of capital.

Solution:**Working Notes:****I. Calculation of Cost of Equity:**

$$D = \text{Rs. 2}, \quad P = \text{MP} = \text{Rs. 20}, \quad g = 7\%$$

$$K_e = \frac{D}{P} + G = \frac{2}{20} + 0.07 = 0.10 + 0.07 = 0.17 \text{ or } 17\%$$

II. Calculation of Cost of Debentures after tax:

$$I = \text{Rs. 8}, \quad P = 100, \quad t = 30\%$$

$$K_{da} = \frac{I}{P}(1-t) = \frac{8}{100}(1-30\%) = 0.08(0.70) = 0.056 \text{ or } 5.6\%$$

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	20,00,000	0.500	0.170	0.0850
6% Pref.Sh.Cap.	5,00,000	0.125	0.060	0.0075
8% Debentures	15,00,000	0.375	0.056	0.0210
	40,00,000	= 1.00	--	0.1135

Calculation of New Weighted Average Cost of Capital**Working Notes:****I. Calculation of Cost of Equity:**

$$D = \text{Rs. } 3, \quad g = 7\%, \quad P = \text{MP} = \text{Rs. } 30$$

$$K_e = \frac{D}{P} + G = \frac{3}{30} + 0.07 = 0.10 + 0.07 = 0.17 \text{ or } 17\%$$

II. Calculation of Cost of Old Debentures:

$$K_d = \frac{I}{P}(1-t) = \frac{8}{100}(1-30\%) = 0.08(0.70) = 0.056 \text{ or } 5.6\%$$

III. Calculation of Cost of New Debentures:

$$K_d = \frac{I}{P}(1-t) = \frac{10}{100}(1-30\%) = 0.10(0.70) = 0.07 \text{ or } 7\%$$

Calculation of New Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Capital	20,00,000	0.40	0.170	0.0680
6% Pref.Sh.Cap.	5,00,000	0.10	0.060	0.0060
8% Debentures	15,00,000	0.30	0.056	0.0168
10% Debentures	10,00,000	0.20	0.070	0.0140
	50,00,000	= 1.00	--	0.1048

4. B. Com. IV Sem. April/May 2015: 15 Marks:**Solution:****a. Calculation of Cost of Equity:**

$$D = \text{Rs. } 5$$

$$P = \text{MP} = \text{Rs. } 110 - \text{floatation cost Rs. } 10 = \text{Rs. } 100$$

$$g = 8\%$$

$$K_e = \frac{D}{P} + g = \frac{5}{100} + 8\% = \frac{5}{100} + 0.08 = 0.05 + 0.08 = 0.13 \text{ or } 13\%$$

b. Calculation of Cost of Preference Share Capital:

$$D = \text{Rs. } 1.5 \text{ per share}$$

$$P = \text{Rs. } 10 + \text{Premium } 10\% \text{ of Rs. } 10$$

$$= \text{Rs. } 10 + 1 = \text{Rs. } 11$$

$$K_p = \frac{I}{P} = \frac{1.5}{11} = 0.1363 \text{ or } 13.63\%$$

c. Calculation of Cost of Irredeemable Debentures:**I. If Debentures are issued at par:**

$$I = \text{Rs. } 10, \quad P = \text{Rs. } 100, \quad t = 40\%,$$

$$K_d = \frac{I}{P}(1-t) = \frac{10}{100}(1-40\%) = 0.10(0.60) = 0.06 \text{ Or } 6\%$$

II. If Debentures are issued at a discount of 10%:

$I = \text{Rs. } 10, P = \text{Rs. } 10 - 10\% \text{ of Rs. } 10 = \text{Rs. } 90. T = 40\%$

$$K_d = \frac{I}{P}(1-t) = \frac{10}{90}(1-40\%) = 0.11(0.60) = 0.066 \text{ or } 6.6\%$$

5. B. Com. IV Sem. April/May 2016, Q. No. 10

Solution:

Working Notes:

I. Calculation of Cost of Equity:

$D = \text{Rs. } 4, P = MP = \text{Rs. } 40, g = 8\%$

$$K_e = \frac{D}{P} + G = \frac{4}{40} + 0.08 = 0.10 + 0.08 = 0.18 \text{ or } 18\%$$

II. Calculation of Cost of Debentures after tax:

$I = \text{Rs. } 8, P = 100, t = 40\%$

$$K_{da} = \frac{I}{P}(1-t) = \frac{8}{100}(1-40\%) = 0.08(0.60) = 0.048 \text{ or } 4.8\%$$

Calculation of Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Cap.	40,00,000	0.500	0.180	0.0900
6% Pref.Sh.Cap.	10,00,000	0.125	0.060	0.0075
8% Debentures	30,00,000	0.375	0.048	0.0180
	80,00,000	= 1.00	--	0.1155

Calculation of New Weighted Average Cost of Capital

Working Notes:

I. Calculation of Cost of Equity:

$D = \text{Rs. } 6, g = 8\%, P = MP = \text{Rs. } 30$

$$K_e = \frac{D}{P} + G = \frac{6}{30} + 0.08 = 0.20 + 0.08 = 0.28 \text{ or } 28\%$$

II. Calculation of Cost of Old Debentures:

$$K_{da} = \frac{I}{P}(1-t) = \frac{8}{100}(1-40\%) = 0.08(0.60) = 0.048 \text{ or } 4.8\%$$

III. Calculation of Cost of New Debentures:

$$K_d = \frac{I}{P}(1-t) = \frac{10}{100}(1-40\%) = 0.10(0.60) = 0.06 \text{ or } 6\%$$

Calculation of New Weighted Average Cost of Capital

Source	Amount	Weights	Cost of Capital	WACC
Eq.Sh.Capital	40,00,000	0.40	0.280	0.1120
6% Pref.Sh.Cap.	10,00,000	0.10	0.060	0.0060
8% Debentures	30,00,000	0.30	0.048	0.0144
10% Debentures	20,00,000	0.20	0.060	0.0120
	1,00,00,000	= 1.00	--	0.1444

UNIT – 4: Working Capital Management

Meaning:

Capital is basically classified into fixed and working. Fixed capital is normally invested in fixed assets and working capital in current assets. It is used in day to day operations. These are the funds that are invested in current assets. The forms of these current assets keep on changing. Eg. Raw material to work in progress to finished product. So it is also called circulating capital.

Gerestenberg defines “Circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another, as for example, from cash to inventories, inventories to receivable, receivables into cash.”

Shubin defines working capital as “The amount of funds necessary to cover the cost of operating the enterprise. Operating expenses involve investment in current assets, payment towards overhead expenses. Investment made in these heads is classified as working capital.

Concept of Working Capital

There are two concepts of working capital that are:

1. Balance Sheet Concept
2. Operating Cycle Concept

1. Balance Sheet Concept:

Working capital as per this is defined in terms of current assets and liabilities. Balance sheet concept further classifies working capital into

- a. Gross Working Capital
- b. Net Working Capital

a. Gross Working Capital:

Gross working capital refers to total investment made in current assets. It is also called circulating capital as these items of assets keep on circulating or rotating from one head to another. E.g. Cash to raw material to finished products, finished products to debtors and debtors to cash.

b. Net Working Capital:

As per this concept working capital is the difference between current assets and current liabilities. This concept stresses on quality aspect of working capital. This concept stresses on quantity aspect; i.e. refers to total investment made in different current asset.

A firm that has excess of current assets over liabilities is said to possess adequate liquidity. On the contrary firm that has excess of current liabilities over current assets means it does not have adequate liquidity.

2. Operating Cycle Concept:

As per this approach working capital refers to investment made in operational activities. Cost incurred towards conduct of routine business operations are categorised under working capital.

These operational activities are expressed in terms of days, depending on number of days for which investment is required for specific operations. These operations are basically classified into;

- a. Raw material inventory period.
- b. Work in process conversion period.
- c. Finished goods conversion period.
- d. Debtors' conversion period, etc.

Operating cycle is calculated to find out total number of days for which investment is required towards items like raw materials, labour, overheads, administrative and selling expenses.

Items of Current Assets and Liabilities:**Current Liabilities:**

Creditors
Bills Payable
Bank over draft
Short term borrowings
Accrued or outstanding expenses

Current Assets:

Cash in hand / bank
Debtors
Bills Receivable
Stock or inventory of:
 a. Raw materials, stores, supplies
 b. Work in progress
 c. Finished goods
Accrued income
Payment in advance
Temporary investment
Prepaid expenses

Need for Working Capital:

In order to earn sufficient profit, a firm has to depend on its sales activities apart from others. We know that sales are not always converted into cash immediately, i.e., there is a time-lag between the sale of a product and the realisation of cash. So, an adequate amount of working capital is required by a firm in the form of different current assets for its activities to continue uninterrupted and to tackle the problems that may arise because of the time lag. Practically this happens because of Operating cycle or Cash Cycle, or Operating Cash Cycle which involves the following steps:

- a. Conversion of cash into inventory;
- b. Conversion of Inventory into Receivables
- c. Conversion of Receivables into cash.

Classification of Working Capital:

Working capital can be classified into two heads:

- a. Regular or Fixed or Core or Permanent Working Capital;
- b. Variable or Seasonal or Temporary Working Capital.

a. Regular or Fixed or Core or Permanent Working Capital

The amount of current assets which are kept by a firm in hand day-in and day-out, i.e., throughout the year, is designated a Regular or Fixed Working Capital.

In other words, in order to maintain the normal day-to-day activities, a certain minimum level of working capital is required on a continuous and uninterrupted basis which will have to be met permanently. Along with other fixed assets, they are considered as fixed working capital.

B. Fluctuating or Variable or Seasonal or Temporary Working Capital.

It is the extra working capital needed to support the changing production and sales activities of the firm.

Due to seasonal variation / fluctuation, investment in raw materials, work-in-progress, finished products will fluctuate or fall. In consequence this portion of the working capital is required in order

to meet such fluctuation. It can also be stated that any amount over and above the permanent level of working capital is Fluctuating or Variable or Seasonable or Temporary Working Capital.

The difference between the fixed and variable working capital can be better be represented with the help of the diagrams given below.

It is quite clear from Fig. 1 that permanent working capital is constant but variable working capital fluctuates, i.e., it is sometimes increasing and sometimes decreasing according to the seasonal demands of the product.

For growing or expanding firm, the permanent working capital line may not be horizontal since demand for permanent current assets is increasing or decreasing. Thus, the difference between the permanent and temporary working capital for an expanding firm can be depicted

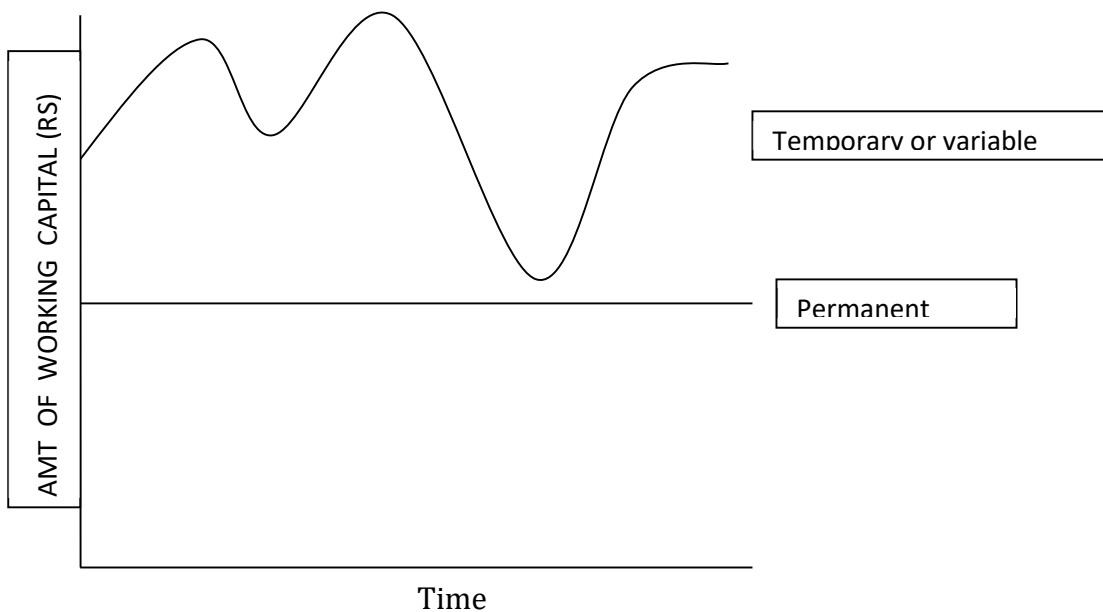


Fig.1. Permanent and Temporary Working Capital

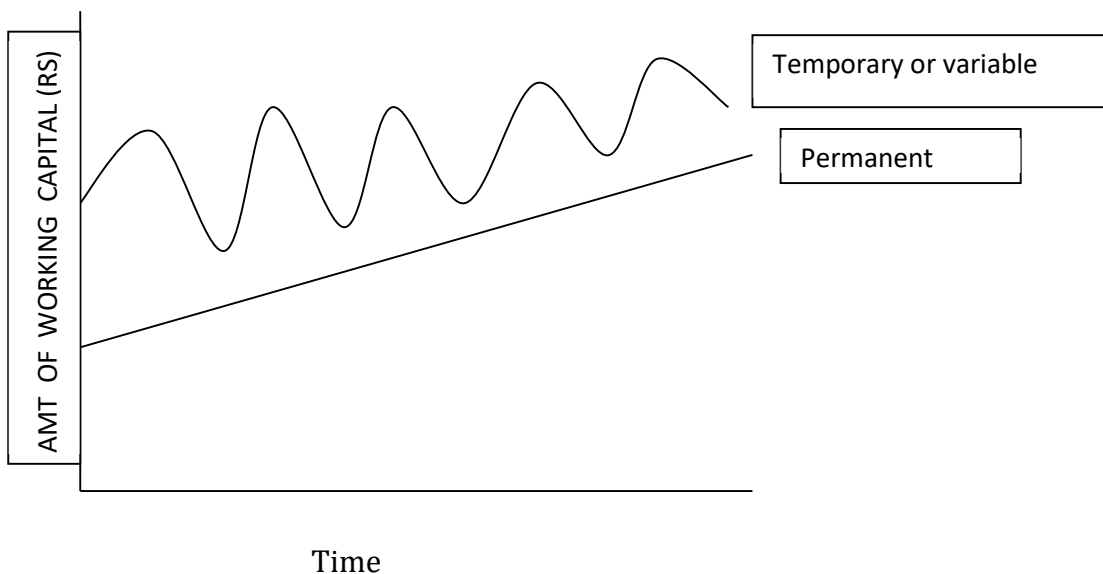


Fig.2. Permanent and Temporary Working Capital

Determinants of Working Capital Requirements:

Requirements of working capital differ from one firm to the other. This is because business conditions and policies of conducting business differ. Working capital required by each firm is determined by the following factors.

1. Nature of Business: Important factor that determines requirement of working capital is nature of business a firm is undertaking. Firms that are engaged in production and marketing need more working capital compared to the firm that are in trading or service oriented business. This is because manufacturing units need more current assets compared to service oriented units.

2. Size of Business: Size of the business obviously determines the requirement of working capital. Bigger the size more is the requirement of working capital. Larger the scale of operations, larger the investment required in current assets.

3. Length of Operating Cycle: Operating cycle means period for which investment is locked up in different operations. Longer the period of inventory holding, work-in-progress, finished goods etc. more is the investment needed in these operations. This necessitates more investment in current assets.

4. Stock Turnover: Stock turn over refers to number of times stock is turned over, i.e., it refers to sales. Quicker the stock turn over (quick sales) less is the requirement of working capital. Slow pace of stock turnover demands more investment as investment is locked up in operations.

5. Credit Policy: Credit policy of the firm will influence requirement of working capital. Firms that offer liberal credit to the debtors have to make more investment in production operations. Such firms need more working capital to keep their production operations continuous. Requirement of working capital will be much more if the firm buys on cash and sells on credit. On the contrary firms that buy on credit and sell on cash basis need less working capital.

6. Production Policy: Firms that undertake all production operations within the organisation need more working capital. Such firms have to make enough investment to manufacture every component or part. On the contrary, firms which undertake outsourcing i.e., buying some of the components or parts from outside agencies need less working capital.

7. Growth of Business: Firms that are experiencing growth need more working capital. Such firms have to constantly increase their production levels to meet rising sales targets. They need to continuously increase investment in current assets.

8. Earning Capacity and Its Appropriation: Firms that earn sufficient profits and invest a portion of profits in business need less working capital. Ploughing back of profits and accumulated reserves will minimise dependence on external capital for working capital needs. On the contrary firms that follow liberal dividend policy or firms that do not have adequate surplus need to borrow more to meet regular working capital needs.

Adequacy or Optimum Working Capital

One of the important aspects of working capital management is to ensure adequate investment in working capital without allowing for either redundancy or inadequacy. Working capital is invested in the operations; profitability of these operations is dependent on the efficient use of such investments. Benefits of having adequate working capital are as follows.

Benefits of Adequate Working Capital:

1. Protects Solvency: Firms with adequate investments in current assets will be in a position to protect their solvency. These firms are in a position to meet their obligations in time. Their payments to creditors, bankers, employees etc., will be as per the schedule. This will ensure solvency of the organisation.

2. Better Goodwill: The firms with adequate working capital will have better reputation and goodwill in the market. Their relationship with the bankers, suppliers, workers and other creditors will be cordial as the firm is regular in honouring its obligations with these people.

3. Exploit Market Conditions: Firms with adequate cash and other current assets can exploit prevailing market conditions to their advantage. They can get discounts, concessions, better quality, reasonable price, etc., as the firm has adequate cash to grab these opportunities.

4. Favourable Terms: Firms with adequate working capital can negotiate with debtors, creditors and other parties on terms and conditions that are favourable to the firm. They will have better bargaining power in matters of price fixation, discounts, delivery of supply etc.

5. More Profits: The Firms with adequate working capital can make adequate profits. Adequate investments in debtors will help to increase the sale. Similarly sufficient investment in inventories, work-in-progress will ensure quality and timely products. These aspects will help to increase profitability of the firm.

DANGERS OF INADEQUATE WORKING CAPITAL

Firms that have inadequate investment in current assets will face several problems. Their production cycle will not be regular due to shortage of raw materials and delay in payment of overheads. These firms may not be in a position to increase sales as they fail to attract customers with favourable credit facilities. Apart from this, limitations of inadequate working capital are as follows.

1. Affects Solvency: Shortage of working capital may affect solvency of these firms in the short run. They will not be in a position to pay the creditors and suppliers in time. Payment of the workers salary may also be postponed. This will have an impact on the solvency of the firm.

2. Irregular Production: Shortage of investment in raw materials, inadequate investments in overheads will hamper the production schedule. Production of goods may not take place as per the schedule. Quantity and quality of the production may affect due to shortage of working capital.

3. Loss of Goodwill: Firms with inadequate working capital will not be in a position to repay their obligations to the bankers and creditors as per the promise. This will affect their reputation, further growth of business and future business deals will get affected due to this.

4. Reduced Profitability: Profitability of these firms is basically affected on two accounts,
a. These firms cannot attract more customers as they are unable to offer liberal credit facilities. And Their production schedule will not be regular and in time, due to poor investment in these operations. Inadequate and ill timed production schedule will affect the sales adversely.

5. Missed Opportunities: The firms with inadequate working capital cannot exploit prevailing business conditions to their advantage. They cannot increase sales as they cannot offer credit or discounts. They cannot also get discount and other concessions from their suppliers as they are unable to maintain good relation with creditors.

LIMITATIONS OF REDUNDANT OR EXCESS WORKING CAPITAL

Redundant or excess working capital is a burden on the organisation. It refers to capital that is not adequately represented by asset or capital that has remained unutilised. Idle capital is a liability to the organisation as the firm has to pay interest on that even though it is not properly utilised. Limitations of redundant working capital are as follows.

1. Wastage of Capital: Excess working capital results in wastage of capital. Capital of the firm is not represented by adequate assets resulting in wastage of capital.

2. Inefficiency: Excess of capital in the hands of purchase manager may result in selection of wrong assets. Improper investment may lead to inefficiency in the management of current assets.

3. Increase in Bad Debts: Firms with excess working capital may adopt liberal credit policy. Excess credit facility may lead to bad debts.

4. Reduced Returns on Investment: Wastage and misuse of capital will lead to reduced returns. Capital is not properly represented by assets or assets do not produce adequately, due to this return on assets (ROA) or return on capital employed (ROCE) will be less leading to loss of profits.

5. No control: Degree of control in the organisations with excess working capital will be inadequate. As every department has adequate resources and power, they run activities of their department without caring for the requirement of other departments or the entire organisation. Eg.. Each department becomes powerful with unlimited resources and capital and it becomes difficult to exercise control over them.

Forecasting of Working Capital Requirements:

Techniques or Methods of Working Capital Estimation:

There are different Methods of forecasting or estimating the working capital requirement. They are as follows:

1. Estimation of Current Assets and Liabilities.
2. Operating Cycle Method.
3. Balance Sheet Method.
4. Cash Method.
5. Forecasting Method.
6. Projected Balance Sheet Method.

1. Estimation of Current Assets and Liabilities.

This is simple and traditional method of estimating the amount of working capital required. Working capital i.e., net working capital is the difference between current assets and current liabilities. This method ascertains the amount of working capital required based on amount of investment to be made in each item or current assets and funds or finance available on each item of current liability. Statement of working capital requirement is prepared to know the amount of net working capital required.

Statement of Estimation of Working Capital Requirement

Particulars	Rs.
A. Current Assets:	
a. Raw Material Inventory (Units × CPU × Inventory Period)	xxx
b. Work in process Inventory (Labour + Material + Overheads) × CPU X Period of inventory	xxx
c. Finished goods inventory (Material + Labour + Overhead + Administrative Expenses) (CPU × Period of Inventory)	xxx
d. Sundry Debtors (Material + Labour + Overhead + Administrative Expenses + Selling and Distribution Expenses) (Units × Cost Per Unit × Period)	xxx
e. Expenses Paid in Advance	xxx
f. Cash and Bank Balances (lump sum)	xxx
Total Current Assets (A)	xxx

Less:	
B. Current Liabilities:	
a. Sundry Creditors (Raw Materials) (Units × Cost Per Unit × Period)	xxx
b. Deferred Expenses (Wages, Salaries etc.)	xxx
Total Current Liabilities (B)	xxx
Current Assets – Current Liabilities (A – B)	xxx
Add: For Contingencies:	
Net Working Capital	xxx

The above statement gives a clear picture of NWC required based on investment required in different items of current assets and investment available from different items of liabilities. Firm has to make arrangement of funds required. These items of assets and liabilities are estimated below.

Problem No. 1:

Calculate the amount of working capital requirement for Surya Ltd. from the following information.

Particulars	Rs. (Per.Unit)
Raw Materials	-- 160
Direct Labour	-- 60
Overheads	-- 120
Total Cost	-- 340
Profit	-- 60
Selling Price	-- 400

Raw materials are held in stock on an average for one month. Materials are in process on an average for half-a-month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month and credit allowed to debtors is two months. Time lag in payment of wages is 1.5 weeks. Time lag in payment of overhead expenses is one month. One fourth of the sales are made on cash basis.

Cash in hand and at bank is expected to be Rs. 50,000 and expected level of production amounts to 1,04,000 units for a year of 52 weeks.

You are assumed that production is carried on evenly throughout the year and a time period of four weeks is equivalent to a month.

Solution:

One year = 1, 04,000 units = 52 weeks, Weekly output = $1,04,000/52 = 2000$ units.

Raw Materials = Rs. 160, Direct Labour / Wages = Rs. 60, Overheads = Rs. 120, Finished Goods cost = Rs. 340, Profit = Rs. 60 and Sales = Rs. 400

Raw materials = 1 month,

WIP = $\frac{1}{2}$ Month

Debtors = 2 Months, ($\frac{1}{4}$ th Cash)

Creditors = 1 Month

Wages = 1.5 Weeks

Overheads = 1 Month

Statement of Estimation of Working Capital Requirement

Particulars	Rs.	Rs.
Current Assets:		
1. Raw Materials (2,000 units × 4 weeks × Rs. 160)	--	12,80,000
2. Work-in-progress		
a. Raw Materials (2000 units × 2 weeks × Rs. 160)	6,40,000	
b. Direct Labour (1/2 × 2000 units × 2 weeks × Rs. 60)	1,20,000	
c. Overheads (1/2 × 2000 units × 2 weeks × Rs. 120)	2,40,000	10,00,000
3. Finished Goods:		
a. Raw Materials (2000 units × 4 weeks × Rs. 160)	12,80,000	
b. Direct Labour (2000 units × 4 weeks × Rs. 60)	4,80,000	
c. Overheads (2000 units × 4 weeks × Rs. 120)	9,60,000	27,20,000
4. Debtors: (2000 units × 8 weeks × Rs. 340) – ¼ th (54,40,000 – 13,60,000 Cash Sales)	--	40,80,000
5. Cash Balance	--	50,000
TOTAL CURRENT ASSETS (A)	--	91,30,000
Less: Current Liabilities:	--	
1. Creditors: (2000 units × 4 weeks × Rs. 160)	12,80,000	
2. Wages Outstanding (2000 units × 1.5 weeks × Rs. 60)	1,80,000	
3. Overheads Outstanding (2000 units × 4 weeks × Rs. 120)	9,60,000	
TOTAL CURRENT LIABILITIES (B)	24,20,000	24,20,000
NET WORKING CAPITAL REQUIREMENT (A – B)	--	67,10,000

2. B.Com. V Sem. December 2010:**Statement of Estimation of Working Capital Requirement (QP-2010)**

Particulars	Rs.	Rs.
Current Assets:		
1. Stock of Raw Material (4 weeks) = $\frac{1,04,000 \times 80 \times 4}{52}$	--	6,40,000
2. Work in Process		
Raw Material = $\frac{1,04,000 \times 80 \times 2}{52}$	3,20,000	
Direct Labour(50%) = $\frac{1,04,000 \times 15 \times 2}{52}$	60,000	
Overheads (50%) = $\frac{1,04,000 \times 30 \times 2}{52}$	1,20,000	5,00,000
3. Finished Goods:		
Raw Material = $\frac{1,04,000 \times 80 \times 4}{52}$	6,40,000	
Direct Labour = $\frac{1,04,000 \times 30 \times 4}{52}$	2,40,000	
Overheads = $\frac{1,04,000 \times 60 \times 4}{52}$	4,80,000	13,60,000

4. Sundry Debtors = $\frac{1,04,000 \times 170 \times 8}{52}$	--	27,20,000
5. Cash AT Bank	--	25,000
TOTAL CURRENT ASSETS (A)	--	52,45,000
Less: Current Liabilities:	--	
1. Sundry Creditors (Raw Materials) = $\frac{1,04,000 \times 80 \times 4}{52}$	6,40,000	
2. Wages Outstanding = $\frac{1,04,000 \times 30 \times 1.5}{52}$	90,000	
TOTAL CURRENT LIABILITIES (B)	7,30,000	7,30,000
	--	45,15,000
Add: Contingencies @ 10%	--	4,51,500
NET WORKING CAPITAL REQUIREMENT (A - B)	--	49,66,500

3. KUD. B.Com. V Sem. December 2012:**Solution:****Current Assets:**

Raw materials – 1 month or 4 weeks

Work in progress – ½ month or 2 weeks

Finished Goods – 1 month or 4 weeks

Debtors - 2 months or 8 weeks (¼ th output is sold against cash)

Cash in hand and at Bank = Rs. 20,000

Current Liabilities:

Creditors for Raw materials – 1 month or 4 weeks

Wages – 1.5 weeks

Overhead expenses = 1 month or 4 weeks

Statement of Estimation of Working Capital Requirement (QP-2012)

Particulars	Rs.	Rs.
Current Assets:		
1. Stock of Raw Material (4 weeks) = $\frac{70 \times 80,000 \times 4}{52}$	--	4,30,769
2. Work in Process (2 weeks)		
Raw Material = $\frac{70 \times 80,000 \times 2}{52}$	2,15,385	
Direct Labour(50%) = $\frac{20 \times 80,000 \times 2}{52}$	61,538	
Overheads (50%) = $\frac{30 \times 80,000 \times 2}{52}$	92,308	3,69,231
3. Finished Goods: (4 weeks)		
Raw Material = $\frac{70 \times 80,000 \times 4}{52}$	4,30,769	
Direct Labour = $\frac{40 \times 80,000 \times 4}{52}$	2,46,154	
Overheads = $\frac{60 \times 80,000 \times 4}{52}$	3,69,231	10,46,154

4. Sundry Debtors = $3/4^{\text{th}}$ of 80,000 = $\frac{170 \times 60,000 \times 8}{52}$	--	15,69,231
5. Cash AT Bank	--	20,000
TOTAL CURRENT ASSETS (A)	--	2389231
Less: Current Liabilities:	--	
1. Sundry Creditors (Raw Materials) = $\frac{70 \times 80,000 \times 4}{52}$	4,30,769	
2. Wages Outstanding = $\frac{40 \times 80,000 \times 1.5}{52}$	92,308	
3. Overhead Expenses = $\frac{60 \times 80,000 \times 4}{52}$	3,69,231	
TOTAL CURRENT LIABILITIES (B)	8,92,308	8,92,308
NET WORKING CAPITAL REQUIREMENT (A – B)	--	1496923

KUD. B.Com. V Sem. Nov. 2007

From the following particulars relating to Glaxo Company Ltd. for the year ended 31st December 2006, Calculate working capital required for the year 2007.

Sales at 3 months on credit	-	15,00,000
Wages paid (15 days time)	-	2,70,000
Cost of raw materials	-	3,75,000
Manufacturing expenses (one month delay)		3,75,000
Office expenses (one month delay)		1,50,000
Sales promotion expenses (to be paid in advance)		30,000
Cash balance to be maintained	-	37,500

Suppliers of raw materials allow one-month credit and raw materials are held in stock for two months. Finished goods are held in stock for 1.5 months. Margin for contingencies to be provided at 15% . Gross profit is 25% on cost. Finished goods are valued at cost.

RCU. B.Com. IV. Sem. May 2013**Solution:****Current Assets:**

Raw materials – 1 month
 Work in progress – $\frac{1}{2}$ month
 Finished goods – 1 month
 Debtors - 2 months

Current liabilities: Creditors – 1 month.

Cost of Raw materials; $0.40 \times \text{Rs. } 15 = \text{Rs. } 6$ per unit.

Direct labour : $0.20 \times 15 = \text{Rs. } 3$ per unit

Overheads: $0.20 \times 15 = \text{Rs. } 3$ per unit

Statement of Estimation of Working Capital Requirement (QP-2013)

Particulars	Rs.	Rs.
Current Assets:		
1. Stock of Raw Material (1 month) = $\frac{6 \times 3,00,000 \times 1}{12}$	--	1,50,000
2. Work in Process (1/2 months)		
Raw Material = $\frac{6 \times 3,00,000 \times 0.5}{12}$	75,000	
Direct Labour(50%) = $\frac{1.5 \times 3,00,000 \times 0.5}{12}$	18,750	
Overheads (50%) = $\frac{1.5 \times 3,00,000 \times 0.5}{12}$	18,750	1,12,500
3. Finished Goods: (1 month)		
Raw Material = $\frac{6 \times 3,00,000 \times 1}{12}$	1,50,000	
Direct Labour = $\frac{3 \times 3,00,000 \times 1}{12}$	75,000	
Overheads = $\frac{3 \times 3,00,000 \times 1}{12}$	75,000	3,00,000
4. Sundry Debtors = (2 months) = $\frac{12 \times 3,00,000 \times 2}{12}$	--	6,00,000
TOTAL CURRENT ASSETS (A)	--	11,62,500
Less: Current Liabilities:		
1. Sundry Creditors (RMS) (1 month) = $\frac{6 \times 3,00,000 \times 1}{12}$	1,50,000	
TOTAL CURRENT LIABILITIES (B)	1,50,000	1,50,000
NET WORKING CAPITAL REQUIREMENT (A – B)		10,12,500

RCU. B.Com. IV. Sem. May 2014**Solution:****Current Assets:**

Raw materials - 2 month

Finished goods - 1.5 months

Debtors - 3 months

Current liabilities

Wages - ½ month

Manufacturing expenses – 1 month

Creditors (RMS) - 1 month

Sahyadri Ltd.**Statement of Estimation of Working Capital Requirement (QP-2014)**

Particulars	Rs.	Rs.
Current Assets:		
1. Stock of Raw Material (2 month) = $\frac{7,50,000 \times 2}{12}$	--	1,25,000
2. Finished Goods: (1.5 months) = $\frac{24,00,000 \times 1.5}{12}$	--	3,00,000
3. Sales expenses (to be paid in advance)	--	60,000
4. Sundry Debtors = (3 months) = $\frac{24,00,000 \times 3}{12}$	--	6,00,000
5. Cash balance to be maintained	--	75,000
TOTAL CURRENT ASSETS (A)	--	11,60,000
Less: Current Liabilities:	--	
1. Sundry Creditors (Raw Materials) = $\frac{7,50,000 \times 1}{12}$	62,500	
2. Wages Outstanding = $\frac{5,40,000 \times 0.5}{12}$	22,500	
TOTAL CURRENT LIABILITIES (B)	85,000	85,000
Net working capital (A-B)	--	10,75,000
Add: Contingencies @ 15%	--	1,61,250
NET WORKING CAPITAL REQUIREMENT	--	12,36,250

Working Notes:

When cost is Rs. 100, plus Rs. 25 profit and Selling price = Rs.125

$$\text{Profit} = \frac{25 \times 30,00,000}{125} = \text{Rs. } 6,00,000$$

$$\text{Cost} = \text{Sales} - \text{Profit} = \text{Rs. } 30,00,000 - 6,00,000$$

$$\text{Cost of sales} = \text{Rs. } 24,00,000$$

RCU. B.Com. IV Sem. May 2018 (Case Study):

Shri Raghu and Co provides you the following information for the year ending 31-03-2017.

Sales	--	Rs. 7,50,000
Cost of raw materials	--	Rs. 3,00,000
Wages paid (15 days delay)	--	Rs. 2,40,000
Manufacturing overhead (one month delay)		Rs. 3,00,000
Administrative overhead(one month delay)		Rs. 1,20,000
Sales promotion expenses to be paid in advance		Rs. 25,000

The suppliers of raw material allow one month credit. Raw materials are held in stock for 2 months and finished goods are kept in warehouse awaiting sales for 1½ months. Cash balance to be maintained is Rs. 25,000 and 10% margin for contingencies to be provided for. The gross profit rate is 20% on sales. Calculate working capital required for the year 2018.

Solution:

Raw materials are held in stock - 2 months

Finished goods are held in stock - 1½ months

Sales promotion expenses to be paid in advance

Cash balance to be maintained - Rs. 25,000

Creditors

Creditors for raw materials allow - 1 month credit

Wages - 15 days delay

Manufacturing overheads – 1 month delay

Administrative overheads - 1 month delay

Shri Raghu and Co.**Statement of Estimation of Working Capital Requirement (QP-2018)**

Particulars	Rs.	Rs.
Current Assets:		
1. Stock of Raw Material (2 month) = $\frac{3,00,000 \times 2}{12}$	--	50,000
2. Stock of finished goods: (1.5 months) (Rs. 7,50,000 - (20% of Rs. 7,50,000) = Rs. 1,50,000) Cost of goods sold = $\frac{6,00,000 \times 1.5}{12}$		75,000
3. Sales expenses (to be paid in advance)	--	25,000
4. Sundry Debtors = (3 months) = $\frac{6,00,000 \times 3}{12}$	--	1,50,000
5. Sales promotion expenses to be paid in advance	--	25,000
5. Cash balance to be maintained	--	25,000
TOTAL CURRENT ASSETS (A)	--	4,00,000
Less: Current Liabilities:	--	
1. Sundry Creditors (Raw Materials)(1 month) = $\frac{3,00,000 \times 1}{12}$	25,000	
2. Wages Outstanding (1/2 Month) = $\frac{2,40,000 \times 0.5}{12}$	20,000	
3. Payment of Manufacturing exps (1 month) = $\frac{3,00,000 \times 1}{12}$	25,000	
4. Payment of Administrative Oh. (1 month) = $\frac{1,20,000 \times 1}{12}$	10,000	
TOTAL CURRENT LIABILITIES (B)	80,000	80,000
Net Current Assets (A-B)	--	3,20,000
Add: Contingencies @ 15%	--	32,000
NET WORKING CAPITAL REQUIREMENT	--	3,52,000

Sourabh Company Ltd.**Statement of Estimation of Working Capital Requirement (QP-2019)**

Particulars	Rs.	Rs.
Current Assets:		
1. Stock of Raw Material (2 month) = $\frac{6,00,000 \times 2}{12}$	--	1,00,000
2. Stock of finished goods: (1.5 months) (Rs. 15,00,000 - (20% of Rs. 15,00,000) = Rs. 3,00,000) Cost of goods sold = $\frac{12,00,000 \times 1.5}{12}$		1,50,000
3. Sundry Debtors = (3 months) = $\frac{12,00,000 \times 3}{12}$	--	3,00,000
4. Sales promotion expenses to be paid in advance	--	50,000
TOTAL CURRENT ASSETS (A)	--	6,00,000
Less: Current Liabilities:	--	
1. Sundry Creditors (Raw Materials)(1 month) = $\frac{6,00,000 \times 1}{12}$	50,000	
2. Wages Outstanding (1/2 Month) = $\frac{4,80,000 \times 0.5}{12}$	20,000	
3. Payment of Manufacturing exps (1 month) = $\frac{6,00,000 \times 1}{12}$	50,000	
4. Payment of Administrative Oh. (1 month) = $\frac{2,40,000 \times 1}{12}$	20,000	
TOTAL CURRENT LIABILITIES (B)	1,40,000	1,40,000
Net Current Assets (A-B)	--	4,60,000
Add: Cash balance to be maintained	--	50,000
NET CURRENT ASSETS		5,10,000
Add: Contingencies @ 15%	--	51,000
NET WORKING CAPITAL REQUIREMENT	--	5,61,000

DISCLAIMER

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