MAR GREGORIOS COLLEGE OF ARTS & SCIENCE

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DEPARTMENT OF COMMERCE

(CORPORATE SECRETARYSHIP)

SUBJECT NAME: COST & MANAGEMENT ACCOUNTING

SUBJECT CODE: SBZ4A SEMESTER: IV

PREPARED BY: PROF.S.AIYSWARYA

MAR GREGORIOS COLLEGE OF ARTS & SCIENCE
DEPT OF BCA - SHIFT 2

SUBJECT: COST & MANAGEMENT ACCOUNTING
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SEMESTER: IV
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SYLLABUS

the course	Accounting
Course outline	**Unit-1:** Cost Accounting: Definition, Meaning and objectives Distinction between Cost and Financial Accounting. Elements of cost and preparation of cost sheets and tender. Management Accounting – Definition and objectives – Distinction between management and financial accounting.
	Unit-2: Stores Records Purchase Order Goods Received. Note Bin Card Stores Ledger Purchase, Receipt and Inspection Inventory Control ABC Analysis Economic Ordering Quantity Maximum, Minimum and Reordering levels Methods of Pricing Issued. Labour: Importance of Labour Cost Control Various Methods of Wage Payment Calculation of wages Methods of Incentive for Schemes
	Unit-3: Overheads: Factory, Administration, Selling and Distribution of overheads Classification Allocation and ApportionmentRedistribution (Secondary Distribution) Absorption of Over heads including 'Machine Hour Rate
	Unit-4: Funds Flow and Cash Flow Analysis: Schedule of changes in working capital Preparation of 'funds flow statement'Preparation of 'Cash Flow Statement' Importance of funds flow and cash flow Analysis Difference between funds flow and cash flow. Ratio Analysis : Utility and limitations of Accounting Ratios calculation of Accounting Ratios Ratio Analysis for Liquidity, Solvency, Profitability and Leverage.
	Unit-5 : Marginal Costing: The Concept Break Even Analysis Break Even Chart Importance and assumptions Application of Profit Volumes Ratio Different types of problems (with special emphasis on decision making problems). Budget and Budgetary Control : Procedure and Utility Preparation of different types of Budget including Flexible Budget

Unit 1: COST ACCOUNTING

1.1. LEARNING OUTCOMES

- Students will understand the basic underlying differences between different branches of accounting.
- They will be able to understand the reason for preparing cost accounting
- They will be able to understand all the basic costs which should be included before fixing the selling price of a product.
- It helps them to apply the technique in any kind of process in their life where they want to fix a cost for a product.

1.2 MEANING AND DEFINITION OF COST ACCOUNTING

Definition:
ICMA defines Cost accounting as, 'The process of accounting for cost from the point at which the expenditure is incurred or committed to the establishment of its ultimate relationship with cost centres and cost units. In its widest usage, it embraces the preparation of statistical data, the application of cost control methods and the ascertainment of profitability of activities carried out or planned'.

Meaning:
Cost accounting is a method of managerial accounting which aims to capture the total production cost of a business by measuring the variable cost as well as the fixed costs in each phase of production.

A company's internal management department uses cost accounting to define both variable and fixed costs associated with the manufacturing process. It will first individually calculate and report these costs, then compare input costs with production results to assist in assessing financial performance and in making potential business decisions.

Types of Cost Accounting

- Standard Costing
- Activity-Based Costing
- Lean Accounting
- Marginal Costing

1.3 OBJECTIVES OF COST ACCOUNTING

Objectives of cost accounting are ascertainment of cost, fixation of selling price, proper recording and presentation of cost data to management for measuring efficiency and for cost control and cost reduction, ascertaining the profit of each activity, assisting management in decision making and determination of break-even point.

The aim is to know the methods by which expenditure on materials, wages and overheads is recorded, classified and allocated so that the cost of products and services may be accurately ascertained; these costs may be related to sales and profitability may be determined. Yet with the development of business and industry, its objectives are changing day by day.

Following are the main objectives of cost accounting:

- To ascertain the cost per unit of the different products manufactured by a business concern;
- To provide a correct analysis of cost both by process or operations and by different elements of cost;
- To disclose sources of wastage whether of material, time or expense or in the use of machinery, equipment and tools and to prepare such reports which may be necessary to control such wastage;
- To provide requisite data and serve as a guide for fixing prices of products manufactured or services rendered;
- To ascertain the profitability of each of the products and advise management as to how these profits can be maximised;
- To exercise effective control if stocks of raw materials, work-in-progress, consumable stores and finished goods in order to minimise the capital locked up in these stocks;
- To reveal sources of economy by installing and implementing a system of cost control for materials, labour and overheads;
- To advise management on future expansion policies and proposed capital projects;
- To present and interpret data for management planning, evaluation of performance and control;
- To help in the preparation of budgets and implementation of budgetary control;

- To organise an effective information system so that different levels of management may get the required information at the right time in right form for carrying out their individual responsibilities in an efficient manner;

- To guide management in the formulation and implementation of incentive bonus plans based on productivity and cost savings;

- To supply useful data to management for taking various financial decisions such as introduction of new products, replacement of labour by machine etc.;

- To help in supervising the working of punched card accounting or data processing through computers;

- To organise the internal audit system to ensure effective working of different departments

- To organise cost reduction programmes with the help of different departmental managers;
- To provide specialised services of cost audit in order to prevent the errors and frauds and to facilitate prompt and reliable information to management; and

- To find out costing profit or loss by identifying with revenues the costs of those products or services by selling which the revenues have resulted.

1.4 ADVANTAGES AND LIMITATIONS OF COST ACCOUNTING

Main advantages of cost accounting are given below:

- Profitable and unprofitable activities are disclosed and steps can be taken to eliminate or reduce those activities from which little or no benefit is obtained or to change the method of production in order to make such activities more profitable.

- It enables a concern to measure the efficiency and then to maintain and improve it. This is done with the help of valuable data made available for the purpose of comparison. For example, if material spent upon a pair of shoes in 2009 comes to Rs 160 and for a similar pair of shoes the amount is Rs 180 in 2010, the increase may be due to increase in prices of material or more wastage in the use of materials or inefficiency at the time of buying or unnecessarily high prices paid.

- It provides information upon which estimates and tenders are based. In case of big contracts or jobs, quotations cannot be given unless the cost of completing the contracts can be found out.

- It guides future production policies. It explains the cost incurred and profit made in various lines of business and processes and thereby provides data on the basis of which production can be appropriately planned,

- It helps in increasing profits by disclosing the sources of loss or waste and by suggesting such controls so that wastages, leakages and inefficiencies of all departments may be detected and prevented.

- It enables a periodical determination of profits or losses without resort to stocktaking.

- It furnishes reliable data for comparing costs in different periods, for different volumes of output, in different departments and processes and in different establishments. This helps in maintaining costs at the lowest point consistent with the most efficient operating conditions.

- The exact cause of a decrease or an increase in profit or loss can be detected. A concern may suffer not because the cost of production is high or prices are low but also because the output is much below the capacity of the concern. This fact is revealed by cost accounts only.

- Cost Accounting discloses the relative efficiencies of different workers and thereby facilitates the introduction of suitable plans of wage payment to reward efficiency and to provide adequate incentive to the less efficient workers. A good system of costing promotes prosperity of the business and thus ensures greater security of service and adequate reward to workers.

- It enables the creditors and investors to judge the financial strength and creditworthiness of the business. A sound business concern with a good system of costing can attract more investors than a similar concern without an adequate system of costing.

- Helpful to the Government. It facilitates the assessment of Excise Duty and Income Tax and the formulation of policies regarding industry, export, import, taxation etc. It also facilitates the preparation of national plans for economic development.

- It provides ready figures for use by the Government for application to problems like price fixation, price control, tariff protection, wage level fixation, payment of dividends or settlement of disputes.

- Helpful to Consumers. The ultimate aim of costing is to reduce cost of production to the minimum and maximise the profits of the business. A part of the benefit resulting from the reduction of the cost is usually passed on to consumers in the form of lower prices. Besides, the installation of a costing system will infuse confidence in the minds of the public about the fairness of the prices charged.

- Efficiency of Public Enterprises. Costing has a more important role to play in public enterprises than in private enterprises. In public enterprises, primary objective is not to earn profit but it is to serve the society by providing quality goods at cheaper rates. Therefore, whatever limited information the usual profit and loss account can give in case of a private enterprise, is not available in case of a public enterprise.

- The efficiency of a public sector can, therefore, be best judged by comparing its cost of production with the cost of production of its counterpart in the private sector. Public enterprises lack the personal initiative and interest of private enterprises. A good system of costing ensures efficient and effective control through a proper analysis of their working.

- It provides for graded financial control over expenditure and avoids conflict of authority. It measures efficiency and profitability of the undertaking to justify its running in the public sector. It helps management in fixing reasonable selling prices for the products manufactured or services rendered by public enterprises.

Limitations of Cost Accounting:

Cost accounting like other branches of accountancy is not an exact science but is an art which has developed through theories and accounting practice based on reasoning and common sense. Many theories can be proved or disproved in the light of conventions and basic principles of cost accounting. These principles are not static but changing with the change of time and circumstances.

Following are the main limitations of cost accounting:

- Cost accounting lacks a uniform procedure. It is possible that two equally competent cost accountants may arrive at different results from the same information. Keeping in view this limitation, all cost accounting results can be taken as mere estimates.

- There are a large number of conventions, estimates and flexible factors such as classification of costs into its elements, issue of materials on average or standard price, apportionment of overhead expenses, arbitrary allocation of joint costs, division of overheads into fixed and variable costs, division of costs into normal and abnormal and controllable and non- controllable and adoption of marginal costs and standard costs due to which it becomes difficult to have exact costs.

- Moreover, no one cost is suitable for all purposes and under all circumstances. Virtually its calculation depends on the use to which the data are required to be put to. Because of inclusion of some items of cost on estimated basis it is difficult to have actual true cost. On this basis when the valuation of stock is done, that will not be based on true facts and naturally the profit calculated from the cost records will not be true.

- For getting the benefits of cost accounting many formalities are to be observed by a small and medium size concern due to which the establishment and running costs are so much that it becomes difficult for these concerns to afford its cost. Thus, cost accounting can be used only by big concerns.

- Contribution of cost accounting for handling futuristic situations has not been much. For example, it has not evolved so far any tool for handling inflationary situation.

1.5 DIFFERENCE BETWEEN COST ACCOUNTING AND FINANCIAL ACCOUNTING

BASIS FOR COMPARISON	COST ACCOUNTING	FINANCIAL ACCOUNTING
Meaning	Cost accounting is a system through which an organisation keeps the track of various costs incurred in the business in production activities.	Financial accounting is a system that captures the records of financial information about the business to show the correct financial position of the company at a particular date.
Information type	Records the information related to material, labour and overhead which are used in the	Records the information which are in monetary terms.

	production process.	
Nature of cost	Both historical and pre-determined cost	Only historical cost.
Users	Information provided by cost accounting is used only by the internal management of the organisation like directors, supervisors, managers, etc.	Users of information include internal and external parties like creditors, shareholders, customers etc.
Valuation of stock	At stock	Cost or Net Realizable Value, whichever is less.
Mandatory	No, expect for manufacturing firms it is mandatory.	Yes for all firms.
Time of reporting	Details provided by cost accounting are frequently prepared and reported to the management.	Financial statements are reported at the end of the accounting period, which is normally 1 year.
Profit Analysis	Generally, the profit is analysed for a particular product, job, batch or process.	Income, expenditure and profit are analysed together for a particular period of the whole entity.
Forecasting	Forecasting is possible through budgeting techniques.	Forecasting is not at all possible.

1.6 ELEMENTS OF COST

"A classification has to be made to arrive at the detailed costs of departments, production orders, jobs or other cost units. The total cost of production can be found without such analysis, and in many instances an average unit cost could be obtained but none of the advantages of an analysed cost would be available". Harold. J. Wheldon.

Simple ascertainment of total cost cannot satisfy the various requirements of decision making. For effective control and managerial decision making, data is to be provided on the basis of analysed and classified costs. In order to satisfy this objective, cost is analysed by elements of cost i.e., by nature of expenditure.

The elements of cost are:

1. Materials
2. Labour
3. Expenses
4. Overheads

The above elements of cost are explained below:

Materials:

"The material cost is the cost of commodities supplied to an undertaking"- I.C.M.A.

Materials cost is of two types, viz.:

- Direct materials cost
- Indirect materials cost.

(i) Direct Materials Cost:

Direct material cost is "The cost of materials entering into and becoming constituent elements of a product or saleable service". Thus, materials which can be identified with units of output or service are known as direct materials.

Cotton used in production of cloth, leather used in the case of production of leather goods and lime in the production of chalk, etc., are the examples of direct materials. Any materials purchased and used for a specific job are also direct materials.

(ii) Indirect Materials:

"Materials used for the product other than the direct materials are called indirect materials. In other words, materials cost which cannot be identified with a specific product, job, process is known as indirect material cost.

Small tools, stationery used in works, office stationery, advertising posters, and materials used in maintenance of plant and machinery are a few examples of indirect materials.

Labour:

Labour is the remuneration paid for physical or mental effort expended in production and distribution.

"The labour cost is the cost of remuneration (wages, salaries, commissions, bonus, etc.) of the employees of an undertaking" – I.C.M.A.

Labour cost is also divided into direct and indirect portions:

(i) Direct Labour Cost:

It is also called 'Direct-wages'. Direct labour cost is the cost of labour directly engaged in production operations. E.g., workmen engaged in assembling parts, carpenters engaged in furniture making, etc.

(ii) Indirect Labour Cost:

Indirect labour cost is the remuneration paid for labour engaged to help the production operations, e.g., inspectors, watchmen, sweepers, store keepers, etc. The remuneration paid to these persons cannot be traced to a job, process or production order. The labour costs of idle time, overtime, holidays, etc., are also taken as indirect costs. Similarly, clerical and managerial staff, salesmen, distribution employees are also included in the orbit of 'indirect labour'.

Expenses:

Expenditure other than material and labour is the third element of cost.

It is defined by I.C.M.A. as- "The cost of service provided to an undertaking and the notional cost of the use of owned assets".

Expenses are of two types:

- Direct expenses
- Indirect expenses.

(i) Direct Expenses:

These are the expenses which can be directly identified with a unit of output, job, process or operation. They are specifically incurred for a job, or unit or process and in no way they are connected with other jobs or processes. The direct expenses are also known as chargeable expenses.

Some examples are:

(a) Hire charges of special plant used for a job.
(b) Royalty on products.
(c) Cost of special patterns, designs or plans for a particular job or work order, etc.

(ii) Indirect Expenses:

Indirect expenses are expenses other than indirect material and indirect labour, which cannot be directly identified with units of output, job, process or operation. These expenses are incurred commonly for jobs and processes. E.g., rent, power, lighting, depreciation, bank charges, advertising, etc.

Direct and Indirect Costs:

Direct Cost or Prime Cost:

The aggregate of all the direct costs i.e., Direct Materials, Direct Labour or wages and Direct expenses is termed as- 'Prime Cost' or 'Direct cost'. Thus prime cost or direct cost is the sum of all the elements of costs which can be specifically identified with particular products or jobs and allocated to such output.

Indirect Cost or 'Overhead' or 'On Cost' or 'Burden':

The aggregate of all the indirect costs i.e., Indirect Material, Indirect labour and Indirect expenses is variously termed as 'On cost' or 'overhead' or 'Burden'. Over heads or on cost or indirect cost cannot be identified with specific products or jobs. So it is apportioned to the output on some reasonable basis.

I.C.M.A., defines overheads as follows:

"The aggregate of indirect materials cost, indirect wages cost (indirect labour cost) and indirect expenses". I.C.M.A. has stated in the note appended to this definition – 'on cost' and "Burden" as synonymous terms which are not recommended.

Overhead:

On the basis of functions overhead is classified as:

- Factory overhead
- Administration or office overhead, and

- Selling and Distribution overhead.

(i) Factory Overhead:

This is the aggregate of indirect material, indirect wages and indirect expenses incurred in the factory. Examples of indirect factory expenses are rent, power, depreciation lighting and heating incurred in the factory.

(ii) Administration or Office Overhead:

All the indirect administration expenses, come under this category. Salaries of office staff, accountants, directors' fees, rent of office building, stationery expenses incurred in the office lighting and bank charges, etc., are the examples.

(iii) Selling and Distribution Overhead:

This includes indirect selling and distribution expenses. Examples are salaries of salesmen, selling commission, advertising, warehouse rent, maintenance of delivery vans, warehouse staff expenses, warehouse lighting, etc.

1.7 PREPARATION OF COST SHEET, TENDERS, QUOTATIONS.

PREPARATION OF COST SHEET:

1. Calculate Prime cost, Factory cost, Cost of Production, Cost of sales and Profit from the following particulars.

Direct materials	1,00,000
Direct wages	25,000
Direct expenses	5000
Wages of foreman	2500
Electric power	500
Lighting factory	1500
Lighting office	500

Rent factory	5000
Rent office	2500
Salary to salesman	1250
Advertising	1250
Income tax	10,000
Sales	1,89,500

Particulars	**Amount**
Direct materials	1,00,000
Direct wages/direct labour	25,000
Direct expenses	5000
Prime cost	1,30,000
Add: Factory Overheads	
Wages of foreman	2500
Electric power	500
Lighting factory	1500
Rent factory	5000
Total Factory OH	8500
Factory cost	1,39,500
Add: Office Overheads	
Lighting office	500
Rent office	2500
Income tax	10,000
Total Office Overheads	13,000
Cost of Production	1,52,500
Add: Sales and distribution OH	
Salary to salesman	1250
Advertising	1250
Total Selling and distribution OH	2500
Cost of sales	1,55,000
Profit	34,000
Sales	1,89,500

Profit= Sales- Cost of sales

2. From the following data, prepare a cost sheet, showing profit for the month. It is customary to fix the selling price by adding 20% to the total cost.

PARTICULARS	**Rs**	**PARTICULARS**	**Rs**
Materials used:		Labour used:	
In manufacturing	80,000	For production	25,000
In primary packing	20,000	For factory supervision	5000
In the factory	2000	Office salaries	6000
In the office	4000	Salesman's salaries	8000
In the selling	5000	Expenses:	
In secondary packing	6000	Direct	2000
Depreciation:		Factory	6000
Factory	4000	Office	4000
Office	3000	Selling	5000

Distribution Vans	2000	Distribution	2000

Particulars	**Amount**
Direct materials	80,000
Direct wages/direct labour	25,000
Direct expenses	2000
Prime cost	1,07,000
Add: Factory Overheads	
Primary packing	20,000
Depreciation factory	4000
Materials in factory	2000
Factory supervision	5000
Factory expenses	6000
Total Factory OH	37,000
Factory cost	1,44,000
Add: Office Overheads	
Materials in office	4000
Depreciation office	3000
Office salary	6000
Office expenses	4000
Total Office Overheads	17,000
Cost of Production	1,61,000
Add: Sales and distribution OH	
Secondary packing	6000
Distribution vans	2000
Salary to salesman	8000
Selling expenses	5000
Distribution expenses	2000
Total Selling and distribution OH	23,000
Cost of sales	1,84,000

Profit	36,800
Sales	2,20,800

INTRODUCTION TO MANAGEMENT ACCOUNTING

Meaning of Management Accounting

It is the study of managerial aspects of accounting. It isa tool in the hands of management to exercise decisionmaking.

DEFINITION

According to ICMA "Management Accounting is the presentation of accounting information in such a way as to assist management in the creation of policy and in the day – to – day operations of an undertaking"

Characteristics (or) Features of Management Accounting

Providing financial information
Cause and Effect of analysis
Use of special techniques
Decision Making
No fixed Conventions
Achievements of objectives
Improving Efficiency
Forecasting
Providing information and not decision

SCOPE OF MANAGEMENT ACCOUNTING

- Financial Accounting
- Cost Accounting
- Budgeting and Forecasting
- Inventory Control
- Statistical Analysis
- Analysis of Data
- Internal Audit
- Tax Accounting

OBJECTIVES & FUNCTIONS OF MANAGEMENT ACCOUNTING

- Presentation of Data
- Aid of Planning and Forecasting
- Help in Organizing
- Decision Making
- Effective Control
- Communication of Management policies
- Incorporation of non-financial information
- Coordination
- Motivating Employees

UNIT 2- MATERIALS & LABOUR

2.1 **LEARNING OUTCOMES**

- Helps students to understand how to keep a record of the purchase history.
- Makes students understand how the inventory is kept is stock always, how stock levels are maintained and so on.
- Gives a clear picture of how to price the products when the raw materials are purchased at various rates.

2.2 PURCHASE RECORDS, ORDERS AND GOODS RECEIVED NOTE

Materials Control Account:

This account shows the total number of transactions relating to materials, for example the total receipt as per invoice and the total number of transfers to stores ledger control as per 'goods received notes'. However, the account is sometimes dispensed with, and only the stores ledger control account is maintained.

Stores Ledger Control Account:

This account is debited for receipt of materials as per the goods received notes and is credited for issue of materials as per materials-requisition or materials analysis sheet. The balance represents the total of stores accounts.

Goods Receipt Notes

The goods receipt note is an internal document produced after inspecting delivery for proof of order receipt. Generally produced by your stores team. It's used by stores, procurement, and finance to raise any issues, update your stock records, and to be matched against the original purchase order and supplier invoice, to allow

payment to be made.

Manually processing paperwork such as goods receipt and delivery notes can take a large amount of staff time in data entry and distribution to various departments. Paper copies of notes can be mislaid, supplier payments delayed and stock control systems out of date.

2.3 INVENTORY CONTROL

Inventory control can be defined as the system used in a manufacturing concern to control the firms investment in Stock. The system involves the recording and monitoring of various stock levels, forecasting future demands and deciding when and how much quantity or order. The overall objective of inventory control is to minimise the costs associated with stock.

Inventory Control Items:

(A) Inventory Control Terminology:

(i) Lead time:

This is a period of time between ordering and replenishment.

(ii) Economic Order Quantity [EOQ]:

This is a calculated recorder quantity which minimizes the balance of cost between carrying costs and ordering costs.

(iii) Buffer Stock or Minimum Stock or Safety Stock:

This is a stock allowance to cover the demand of materials during the lead time. This is the level below which stock is not allowed to fall.

(iv) Maximum level:

This is a stock level calculated as the maximum desirable stock to be maintained and is an indicator to the management to show when stocks have risen too high.

(v) Reorder level:
This is the level of stock at which a further replenishment order should be placed. This stock level is dependent on the lead time and the rate of consumption during the lead time.

(vi) Reorder Quantity:
The quantity of the replenishment order.

2.4 ECONOMIC ORDER QUANTITY

Economic order quantity (EOQ), refers to the optimum amount of an item that should be ordered at any given point in time, such that the total annual cost of carrying and ordering that item is minimized. EOQ is also sometimes known as the optimum lot size.

1. From the following particulars, calculate the EOQ.

Annual requirements 10,800kgs
Cost of purchasing and receiving one order Rs. 1,000
Annual carrying cost Rs. 20.

Solution:

$$EOQ = \frac{2AB}{CS}$$

$$EOQ = \sqrt{\frac{2*10,800*1000}{20}}$$

$$= \sqrt{\frac{2,16,00,000}{20}}$$

EOQ= 103 units

2. Calculate the re-order quantity from the following particulars:

Annual usage	20,000 units
Buying cost per order	Rs. 10
Cost per unit	Rs.100
Cost of carrying inventory	10% of cost

Solution:

$$EOQ = \frac{2AB}{CS}$$

$$EOQ = \sqrt{\frac{2*20,000*10}{100*10/100}}$$

$$EOQ = \sqrt{4,00,000}$$

10

EOQ = 200 units

3. From the following figures, calculate Economic Order quantity:

Annual Consumption of materials = 4000 units
Cost of buying per order = Rs. 5
Cost per unit = Rs. 2
Storage and carrying cost = 8% on average inventory

Solution:

$$EOQ = \frac{2AB}{CS}$$

$$EOQ = \sqrt{\frac{2*4000*5}{2*8/100}}$$

$$= \sqrt{\frac{40,000}{0.16}}$$

EOQ = 500 units

2.5 ABC ANALYSIS

Activity-based costing (ABC) is a costing method that assigns overhead and indirect costs to related products and services. This method recognizes the relationship between costs, overhead activities, and manufactured products, assigning indirect costs to products less arbitrarily than traditional costing methods. However, some indirect costs, such as management and office staff salaries, are difficult to assign to a product.

The ABC calculation is as follows:

1. Identify all the activities required to create the product.
2. Divide the activities into cost pools, which includes all the individual costs related to an activity—such as manufacturing. Calculate the total overhead of each cost pool.
3. Assign each cost pool activity cost drivers, such as hours or units.
4. Calculate the cost driver rate by dividing the total overhead in each cost pool by the total cost drivers.
5. Divide the total overhead of each cost pool by the total cost drivers to get the cost driver rate.
6. Multiply the cost driver rate by the number of cost drivers.

2.6 COMPUTATION OF STOCK LEVELS

1. From the following information, calculate

a) Maximum stock level
b) Minimum stock level
c) Reorder level
d) Average stock level

Minimum consumption - 240 units per day
Maximum consumption - 420 units per day
Normal consumption - 300 units per day
Reorder quantity - 3600 units

Reorder period - 10 to 15 days
Normal reorder period - 12 days

Ans:

Reorder level = Maximum consumption x Maximum reorder period
= 420 x 15
= 6300 units

Maximum stock level = Reorder level + Reorder quantity - (Minimum consumption x Minimum reorder period)
= 6300 + 3600 - (240x 10)
= 9900-2400
= 7500 units

Minimum stock level = Reorder level - (Normal consumption x Normal reorder period)
= 6300 - (300 x 12)
= 6300 - 3600
= 2700 units

Average stock level = $\frac{\text{maximum stock level + minimum stock level}}{2}$
= $\frac{7500 + 2700}{2}$
= 5100 units

2. From the following information calculate maximum, minimum and average stock levels .

Normal consumption per day	500 kgs
Minimum consumption per day	200 kgs
Maximum consumption per day	800 kgs
Lead time	10 to 16 days
Reorder quantity	3000 kgs

Reorder level = Maximum consumption x Maximum reorder period
= 800 x16
= 12800 units

Maximum stock level = Reorder level + Reorder quantity - (Minimum consumption x Minimum reorder period)

= 10050 units

= 12800 + 3000 - (200 x 10)

= 15800 - 2000

= 13800 units

Minimum stock level = Reorder level - (Normal consumption x Normal reorder period)

= 12800 - (500 x 13)

= 12800 - 6500

= 6300 units

Average stock level = Maximum stock level + Minimum stock level

2

= 13800 + 6300

2

2.7 METHODS OF PRICING ISSUES

Pricing of materials refers to valuation of materials issued by the stores department for the production process. Pricing of materials should be done by adopting the method which is suitable for nature of materials and business itself. The methods applied for pricing of materials are as follows:

TYPES:

1. Cost Price Methods
    - FIFO-First In First Out
    - LIFO-Last In First Out
    - Specific Price
    - Base Stock
    - HIFO-Highest In First Out
2. Average Price Methods
    - Simple Average
    - Weighted Average
    - Periodic Simple Average
    - Periodic Weighted Average
    - Moving Simple Average
    - Moving Weighted Average
3. Notional Price Methods
    - Standard Price
    - Inflated Price
    - Re-use Price
    - Replacement Price

1. From the following transactions, prepare separately, the stores ledger account, using the following methods- LIFO, FIFO.

Date	Particulars	Amount
Jan 1	Opening balance	100 units @ Rs. 5 per unit
Jan 5	Received	500 units @ Rs. 6 per unit
Jan 2	Issued	300 units
0		
Feb 5	Issued	200 units
Feb 6	Received back from work order, Issued on Feb 5	
Feb 7	Received	600 units @ Rs. 5 each
Feb 20	Issued	300 units
Feb 25	Returned to supplier	50 units purchased on 7thfeb
Feb 2	Issued	200 units

6		
Mar 10	Received	500 units @ Rs. 7 per unit
Mar 15	Issued	300 units

Stock verification on 15th March revealed a shortage of 10 units.

FIRST IN FIRST OUT- FIFO method

Date	Par	Received			Issued			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
Jan	Bal	-	-	-	-	-	-	100	5	500
1										
Jan 5	**Rec**	500	6	3000	-	-	-	100	5	500
								500	6	3000
Jan 20	**Iss**	-	-	-	100	5	500			
	-	-	-	-	200	6	1200	300	6	1800
Feb 5	**Iss**	-	-	-	200	6	1200	100	6	600
Feb 6	**Rec**	200	6	1200	-	-	-	300	6	1800
Feb	**Rec**	600	5	3000	-	-	-	300	6	1800

7										
								600	5	3000
Feb 20	**Iss**	-	-	-	300	6	1800	600	5	3000
Feb 25	**Ret**	-	-	-	50	5	250	550	5	2750
Feb 26	**Iss**	-	-	-	200	5	1000	350	5	1750
Mar 10	**Rec**	500	7	3500	-	-	-	350	5	1750
								500	7	3500
N	**I**				3	5	1	5	5	2

ar 15	**ss**				00		500	0		50
								500	7	3500
								50	5	250
								490	7	3430

Closing stock= 50 units @ Rs. 5= Rs. 250
490 units @ Rs. 7= Rs. 3430.

2. LAST IN FIRST OUT- LIFO METHOD

Date	**Par**	**Received**			**Issued**			**Balance**		
		Qty	**Rate**	**Amt**	**Qty**	**Rate**	**Amt**	**Qty**	**Rate**	**Amt**
Jan 1	Bal	-	-	-	-	-	-	100	5	500
Jan 5	Rec	500	6	3000	-	-	-	100	5	500
								500	6	3000
Jan20	Iss	-	-	-	300	6	1800	100	5	500
								200	6	1200
Feb 5	Iss	-	-	-	200	6	1200	100	5	500
Feb 6	Rec	200	6	1200	-	-	-	100	5	500
								200	6	1200
Feb 7	Rec	600	5	3000	-	-	-	100	5	500
								200	6	1200

								600	6	3600
Feb20	Iss	-	-	-	300	6	1800	100	5	500
								200	6	1200
								300	6	1800
Feb25	Ret	-	-	-	50	6	300	100	5	500
								200	6	1200
								250	6	1500
Feb26	Iss	-	-	-	200	6	1200	100	5	500
								200	6	1200
								50	6	300
Mar10	Rec	500	7	3500	-	-	-	100	5	500
								200	6	1200
								50	6	300
Mar15	Iss	-	-	-	300	7	2100	100	5	500
								200	6	1200
								50	6	300
								200	7	1400

3. Show the stores ledger account as it would appear when using Highest In First Out method:

April 1 Balance in hand- 300 units @ Rs. 20
April 2. Purchased- 200 units @ Rs. 22
April 4. Issued 150 units
April 6. Purchased 200 units @ Rs. 23
April 11 Issued – 150 units
April 19 Issued – 200 units
April 22 Purchased – 200 units at Rs. 24 April 27 Issued – 250 units

DATE	PARTICULARS	RECEIPTS			ISSUES			BALANCE		
		QTY	RATE	RS	QTY	RATE	RS	QTY	RATE	RS
Apr 1	Balance b/d	-	-	-	-	-	-	300	20	6000
Apr 2	Purchased	200	22	4400	-	-	-	300	20	6000
		-	-	-	-	-	-	200	22	4400
Apr 4	Issued	-	-	-	150	22	3300	300	20	6000
		-	-	-	-	-	-	50	22	1100
Apr 6	Purchased	200	23	4600	-	-	-	300	20	6000
		-	-	-	-	-	-	50	22	1100
		-	-	-	-	-	-	200	23	4600
Apr 11	Issued	-	-	-	150	23	3450	300	20	6000
		-	-	-	-	-	-	50	22	1100
		-	-	-	-	-	-	50	23	1150
Apr 19	Issued	-	-	-	50	23	1150	200	20	4000
		-	-	-	50	22	1100	-	-	-
		-	-	-	100	20	2000	-	-	-
Apr 22	Purchased	200	24	4800	-	-	-	200	20	4000
		-	-	-	-	-	-	200	24	4800
Apr 27	Issued	-	-	-	200	24	4800	150	20	3000
		-	-	-	50	20	1000	-	-	-

Closing stock-
100 units @ Rs. 5 per unit- Rs. 500

200 units @ Rs. 6 per unit- Rs. 1200

50 units @ Rs. 6 per unit- Rs. 300

200 units @ Rs. 7 per unit- Rs. 1400

Closing stock = 150 units x Rs20 = Rs. 3,000

average rate method.

4. SIMPLE AVERAGE METHOD

The following transactions took place in respect of an item:

2 March- Received 200 units @ Rs. 2 per unit

10 March – Received 300 units @ Rs. 2.40 per unit

11 March – Issued 250 units

18. March – Received 250 units @ Rs. 2.60 per unit.

20. March- Issued 200 units

Record the transactions in stores ledger, using simple

Date	Par	Receipts			Issues			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	amt
Mar 2	Rec	200	2	400	-	-	-	200	-	400
Mar 10	Rec	300	2.40	720				500	-	1120
Mar 11	Iss				250	2.2	550	250	-	570
Mar 18	Rec	250	2.60	650	-	-	-	500	-	1220
Mar 20	Iss	-	-	-	200	2.5	500	300	-	720

Simple average is calculated as follows:
Price= (2+2.4) / 2= 2.2

The price of first goods received is not taken into account for calculating the amount for the next issues because, the goods would have been left the godown already.

5. WEIGHTED AVERAGE METHOD

Date	Par	Receipts			Issues			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	amt
Mar 2	Rec	200	2	400	-	-	-	200	2	400
Mar 10	Rec	300	2.40	720				500	2.24	1120
Mar 11	Iss				250	2.24	560	250	2.24	570
Mar 18	Rec	250	2.60	650	-	-	-	500	2.44	1220
Mar	Iss	-	-	-	200	2.44	488	300	2.44	732

20			

Closing stock- 300 units @ Rs. 2.44 – Rs. 732

2.8 PERPETUAL INVENTORY SYSTEM

Perpetual inventory is a method of accounting for inventory that records the sale or purchase of inventory immediately through the use of computerized point-of-sale systems and enterprise asset management software. Perpetual inventory provides a highly detailed view of changes in

inventory with immediate reporting of the amount of inventory in stock, and accurately reflects the level of goods on hand. Within this system, a company makes no effort at keeping detailed inventory records of products on hand; rather, purchases of goods are recorded as a debit to the inventory database. Effectively, the cost of goods sold includes such elements as direct labour and materials costs and direct factory overhead costs.

A perpetual inventory system is distinguished from a periodic inventory system, a method in which a company maintains records of its inventory by regularly scheduled physical counts.

LABOUR

2.9 LABOUR COST CONTROL

Labour cost refers to the amount of money paid to the people who are engaged in the production of goods. In manufacturing businesses, often management will break down labour cost into direct cost and indirect cost.

Employees of any organization, as its precious wealth and backbone, play an important role in its developmental and productive activities. The development and progress of the organization, to a greater extent, are influenced by the effective and systematic utilization of available human resources. In the same analogy, if this resource is not utilized properly, it is sure that its manufacturing and marketing activities are bound to be retarded.

In other words, it is the human resource which is capable of either annihilating an organization which otherwise is doing well or putting an organization on an even keel which otherwise is on the way to extinction. It is these factors which necessitate to lay emphasis on the labour related aspects such as recruitment, training, placement, payment of wages and incentives, etc.

Labour cost is another important element of total cost of any organization and it works out to 40 to 60% of total cost in most of the corporate undertakings. By keeping these labour costs at the minimum level, it is possible to lower the total labour cost, conversion cost, production cost and the cost of sales which

enables the company to offer its products to the customers at a comparatively lower prices which in turn ensures higher demand for the products.

As a result, the company is in a position to earn a higher amount of profit. On the other hand, if the labour costs are not controlled properly, it will have an adverse impact on both the cost economies and profit.

Minimization of labour cost through control does not necessarily mean paying less to the employees. It means obtaining maximum work from the employees by providing them all the facilities – both monetary and non-monetary.

Because, an employee who is satisfied with his employer's remuneration, work environment, fringe benefits, etc., is able to devote his full attention to the overall welfare of the company.

This analysis clearly brings the point to the fore that systematic utilization of the labour force is a necessity. The companies must, therefore, try to accomplish this objective by proper planning and implementation of its policies, programmes, etc., starting from recruitment.

2.10 METHODS OF WAGE PAYMENT

Total wages earned by the employees is termed as remuneration. Time wages or Piece wages earned plus other financial incentives constitute the earning of employees. Productivity mainly depends on labour and other things like better equipment, production planning are contributory factors to higher productivity. Good wage system along with effective incentive system will encourage the labour force to give their best to the employeer.

Methods of remuneration

- Time rate system
- Piece rate system

Piece rate system

- Straight piece rate
- Differential piece rate

e piece rate

<83%- ordinary piece rate

83-100%- 110% of o p r

>100%- 120% of o p r

- Gantt' task and Bonus plan.

Output is below standard, guaranteed time wages – Below 100%

Output is at standard, time rate + 20% bonus- At 100%

Output is above standard, High piece rate- Above 100%

Differential piece rate

- Taylor's differential piece rate

Low piece rate applicable for below standard output- 80%

High piece rate applicable for above standard output- 120%

- Merrick's differential/multipl

The output of a worker X is 100 units in 40 hours per week. Graduated time rate is Rs. 4 per hour. Ordinary piece rate is Rs. 2 per unit. Show the earnings of the worker under piece rate and time rate system.

Piece rate =No. of. piece x Rate per piece

= 100 * 2 =Rs.200.

Time rate = Hours worked x Rate per hour

= 40 *4 = Rs.160.

A worker is paid at rs.2 per unit for the unit for the units produced by him . His hourly wage rate is Rs.3 per hour. In a working day of 8 hours the worker has produced 10 units . Calculate the wages of the worker according to time rate and piece rate system.

Piece rate = No. Of. Piece x Rate per hour

= 2 * 10=Rs. 20

Time rate = Hours worked x Rate per hour

= 8 * 3= Rs. 24

TAYLOR'S DIFFERENTIAL PIECE RATE

From the following particulars, Calculate the earnings of workers A & B under straight piece rate system and Taylor's Differential piece rate system.

Standard time allowed 25 units per hour

Normal time rate Rs. 50 per hour

In a day of 8 hours A produced 150 units and B produced 250 units.

Ans:

Calculation of piece rates:

Standard production for 1 hour= 25 units
Standard production for 8 hours= 25*8= 200 units
Rate per hour= Rs. 50
Straight piece rate= 50/25 units= Rs. 2 per unit
Low piece rate= 2*(80/100)= Rs. 1.6 per unit
High piece rate= 2*(120/100)= Rs. 2.4 per unit

Calculation of Earnings of workers:

A- Under straight piece rate
Units produced * Rate per unit= 150*2= Rs. 300

B- Under straight piece rate
Units produced * Rate per unit= 250*2= Rs. 500

A- Under Taylor's differential piece rate
Standard production is 200 units
Actual production is 150 units
Efficiency is BELOW standard
Piece rate= Low piece rate at 80%
Wages= 150*1.6= Rs. 240

B- Under Taylor's differential piece rate
Standard production is 200 units
Actual production is 250 units
Efficiency is ABOVE standard
Piece rate= High piece rate at 120%
Wages= 250*2.4= Rs. 600

MERRICK'S MULTIPLE PIECE RATE SYSTEM

Calculate the earnings of 3 workers A, B and C under the Merrick's plan using the following information:

Standard prod- 120
A- 90 units
B- 100 units
C- 130 units
Ordinary piece rate- 0.10

Ans:
Performance of workers- Actual prod/Standard prod * 100

A. 90/120 * 100 = 75%
B. 100/120 * 100= 83.33%
C. 130/120 * 100= 108.33%

<83%- ordinary piece rate
83-100%- 110% of o p r
>100%- 120% of o p r

A. 90*0.10= Rs. 9
B. 100* 0.10*1.10=Rs. 11
C. 130*0.10*1.20= Rs. 15.6

GANTT'S Task and Bonus plan

The following particulars are applicable to a work process:

Time rate- Rs. 5 per hour, 40 hours per week
High task- 40 units per week
Piece rate above high task- Rs. 6.5 per unit

A. 35 units
B. 40 units
C. 41 units
D. 52 units

Calcuate the wages under Gantt's task and bonus plan.

Output is below standard, guaranteed time wages – Below 100%
Output is at standard, time rate + 20% bonus- At 100%
Output is above standard, High piece rate- Above 100%

Level of Performance

A. 35/40 * 100= 87.5%
B. 40/40 * 100= 100%
C. 41/40 * 100= 102.5%
D. 52/40 * 100= 130%

Wages

A. Below standard, so time wages- 40*5= Rs. 200
B. 40*5 + 20% (40*5)= 200+40= Rs. 240
C. High piece rate- 41*6.5= Rs. 266.5
D. 52*6.5= Rs. 338

Guaranteed time rate- Re. 1 per hour, 8 hours per day
High piece rate- Re. 0.20 per unit
Standard output- 10 units per hour- 10*8= 80 units

In a day of 8 hours,
A. 70 units
B. 80 units
C. 90 units

Performance of workers
A. 70/80 * 100= 87.5%
B. 80/80 * 100= 100% (At standard)
C. 90/80 * 100= 112.5%

Wages
A. Time rate- 8*1= Rs. 8
B. 8 + 20% 8= Rs. 9.6
C. 90* 0.20= Rs. 18

2.11 METHODS OF INCENTIVES

From the following particulars, calculate earnings of a worker under:

1. Halsey plan
2. Rowan plan
3. Halsey-weir plan.

Wage rate- Rs. 2 per hour
Production per hour- 4 units
Dearness allowance- Re. 1 per hour
Standard time fixed- 80 hours
Actual time taken- 50 hours
Production- 250 units

Halsey Plan

Earnings= T*R +(50/100)(S-T) R+D.A

= 50*2 + 0.5(80-50)2+ 50*1
= 100+ 30+50
= Rs. 180

Rowan Plan

Earnings= T*R + (S-T)/S * T*R+D.A

= 50*2+
0.375 *
50*2+50*
1
=
100+37.5
+50
= Rs.
187.50

Standard time- 25 hours
Actual time- 20 hours
Standard rate per hour- Rs. 12

Earnings= Rate per hour * √Standard time*Actual time

= 12*√25820
= 12*22.36
= Rs. 268.33

Halsey-Weir Plan

Earnings = T*R + (30/100) (S-T)*R

= 50*2 +
0.3
(30)*2
=100+18
= Rs. 118

2.12. TREATMENT OF OVERTIME AND IDLE TIME

Calculate the overtime and idle time wages payable to a workman from the following data:

Days	Hours worked
Monday	8
Tuesday	12
Wednesday	10
Thursday	10
Friday	9
Saturday	4
Total	53

Normal working hours- 8 per day; Normal rate- Re. 0.50 per hour
Overtime rate: Upto 9 hours in a day at single rate and over 9 hours in a day at double rate

Barth's Variable Sharing Plan

From the following details, Calculate the earnings of worker under Barth's Variable sharing plan.

Days	**Total hrs worked**	**Normal working hrs**	**Overtime**	
			Single rate	Double rate
Mon	8	8	-	
Tue	12	8	1	3
Wed	10	8	1	1
Thu	10	8	1	1
Fri	9	8	1	-

sat	4	Number of employees discharged- 5		-
Total		Number of employees replaced- 18		5

Calculate labour turnover by applying all three methods.

Normal working hours – 48* 0.50= Rs. 24
Overtime- single rate- 4* 0.50= Rs. 2

Double rate= 5* 1= Rs 5
Total wages= Rs. 31

Average number of employees=(No of workers in the beginning + No of employees in the end) / 2

= 200+240 / 2
Average no of employees = 220

Seperation method= (No of employees resigned+discharged) / average no of employees * 100
= 20+ 5 / 220 * 100= 11.36%

Replacement method= No of workers replaced / avg no of workers * 100
= 18/220 * 100
= 8.18%

2.13 LABOUR TURNOVER

R company gives the following information:

Number of employees in the beginning- 200
Number of employees at the end- 240
Number of employees resigned- 20

Flux method= no of seperations+ no replaced / avg employees * 100
= 25+18/220 * 100= 43/220 * 100
= 19.54%

UNIT 3- OVERHEADS

3.1 LEARNING OUTCOMES

- Students will be able to identify the different heads of expenses.
- Will be able to classify the expenses

3.2 MEANING AND DEFINITION OF OVERHEADS

The indirect coat constitutes the 'overhead' which in the total of indirect material indirect labour and indirect expenses. CMA define a indirect coat as "expenditure on labour materials or services which cannot be economically identified with a specific saleable coat unit"

According to Whelden "overhead may be defined as the coat of indirect tax material indirect labour and Such other expenses including services as cannot conveniently be charged to a specific unit. Alternatively overhead are all the expense other than direct expense"

3.3. CLASSIFICATION OF OVERHEAD COSTS

Cost classification the process of grouping of cost accounting to their characteristics and establishing a series of special groups according which coats are clarified. The format refers to determination of various group according to which are to be classified. The letter refers to the process of actually classifying the cost and accumulating according in the group.

1. Identification of group in which overheads are sub grouped
2. The process of classification of various items of overheads into cost or another of the groups Determination of classifying groups.

The method of classification of overheads depend on nature and size of the business.
The various bases for classification are as under:
(1) Manufacturing overhead
(2) Administration overhead
(3) Selling overhead
(4)Distribution overhead,

3.4 DISTRIBUTION OF OVERHEADS

1t is that portion of marketing costs incurred un warehousing saleable product and in delivering product to customers. It includes all expenses incurred from the time product in made in the factory until it destination. The examples of distribution expenses are carriage outward, warehouse at off salaries, warehouse rent, packing required for transport and insurance, etc.

RESEARCH DEVELOPMENT OVERHEADS

- Fixed overhead costs
- Variable overhead costs
- Semi variable overhead costs
- Cost segregation i.e..., Determination of Degree of Variability of Expenses salaries, warehouse rent, packing required for transport and insurance, etc.

PRIMARY DISTRIBUTION OF OVERHEADS

- Primary distribution of overheads is the process of allocating and apportioning the costs on suitable basis to ail the departments or cost centers Primary distribution is done without distinction between production and service departments.
- In order to ascertain the correct cost of cost centres and cost units, suitable cases have to be adopted for allocation and apportionment of overhead The under mentioned are some of the bases adopted for apportionment of manufacturing overheads.
- Direct allocation Wherever traceable, overheads are too he directly allocated to particular departments Examples are power, overtime premium of particular departments
- Labour hours Overheads are apportioned on the basis of direct labour hours of different departments
- Machine: Overheads are distributed on the basis of machine hours worked in each department indirect maternal and maternal handling charges.

SECONDARY DISTRIBUTION OF OVERHEADS

In the primary distribution of overbids, the overhead expenses are distributed among all the departments or cost centers, whether it is production department or service department.
In fact the production departments are engaged in producing goods whereas service departments assist them in the process of production. Hence ultimately the service department costs need to be spread over the production department and only then the overheads can be charged to production.
This process of apportioning service department expenses among the production departments is called secondary distribution of overheads. In other words, secondary distribution is the reapportionment of service department expenses among the production departments after completion of primary distribution.
While making secondary distribution, some common bases of apportionment are taken.

1. Explain different kinds of overhead absorption rates.

The "X" machine shop has 3 cost centres A, B, C each having distinct set of machines.

	A	B	C	Total
(a) No. of workers	400	400	800	1,600
(b) No. of machine hours	50,000	50,000	60,000	1,60,000
(c) Percentage of H.P.	40	25	35	100

(d) Value of assets (Rs. in lakhs)

20 35

30

85

(e) Direct wages (Rs. in lakhs)

16

20 24

60

(f) Indirect wages (Rs. in lakhs)

18

(g) Supervisory salaries (Rs. in lakhs)

7

(h) Depreciation (Rs. in lakhs)

8.50

(i) Insurance (Rs. in lakhs)

4.25

(j) Electricity charges (Rs. in lakhs) 12

(k) Welfare expenses (Rs. in lakhs) 9

(l) Office and other expenses(Rs. in lakhs) 16

Work out a composite machine hour rate for each of the cost centers.

Solution:

COMPUTATION OF MACHINE HOUR RATE OF COST CENTER

Particulars	Basis	A	B	C
Indirect wages	Workers	4.5	4.5	9
Superior salary	Workers	1.75	1.75	3.5
Depreciation	Assets	2	3.5	3
Insurance	Assets	1	1.75	1.5
E.B	%of hp	4.8	3	4.2
Welfare expenses	Workers	2.25	2.25	4.5
	Direct wages	4.27	5.33	6.4
Office and expense		20.57	22.08	32.1
Total		50000	50000	60000
Total machinehour		41.14	44.16	53.5
Machine hour rate				

2. The following annual charges are incurred in respect of a machine in a shop where no manual labour and work done by 5 machines of same type.

	Rs.
(a) Rent and rates (proportional to floor space occupied) for shop	4,800
(b) Depreciation on each machine	500
(c) Repairs and maintenance for 5 machines	1,000
(d) Power (as per meter) at 5p per unit for shop	3,000
(e) Electric charges for light in shop	540

(f) Attendants : 2 for 5 machines and each paid Rs. 60 per month.

(g) For the 5 machines, there is 1 supervisor paid at Rs. 250 p.m

(h) Sundry supplies - lubricants, jute etc., for the shop

450

(i) Hire purchase instalment payable for machine (including Rs. 300 as interest) 1,200

The machine uses 10 units of power per hour. Calculate machine hour rate.

Solution:

COMPUTATION OF MACHINE HOUR DATE

Particulars	Rs	Rs
Rent and rates 4800×1 –	960	
——5		
Lighting charges 540×1 ——5	288	
Attendant salary 1440×1 ——5	600	
Supervision 3000×1 ——5	900	1.705
	204	0.4167
Sundry supplies 4500×1 –	1200	0.1666 0.5

— 5		2.7884
Standing charges/year		
Hour rate /machine		
Machine expenses		
Depreciation 500÷1200		
Repairs 200÷1200		
Power Comprehensive machine hour		

rate		

Working notes

Total amount of power=rs 3000

Rate/hour=rs.050

Total working hour=$\frac{3000}{0.5}$ =6000hrs

Hours/machine=$\frac{6000}{5}$ =1200hrs

3. A company has three production departments and two service departments. The expenses of the departments for a particular period are given below :

Production departments :

A – Rs.6,300 ; B – Rs.7,400 ; C – Rs.2,800

Service departments :

X – Rs.4,500 ; Y – Rs.2,000

It was decided to apportion the service departments expenses as follows :

Production depts				Service depts	
Service depts :	A	B	C	X	Y
X	40%	30%	20%	–	10%
Y	30%	30%	20%	20%	–

Solution:

SECONDARY OVERHEAD DISTRIBUTION

Particulars	A	B	C	X	Y
Primary distribution	6300	7400	2800	4500	2000
X- 40:30:20:10	1800	1350	900	4500	450
	8100	8750	3700	-----	2450
Y- 30:30:20:20	735	735	490	490	(2450)
	8835	9485	490	490	------
X-					

40:30:20:10	196	147	98	(490)	49
	9331	9662	4288	---	49
Y-					
40:30:20:10	15	14	10	10	(49)
	9346	9646	4298	10	----
X-	4	4	2	(10)	---
40:30:20:10	9350	9650	4300	---	---

3.5 ABSORPTION OF OVERHEADS

The last step is the process of accounting for manufacturing overhead is 'Absorption' of the overhead The process of charging the overhead cost of a cost center to the cost units is called overhead absorption.

According to I.C.M.A, overhead absorption is "the allotment of overhead tocost units by means of rates separately calculated for each cost center." The terms 'overhead absorption', 'recovery', 'charge' and 'application of overheads 'are used interchangeably. Allotment of overhead to cost units is of great importance as each unit of output should share a reasonable portion of overhead, besides bearing the cost of direct material and wages. Overhead absorption is accomplished by overhead rates.

OVERHEAD RATES

Absorption of overheads is the 'charging' of overheads of a department or a cost center to the cost units which pass through the department or cost centre. In order to equitably charge the overhead expenses to cost units a suitable base must be adopted. The base selected is used to calculate a uniform 'Rate' to absorb the overheads which is called 'Absorption rate'. The absorption rate is calculated by dividing the overhead by the units of base selected such as units of production, labour hours, machine hours, etc. The overhead cost of products or jobs is arrived at by multiplying the rate by units of base contained in the job product or process, etc.

1. Kannan industries Ltd., has four departments. A,B and C are production departments and D is the service department. The actual expenses for a month were as follows:

	Rs.		Rs.
Rent	10,000	Supervision	15,000
Repairs to plant	6,000	Insurance of stock	5,000
Depreciation	4,500	Power	9,000
Lighting charges	1,000		

Employer's liability for insurance Rs. 1,500

The following information is also available:

	Dept A	Dept B	Dept C	Dept D
Area (sq. feet)	1,500	1,100	900	500
Number of lights	75	11	9	5
Number of employees	200	150	100	50
Total wages (Rs)	60,000	40,000	30,000	20,000
Value of plant(Rs)	2,40,000	1,80,000	1,20,000	60,000
Value of stock(Rs)	1,50,000	90,000	60,000	–

Apportion the costs to four departments on the most equitable method.

Solution:

PRIMARY DISTRIBUTION OF O/H

Particulars	**Basics**	**A**	**B**	**C**	**D**	**Total**
Rent Depreciation	**Area** **Plant** Plant	**3750**1800024000750	**27501350**1800110	**2250**900120090 30	**1250450**60050 150	**10000**45006000100

Repairs of plant Lighting Supervisio	No of - lights No of - Employees Val	6000 2500 3600600 _ 21400	4500 1500 2700450 _ 15160	00 1000 1800300 _ 10540	0 _ 90015020000 **24900**	0 150000 50000 9000015002 0000 **72000**

ry	ue					
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ow	Em					
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3. Kannan industries Ltd., has four departments. A,B and C are production departments and D is the service department. The actual expenses for a month were as follows:

	Rs.		Rs.
Rent	6,000	Supervision	9,000
Repairs to plant	3,600	Insurance of stock	3,000
Depreciation	2,700	Power	5,400
Lighting charges	600		

Employer's liability for insurance Rs. 900

The following information is also available:

	Dept A	Dept B	Dept C	Dept D
Area (sq. feet)	300	220	180	100
No. of workers	48	32	24	16

Number of employees
200
150
100
50
Total wages (Rs)
8,000
6,000
4,000
2,000
Value of plant (Rs)
24,000
18,000
12,000
6,000
Value of stock (Rs)
15,000
9,000
6,000
–

Apportion the costs to four departments on the most equitable method.

Solution:

PRIMARY DISTRIBUTION OF O/H

articulars	sis	tal				
Rent	Area	6000	2250	1650	1350	750
Repairs	Plant	3600	1440	1080	720	360
Depreciation	Plant	2700	1080	810	540	270
Lighting-charges	Area	600	225	165	135	75
Supervision	Employees	9000	3600	2400	1800	1200
Insurance-On stock	Stock	3000	1500	900	600	_
Power	Plant	5400	2160	1620	1080	540
Employees-Insurance	Employees	900	360	240	180	120
Wages	Direct	2000	_	_	_	2000
Total-overhead		33200	12615	8865	6405	5315

3.6. MACHINE HOUR RATE

Calculate the machine hour rate for machine A
Cost of machine – Rs.16,000
Estimated scrap value – Rs.1,000
Effective working life – 10,000 hours
Running hours for a 4 weekly period – 160 hours
Average repairs and maintenance for a 4 weekly period – Rs. 120
Average standing charges for a 4 weekly period – Rs.40
Power 4 units per hour at a cost of 25 paise per hour.

Solution:

MACHINE HOUR RATE

P	B a	T o	A	B	C	D	Particulars	Cost/hour
							Standingcharges	40÷160 0.25

Machine expenses	1.5
Depreciation 16000-10000	
Repairs 120-160	0.75
Power 4×0.25	1
Machine hours used	3.5

UNIT 4- CASH FLOW ANALYSIS & RATIO ANALYSIS

4.1 Learning outcomes

To understand the uses of the statement of cash flows

To understand the cash flow classifications appearing on the statement of cash flows

Learn to analyse the importance of ratios in judging any company.

4.2 Meaning of Cash flow statement:

It is a statement which portrays the changes in the cash position between two accounting period. The detailed analysis provided in such a statement provides a clear insight to the management about the different sources of cash inflows and the different uses or application which cash is needed.

4.3 How its differ from Funds Flow Statement?

Preparation

Accounting concept

Uses

Changes

Techniques used

4.4 Advantages of CFS (Cash Flow Statement)

Forecasting

Effective Cash Management

Formulation of Financial Policies

Preparation of cash budget

Short term decision

Liquidity position

4.5 Preparation of Cash Flow Statement

Steps to prepare CFS….

1. Statements of Funds From Operation (FFO) (5MKS)
2. Statements of Cash From Operation (CFO) (5MKS)

3. Both in a Single Statement
4. Cash Flow Statement (10 MKS)

in Current Liability - Increase Cash

Decrease in Current Liability - Decrease Cash

Increase in Current Asset - Decrease Cash

Decrease in Current Asset - Increase Cash

FORMATS

Important Hint:

Increase

Form of Statement of cash from operations

(a) Forms showing funds from operations and cash from operations separately.

Statement of Funds From Operations

Particulars	*Rs.*	*Rs.*
Net profit as per P & L A/c		xxxx
Add: Depreciation on fixed assets	xxx	
Loss on sale of investments	xxx	
Goodwill written off	xxx	
Preliminary expenses written off	xxx	
Transfer to reserves	xxx	xxxx
		xxxxx
Less: Profit on sale of fixed assets	xxx	
Profit on sale of investments	xxx	xxx
Funds from operations		xxxxx

(or)

Form of Cash Flow Statement

(A) Form excluding computation of cash from operations

(1) Report Form:

Cash Flow Statement for the year ended .....

Particulars	*Rs.*	*Rs.*
Opening Balances: Cash	xxx	
Bank Balance	xxx	xxx
Add: Sources of cash:		
Cash from operations	xxx	
Issue of shares	xxx	
Issue of debentures	xxx	
Sale of fixed assets	xxx	
Sale of investments	xxx	
Long term loans taken, etc.	xxx	
Total sources		xxx
Total cash available		xxx
Less: Applications of cash:		
Cash out flow on account of operations	xxx	
Redemption of preference shares	xxx	
Redemption of debentures	xxx	
Loans repaid	xxx	
Tax paid	xxx	
Dividend paid, etc.	xxx	
Total applications		xxx
Closing balances: Cash	xxx	
Bank balance	xxx	xxx

Note: If there is bank overdraft at the beginning of the period or at the end of the period, it can be shown as a negative figure. All additions or reductions should be adjusted accordingly. (See Illustration Nos 14 & 15)

(2) Account Form

Cash Flow Statement may also be presented in the account form as shown below:

Cash Flow Statement for the year ended.....

Sources	*Rs.*	*Rs.*	*Applications*	*Rs.*	*Rs.*
Opening Balances:			Cash out flow on account		
Cash	xxx		of operations		xxx
Bank balance	xxx	xxx	Redemption of preference shares		xxx
Cash from operations		xxx	Redemption of debentures		xxx
Issue of shares		xxx	Purchase of fixed assets		xxx
Issue of debentures		xxx	Repayment of loans		xxx
Sale of fixed assets		xxx	Tax paid		xxx
Loans borrowed, etc.		xxx	Dividend paid		xxx
			Closing balances: Cash	xxx	
			Bank balance	xxx	xxx
		xxx		xxx	xxx

SITUATIONS

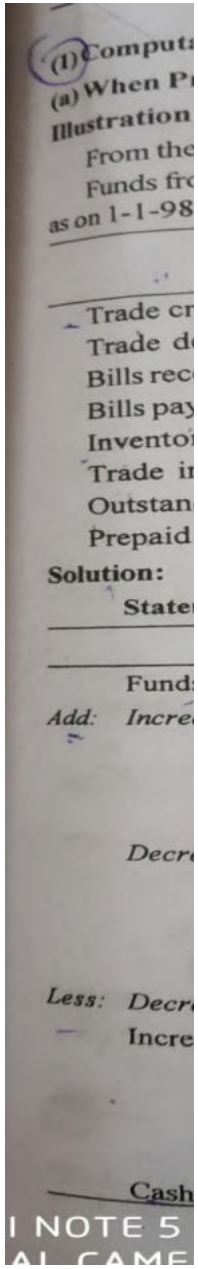
To Compute CFO (Cash From Operations) 5 mks

- When Profit and Current Liabilities are given
- When P&L A/c alone is given
- When Balance Sheet alone is given
- When sundry details are given

Accounting Treatment for various situations

To compute CFS (Cash Flow Statements) 10 mks

- CFS of Sole Trader & Partnership
- CFS of Without sale of Fixed Assets
- CFS of With Sale of Fixed Assets
- CFS of Issue of Shares



1. Compute cash from operations from the following. Profit for the year 1996 is a sum of Rs.10,000 after providing for depreciation of Rs.2,000

Particulars	1995	1996
Sundry Debtors	10,000	11,00
Prov.doubtful debts	1,000	1,200
Bills Receivables	4,000	3,000
Bills Payable	5,000	6,000
Sundry Creditors	8,000	9,000
Inventories	5,000	8,000
Short term investment	10,000	12,00

Inventories 3000

Sort term investment 2000

solution

CFO

Amt Amt

9,200

Particular

RATIO ANALYSIS

FFO (profit + depre) 12000

4.6 Meaning:

Add: Bills Payable 1000

S.Creditors 1000

Pro.doubt 200

Bills Receivable 1000 3200

Less: 15200

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- Ratio is an expression of relations

hip between two or more items in mathematical terms.Exhibition of meaningful and useful relation between different accounting data is called Accounting Ratio. Ratio may be expressed as a:b (a is to b), in terms of simple fraction, integer, or percentage.

4.7 Advantages of Ratio Analysis:

- It is powerful tool to measure short and long-term solvency of a company.
- It is a tool to measure profitability and managerial efficiency of a company.
- It is an important tool to measure operating activities of a business.
- It helps in analyzing the capital structure of a company.
- Large quantitative data may be summarized using ratio analysis.

4.8 Limitations of Ratio Analysis:

- If the data received from financial accounting is incorrect, then the information derived from ratio analysis could not be reliable.
- Unauthenticated data may lead to misinterpretation of ratio analysis.
- Future prediction may not be always dependable, as ratio analysis is based on the pastperformance.
- To get a conclusive idea about the business, a series of ratios is to be calculated. A single ratio cannot serve the purpose.
- It is not necessary that a ratio can give the real present situation of a business, as the result is based on historical data.

4.9 Uses of Ratio Analysis

- To know the financial strength and weakness of an organization.
- To measure operative efficiency of a concern.
- For the management to review past year's activity.
- To assess level of efficiency.
- To predict the future plans of a business.

olvency, profitability and managerialefficiency of a concern.

- To optimize capital structure.
- In inter and intra company compariso ns.
- T o m e a s u r e l i q u i d i t y , s

- In proper utilization of assets of a company.
- In budget preparation.
- In assessing solvency of a firm, bankruptcy position of a firm, andchances of corporate sickness.

(
Balance Shee
• Current Ratio • Liquid Ratio • Absolute Liquid • Debt Equity Rat • Proprietorship F • Capita Gearing • Assets Propriet • Capital Inventor Capital Ratio • Ratio of Curren Fixed Assets

FUNCTIONAL CLASSIFICATION OF RATIOS			
Liquidity Ratios	**Long-Term Solvency and Leverage Ratios**	**Activity Ratios Asset Management Ratios**	**Profit Abili**
(A) • Current Ratio • Liquid Ratio • Absolute Liquid or Cash Ratios • Interval Measure (B) • Debtors Turnover Ratio • Creditor Turnover Ratio • Inventory Turnover Ratio	• Debt/Equity Ratio • Debt to total Capital Ratio • Interest Coverage Ratio • Cash Flow/ Debt • Capital Gearing	• Inventory Turnover Ratio • Debtors Turnover Ratio • Fixed Assets Turnover Ratio • Total Assets Turnover Ratio • Working Capital Turnover Ratio • Payable Turnover Ratio • Capital Employed Turnover Ratio	**(A) In re sales** • Gross Pr • Operatin • Operatin • Operativ Ratio • Net Profi • Expense **(B) In re Investmer** • Return o Investme • Return o • Return o • Return o • Resource • Earnings • Price Ea Ratio

S
(a) Current Ratios
(b) Quick or Acid Te Ratio
(c) Absolute Liquid F
(d) Interval Measure
Cur
(a) Inventory /Stock Ratio
(b) Debtors or recei Turnover Ratio/Velo
(c) Average Collecti
(d) Creditors / Payal Ratio / Velocity
(e) Average Paymer
(f) Working Capital T Ratio

Analysis of Long-term Financial Position or Test of Solvency	
(a) Debt Equity Ratio	$= \frac{\text{Outsiders Funds}}{\text{Shareholders' Funds}}$ or $= \frac{\text{Outsiders' Equities}}{\text{Internal Equities}}$
(b) Funded Debt to Total Capitalization Ratio	$= \frac{\text{Funded Debts}}{\text{Total Capitalization}} \times 100$
(c) Ratio of Long term Debt to Shareholders, Funds (Debt Equity)	$= \frac{\text{Long term Debts}}{\text{Shareholders' Funds}}$
(d) Proprietary or Equity Ratio	$= \frac{\text{Shareholders Funds}}{\text{Total Assets}}$
(e) Solvency Ratio	$= \frac{\text{Total Liabilities to Outsiders}}{\text{Total Assets}}$
(f) Fixed Assets Net Worth Ratio	$= \frac{\text{Fixed Assets after Depreciation}}{\text{Shareholders' Funds}}$
(g) Fixed Assets Ratio or Fixed Assets to Long Term Funds	$= \frac{\text{Fixed Assets after Depreciation}}{\text{Total long term Fund}}$
(h) Ratio of Current Assets to Proprietary funds	$= \frac{\text{Current Assets}}{\text{Shareholders' Funds}}$
(i) Debt-Service or Interest Coverage	$= \frac{\text{Net Profit (before Int. \& Taxes)}}{\text{Fixed Interest Charges}}$
(j) Total Coverage or Fixed Charge Coverage	$= \frac{\text{EBIT}}{\text{Total Fixed Charges}}$
(k) Preference Dividend Coverage Ratio	$= \frac{\text{Net Profit (before Int.\& Tax)}}{\text{Preference Dividend}}$

(i) General Profitab	
(a) Gross Profi	
(b) Operating F	
(c) Expenses R	
(d) Net Profit R	
(e) Operating F	
(a) Return on Share Investment (RoI)	
(b) Return on Equit	
(c) Earnings per Sh	
(d) Return on Gross Employed	
(e) Return on Net C Employed	
(f) Return on Assets	
(g) Capital Turnove	
(h) Fixed Assets Tu	
(i) Working Capital Ratio	

Market Test or Valuation Ratio	
(a) Dividend Yield Ratio	$= \frac{\text{Dividend per Share}}{\text{Market Value per Share}}$
(b) Dividend Payout Ratio	$= \frac{\text{Dividend per Equity Share}}{\text{Earnings per Share}}$
(c) Price/Earnings (P/E) Ratio	$= \frac{\text{Market Price per Equity Share}}{\text{Earnings per Share}}$
(d) Earning Yield Ratio	$= \frac{\text{Earnings per Share}}{\text{Market price per share}}$
(e) Market Value Book Value Ratio	$= \frac{\text{Market value per share}}{\text{Book value per share}}$
(f) Market Price to Cash Flow Ratio	$= \frac{\text{Market price per share}}{\text{Cash flow per share}}$
Market Test or Valuation Ratio	
(a) Capital Gearing Ratio	$= \frac{\text{Equity Share Capital + Reserve \& Surplus}}{\text{Pref.Capital + Long term Debt bearing Fixed Interest}}$
(b) Total Investment to Long Term Liabilities	$= \frac{\text{Shareholders Fund + Long term Liabilities}}{\text{Long term Liabilities}}$
(c) Debt Equity Ratio	$= \frac{\text{Outsiders Funds}}{\text{Shareholders Funds}}$
(d) Ratio to Fixed Assets to Funded Debt	$= \frac{\text{Fixed Assets}}{\text{Funded Debts}}$
(e) Ratio of Current Liabilities to Proprietors fund	$= \frac{\text{Current Liabilities}}{\text{Shareholders' Funds}}$
(f) Ratio of Reserve to Equity Capital	$= \frac{\text{Reserves}}{\text{Equity Share Capital}} \times 100$
(g) Financial Leverage	$= \frac{\text{EBIT}}{\text{EBIT} - \text{Interest \& Pref.Dividend}}$
(h) Operating Leverage	$= \frac{\text{Contribution}}{\text{EBIT}}$

SOLVENCY

RATIO:

Solvency (or) Financial ratios include all ratios which express financial position of the concern. It is also known as Balance Sheet ratios.

Financial ratios are

as under:

1. Overall solvency
2. Short term solvency (or) Liquidity ratios
   a) Current Ratio
   b) Liquid Ratio
   c) Cash Position Ratio
3. Long-term Solvency Ratios
   a) Fixed Assets Ratio
   b) Debt Equity Ratio
   c) Proprietary Ratio
   d) Capital Gearing Ratio

III. Solvency or

Solvency or
of the concern.
Sheet. Therefor
may mean diff
Creditors, bank
financial positi
long-term solv
interested parti
funds. The sign
and long-term
Therefore fi
(1) Overall
(2) Short-te
(i)
(ii)
(iii)
(3) Long-te
(i)
(ii)
(iii)
(iv)

(1) *Overall sol*

It is a ratio
funds. In a sens
Formula:

In this ratio,
shows the prop
greater risk an
vulnerable to
borrowing bec
called 'Highly

(2) *Short-term*

(1) *Current*
'current ratio'.
concern, compa
ratio indicates
they are due fo

Formula: $$\text{Current Ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The term current assets includes debtors, stock, bills receivables, bank and cash balances, prepaid expenses, income due and short-term investments.

The term current liabilities includes creditors, bank overdraft, bills payable, outstanding expenses, income received in advance, etc.

Standard expected current ratio: Internationally accepted current ratio is 2 : 1 *i.e.*, current assets shall be 2 times to current liabilities.

The business concern will be able to meet its current obligations easily with such a ratio between its current assets and liabilities. The ability of the concern also depends on composition of current assets. If current assets have more of stock, debtors, other than cash and bank, it may be difficult to meet current obligations. But at the same time most of the current assets consist of bank and cash, it is easier to meet the obligations. A very high current ratio also does not indicate efficiency since it means less efficient use of funds. A high current ratio also indicates dependence on long-term sources of raising funds. Long-term funds are more expensive than current liabilities. A ratio of less than 2 indicates inadequate current assets to meet current liabilities. Ideal ratio of '2' is insisted because even if current assets are reduced to half i.e., '1' instead of '2', creditors will be able to get their dues in full. The difference between the current assets and current liabilities acts as 'cushion' and provides flexibility for payments.

(2) *Liquid Ratio:* This ratio is also called 'Quick' or 'Acid test' ratio. It is calculated by comparing the quick assets with current liabilities.

Formula:

$$\text{Liquid ratio} = \frac{\text{Quick assets or liquid assets}}{\text{Current liabilities}}$$

Quick or liquid assets refer to assets which are quickly convertible into cash. Current assets other than stock and prepaid expenses are considered as quick assets.

The ideal liquid ratio or the generally accepted 'norm' for liquid ratio is '1'.

Comparison of quick ratio with current ratio indicates the inventory hold ups.

(3) *Cash position ratio:* This ratio is also called 'Absolute Liquidity ratio' or 'Super quick ratio'. This is a variation of quick ratio. This ratio is calculated when liquidity is highly restricted in terms of cash and cash equivalents. This ratio measures liquidity in terms of cash and near cash items and short-term current liabilities. Cash position ratio is calculated with the help of the following formula.

Formula:

$$\text{Cash position ratio} = \frac{\text{Cash and Bank Balances} + \text{Marketable securities}}{\text{Current liabilities}}$$

An ideal cash position ratio is 0.75 : 1. This ratio is a more rigorous measure of a firms liquidity position. It is not a widely used ratio.

Long-term Solvency

(1) *Fixed assets*

assets and long-term

the proportion of lon

as given below:

Formula :

The ratio should

indicates that a port

It is desirable in tha

or less a fixed item.

An ideal fixed a

Fixed assets rat

short-term funds,

Fixed assets he

Long-term fun

(2) *Debt equity*

position of a com

ratio'.

Formula:

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Ideal ratio is

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1. Debt-

2. Debt-

3. Debt-

The third form
owners' funds is th

(3) *Proprietary*
funds and total tan
between the propr

Formula

Pro

This ratio sho
interest to the c
shareholders fun
safety to the cred

A ratio below
the event of com
lesser of shareho

(4) ***Capital Gear***

This ratio is a
long-term solven
The ratio establi
funds and equity
the help of the fo

Formula

Capital geari

Capital gear
finance employ
proportion betw
called leverage.
ratio is low the
gearing is tradi
Further highly g
which means th
by the volume
aim should be
capitalisation'.

Sl. No.	Ratio	Alternative Names	Formula
III	***Solvency or Financial Ratios:***		
(a)	***Short-term solvency ratios:***	***Liquidity ratios***	
(26)	Current ratio	–	Current assets / Current liabilities
(27)	Liquid ratio	Quick ratio Acid test ratio Liquidity ratio	Liquid (or) Quick assets / Current liabilities
(28)	Cash position ratio	Absolute liquidity ratio Super quick ratio	Cash and bank balance + Marketable securities / Current Liabilities
(b)	***Long-term solvency ratios***	***Debt ratios***	
(29)	Fixed Assets ratio	–	Fixed assets / Long - term funds
(30)	Debt equity ratio		Total long - term debt / Shareholders' funds (or) External equities / Internal equities
(31)	Proprietary ratio		Shareholders' funds / Total tangible assets
(32)	Capital gearing ratio		Long - term loans + Debentures + pref. capital / Equity shareholders' funds
(c)	***Over all solvency:***		
(33)	Solvency ratio	Total debt ratio Debt ratio	Total debt / Total tangible assets

(C) FINANCIAL OR SOLVENCY RATIOS

Illustration 18

You are given the following information:

	Rs.
Cash	18,000
Debtors	1,42,000
Closing stock	1,80,000
Bills payable	27,000
Creditors	50,000
Outstanding expenses	15,000
Tax payable	75,000

Calculate (a) Current ratio (b) Liquidity ratio (c) Absolute liquidity ratio

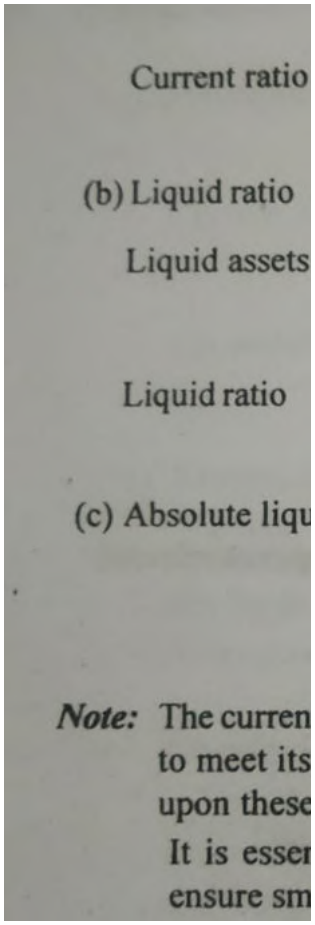
[Madras, BCom., BBA, etc., April 2008]

[Madurai Kamaraj, B.Com., April 1993]

Solution:

(a) Current Ratio $= \frac{\text{Current assets}}{\text{Current liabilities}}$

	Rs.
Current assets	
Cash	18,000
Debtors	1,42,000
Closing stock	1,80,000
Total	3,40,000
Current liabilities	
Bills payable	27,000
Creditors	50,000
Outstanding expenses	15,000
Tax payable	75,000
Total	1,67,000



Ratio from the following

Pref. share capital	Rs.3,00,000
O/S creditors	Rs. 1,60,000
Equity Share Capital	Rs. 11,00,000
Provision for taxation	Rs. 1,80,000
Capital Reserve	Rs. 5,00,000
Bills Payable	Rs. 1,20,000
P&L A/c	Rs.2,00,000
S. Creditors	Rs. 2,40,000
6% Debentures	Rs. 5,00,000

Calculate

Debt-Equity

UNIT 5- MARGINAL COSTING, BUDGET & BUDGETARY CONTROL

5.1 LEARNING OUTCOMES

- To know the meaning of marginal cost.
- To understand the various elements of marginal costing technique.

- To appreciate the importance of marginal costing as a decision making tool.
- To Explaining the role of budgeting in business managemen t, defining elements of budget and describing steps of preparing a master budget.
- To Preparing an operating budget, cash budget, projection of financial statements, flexible budget and capital budget.

5.2 MEANING OF MARGINAL COSTING:

It is a technique can be used in conjunction with any method of cost ascertainment. It can also be used in combination with other techniques suchas budgeting and standard costing. It emphasis on behavior of the costs and their impact on profitability.

5.3 DEFINITION OF MARGINAL COSTING:

According to ICMA "the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiatingbetween fixed costs and variable costs"

Marginal Cost = Prime cost + Total Variable overheads or Total Cost – Fixed Cost

5.4 FEATURES OF MARGINAL COSTING:

Technique for decision making

Total cost classified into Fixed cost and variable cost

Contribution ascertained

Profitability of products

Cost ascertainment

5.5 ADVANTAGES OF MARGINAL COSTING

Simplicity

Stock Valuation

Meaningful Reporting

Effect of fixed costs

Profit planning

Cost control

Pricing Policy

Helpful for Management

- Not apply in all type of business
- Misleading picture
- Less scope for long term policy

5.6 LIMITATION OF MARGINAL COSTING

- Classifications of cost
- Not suitable for external reporting
- Lack of long term perspective
- Undervaluation of stock
- Automation
- Production aspect is ignored

5.7 IMPORTANTTERMS

Cost Volume Profit Analysis (CVP)

It is the analysis of three variables cost, volume and profit. It measures variations of costs and volume and their impact on profit. Profit is affectedby several internal and external factors which influence sales revenue and costs.

Fixed Cost

Fixed costs are fixed in total but variable per unit. It does not change upto the full capacity of a firm. Fixed costs remain constant.

Variable Cost

Variable costs vary in total but they remain constant per unit. It is also called 'Product cost' or 'Marginal Cost'

Contribution

Contribution is the difference between sales and marginal cost. It is thecontribution towards fixed cost and profit.

Break Even Point (BEP)

It is a method of studying relationship between revenue and costs inrelation to sales volume of a business enterprise. It is also called "noprofit, no loss point" or "Zero Profit & Zero loss point"

Margin of Safety (MOS)

It is the difference between actual sales and break even sales. It indicates the value/volume of sales which directly contribute to profit, as fixed costshave already been recovered at break even point.

SUMMARY OF FORMULAE FOR BREAK EVEN ANALYSIS OR COST VOLUME PROFIT ANALYSIS

(1) *Marginal cost equation*

Sales – Variable cost = Fixed cost + Profit (S – V = F + P)

Sales – Variable cost = Contribution (S – V = C)

∴ Contribution = Fixed cost + Profit (C = F + P)

(2) *P/V Ratio*

$$P/V = \frac{\text{Contribution}}{\text{Sales}} \times 100 \text{ or } \left(\frac{C}{S} \times 100\right)$$

$$P/V = \frac{\text{Sales} - \text{Variable cost}}{\text{Sales}} \times 100 \text{ or } \left(\frac{S-V}{S} \times 100\right)$$

$$P/V = \frac{\text{Change in Profit}}{\text{Change in sales}} \times 100$$

Note: The last formula is used only when profit/loss and sales of two periods are given.

(3) *Break-even Point (B.E.P)*

(a) Break even volume (units)

$$= \frac{\text{Fixed cost}}{\text{Contribution per unit}} \text{ (or) } \frac{\text{Break even sales}}{\text{Selling price per unit}}$$

(b) Break even sales (in rupees)

$$= \frac{\text{Fixed cost}}{\text{P / V ratio}} \text{ (or) } \frac{F}{P/V}$$

(or) Break even volume × Selling price per unit

(4) *Margin of Safety (MOS)*

MOS = Actual Sales – Break even sales

$$\text{MOS in rupees} = \frac{\text{Profit}}{\text{P / V Ratio}} \text{ (or) } \frac{P}{P/V}$$

$$\text{MOS in units} = \frac{\text{Profit}}{\text{Contribution per unit}}$$

(5) *Required sales for given profit*

$$\text{Required sales in units} = \frac{\text{Required profit} + \text{Fixed cost}}{\text{Contribution per unit}}$$

$$\text{Required sales value in rupees} = \frac{\text{Required profit} + \text{Fixed cost}}{\text{P / V Ratio}}$$

(6) *Profit from given sales*

Contribution = Given sales × P/V ratio

Profit = Contribution – Fixed cost

Note: The above formulae can be appropriately used to solve most of the problems of C.V.P. or Break even analysis.

ulate the P/V

om., Sep. 1987]

Illustration 10

From the follo
to find out
(a) P/V Ratio (
sales to earn profi

Tot
Tot
Tot

[Madras, 1st M.C
April

Solution:

Parti

	Sales
Less:	Variable cost
	Contribution
Less:	Fixed cost
	Profit

(a) P/V Ratio

(b) Break even sa

(c) Profit
(d) Margin of sa

(e) Sales to earn

Required sale

(2-C) Cost volume profit analysis

When two consecutive periods figures are given

Illustration 17

The sales turnover and profit during two years were as follows:

Year	*Sales* Rs.	*Profit* Rs.
2007	1,40,000	15,000
2008	1,60,000	20,000

Calculate :

(a) P/V Ratio
(b) Break-even point
(c) Sales required to earn a profit of Rs. 40,000
(d) Fixed expenses and
(e) Profit when sales are Rs. 1,20,000

[Madras, 1st M.Com.(CA2A) Ap. 2009; B.Com(AF) April 2008; (Modified); B.Com., April 2001 (Old)]

Solution :

When sales and profit or sales and cost of two periods are given, the P/V Ratio is obtained by using the 'Change formulae'.

Fixed cost can be found by ascertaining the contribution of one of the periods given by multiplying sales with P/V Ratio. Then, contribution – Profit can reveal the fixed cost.

Ascertaining P/V ratio using the change formula and finding fixed cost are the essential requirements in these types of problems.

(a) P/V Ratio $= \dfrac{\text{Change in profit}}{\text{Change in sales}} \times 100$

Change in profit $= 20,000 - 15,000 = \text{Rs. } 5,000$
Change in sales $= 1,60,000 - 1,40,000 = \text{Rs. } 20,000$

$\therefore$ P/V Ratio $= \dfrac{5,000}{20,000} \times 100 = 25\%$

(b) Break even point $= \dfrac{\text{Fixed expenses}}{\text{P / V Ratio}}$

Fixed expenses $=$ Contribution - Profit
Contribution $=$ Sales $\times$ P / V Ratio

Using 2007 sales, contribution $= 1,40,000 \times \dfrac{25}{100} = \text{Rs. } 35,000$

Fixed expenses $= 35,000 - 15,000 = \text{Rs. } 20,000$

Note: The same fixed cost can be obtained using 2008 sales also.

Illustration 19

From the particulars given below calculate:

(a) Break even point

(b) Profit or loss when sales are Rs. 12,000 and

(c) Sales required to earn a profit of Rs. 5,000

	Sales Rs.	*Profit/Loss (–)* Rs.
Period 1	10,000	– 500
2	14,000	1,500

[Madras, B.Com., Sep. 1990]

Solution:

W. N. 1

$$\text{P/V Ratio} = \frac{\text{Change in profit}}{\text{Change in sales}} \times 100$$

Change in profit = 1,500 + 500 = Rs. 2,000

Change in sales = 14,000 – 10,000 = Rs. 4,000

$$\therefore \text{ P/V Ratio} = \frac{2,000}{4,000} \times 100 = 50\%$$

Note: Loss in period 1 and profit in period 2 should be added to get change in profit.

W. N. 2

Fixed expenses = Contribution – Profit

Contribution = Sales × P / V Ratio

Using sales of period 2, $= 14,000 \times \frac{50}{100} = \text{Rs. } 7,000$

Fixed expenses = 7,000 – 1,500 = Rs. 5,500

(a) Break even point (in rupees) $= \frac{\text{Fixed expenses}}{\text{P / V Ratio}}$

$$= \frac{5,500}{50\%} = \text{Rs. } 11,000$$

(b) Profit or Loss when sales are Rs. 12,000

Contribution = Sales × P / V Ratio

$$= 12,000 \times \frac{50}{100} = \text{Rs. } 6,000$$

Profit = Contribution – Fixed cost

= 6,000 – 5,500 = Rs. 500

(c) Sales required to earn profit of Rs. 5,000

$$\text{Required sales} = \frac{\text{Required profit + Fixed expenses}}{\text{P / V Ratio}}$$

$$= \frac{5,000 + 5,500}{50\%} = \text{Rs. } 21,000$$

ing is preparing budgets and other procedures for planning, coordination and control of business enterprise.

BUDGET & BUDGETARY CONTROL

5.8 Meaning of Budget:

A budget is the monetary and /or quantitative expression of business plans and policies to be pursued in the future period of time. Budget

5.9 Definition of Budget:

According to ICMA defines a budget as "A financial and/or quantitative statement, prepared prior to a defined period of time, of the policy to be pursued during that period for the purpose of attaining a given objective"

5.10 Meaning of Budgeting:

It refers to the process of preparing the budgets. It involves a detailed study of business environment clearly grasping the management objectives, the available resources of the enterprise and capacity of the enterprise.

5.11 Meaning of Budgetary Control:

It is the process of preparation of budgets for various activities and comparing the budgeted figures for arriving at deviations if any, which are to be eliminated in future.

5.12 Objectives of Budgetary Control:

Planning
Coordination
Efficiency and Economy

Increase in Profitability

Anticipation of future capital expenditure

Control

Deviations

5.13 CLASSIFICATIONS OF BUDGETS

Budgets are classified according to their nature. The following are thedifferent classifications of budgets.

A. Classification according to time

Long – term budgets

Short – term budgets

Current Budgets

B. Classification based on function

Functional or Subsidiary budgets

Master budget

C. Classification on the basis of flexibility

Fixed Budget

Flexible Budget

5.14 Meaning of Fixed Budget:

It is a budget which is designed to remain unchanged irrespective of the levelof activity actually attained.

5.15 Meaning of Flexible Budget:

It is designed to change according to the level of activity under fixed, variable and semi fixed category

5.16 FUNCTIONAL BUDGET

a) Purchase Budget - Estimated amount compare with actual amount ofpurchase of raw material and goods

b) Cash Budget – Estimate the amount of cash receipts and payments and the balance of cash during a specific budget period.

c) Production Budget – It shows the budgeted quantity of output to beproduced during a specific period. (Input & Output)

d) Sales Budget - It shows quantity of finished products to be sold and price atwhich they are sold.

e) Materials Budget – The budget is based on material consumption budget. Italso takers into account the opening stock of materials and desirable closing stock of materials

5.17 MASTER BUDGET

It is an overall plan for the guidance of the management. It is a summary of various functional budgets. It is prepared to coordinate the activities ofvarious functional departments.

5.18 ZERO BASE BUDGETING (ZBB)

The purpose of management control is to ensure better performance andbetter utilization of scarce resources. ZBB provides a solution towards thisend. It request in detail from scratch (hence zero base) and shifts the burden of proof to each manager to justify why we should spend any money at all

(J) Flexible Budget

Illustration 16

Draw up a flexible budget for production at 75% and 100% capacity on the basis of the following data for a 50% activity.

	Per unit Rs.
Materials	100
Labour	50
Variable expenses (direct)	10
Administrative expenses (50% fixed)	40,000
Selling and distribution expenses (60% fixed)	50,000
Present production (50% activity):	1,000 units

[Madras, BCA., Nov. 2010; B.Com(ICE) Oct. 2008; B.Com., B.B.A., etc. April 2008]

Solution:

Flexible Budget

Particulars	*Capacity Levels*					
	50% 1,000 units		*75% 1,500 units*		*100% 2,000 units*	
	Per unit Rs. P.	*Total Rs.*	*Per unit Rs. P*	*Total Rs.*	*Per unit Rs. P*	*Total Rs.*
Materials	100	1,00,000	100.00	1,50,000	100	2,00,000
Labour	50	50,000	50.00	75,000	50	1,00,000
Variable expenses	10	10,000	10.00	15,000	10	20,000
Prime cost	160	1,60,000	160.00	2,40,000	160	3,20,000
Administration expenses:						
Variable (50%)	20	20,000	20.00	30,000	20	40,000
Fixed (50%)	20	20,000	13.33	20,000	10	20,000
Cost of production	200	2,00,000	193.33	2,90,000	190	3,80,000
Selling and Distribution expenses:						
Variable (40%)	20	20,000	20.00	30,000	20	40,000
Fixed (60%)	30	30,000	20.00	30,000	15	30,000
Total cost	250	2,50,000	233.33	3,50,000	225	4,50,000

Note: (1) Variable costs per unit remain constant at all the capacity levels. Fixed costs remain constant in total at all the capacity levels.

(2) The effect of constant fixed cost is that the cost per unit goes on decreasing with every increase in capacity level. However, beyond 100% capacity level, fixed costs also may change.

(H) Cash Budg

Illustration 11

From the fo
and June 1998.

Month 1998
February
March
April
May
June

Further inform
Sales at 10
subsequent m
Purchases
Wages : 20
Sundry ex
Income tax
Dividend
Income fro
Cash balan

Solution:

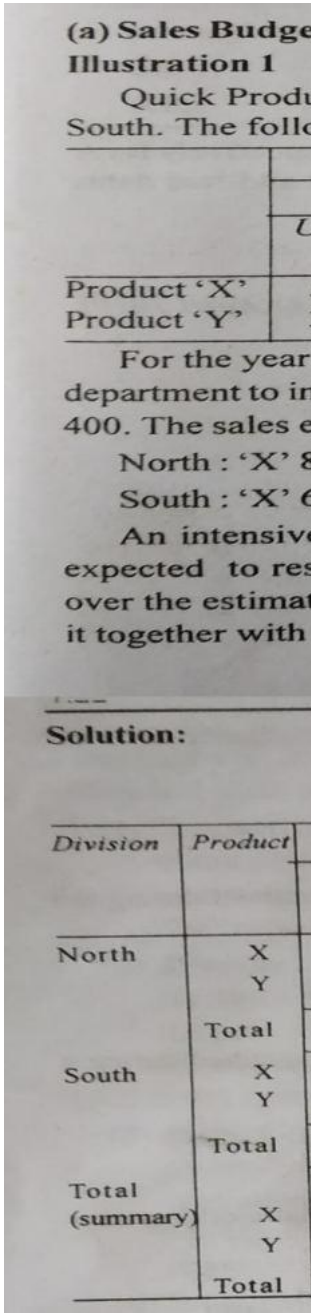
Openin	
Add: Receipts	
Cash sa	
Cash from deb	
1st mon	
2nd mo	
Total re	
Payments: Cre	
Wages: Curren	
Arrear	
Sundry expens	
Income tax	
Dividend	
Total payment	
Closing balan	

Note: (1) Out of tota
given mon
(See. W. N
(2) In any give
month's w
(3) Income fr
to June.

Working Note: Colle

	Total sales
Less:	Cash sales at
Credit sales	
	Collection in
	after credit sal
	Collection in

5.19 CAPITAL BUDGETING



(a) Sales Budge

Illustration 1

Quick Produ
South. The follo

Product 'X'	
Product 'Y'	

For the year
department to in
400. The sales e

North : 'X' 8

South : 'X' 6

An intensive
expected to res
over the estimat
it together with

Solution:

Division	*Product*	
North	X	
	Y	
	Total	
South	X	
	Y	
	Total	
Total (summary)	X	
	Y	
	Total	

It refers to the process of making investment decision on capital expenditure. The benefit of the expenditure which are expected to be received over a period exceeding one year.

Definition:

According to Lynch "Capital Budgeting consists in planning deployment of available capital for the purpose of maximising the long-term profitability of the concern"

Features of Capital Budgeting

Future Benefits

Longterm activity

Huge amount to be spent

Non flexible

Steps to control the capital expenditure

- Preparation of capital expenditure budget
- Proper Authorisation of capital expenditure
- Recording and control of expenditure
- Evaluation of performance of the project

Importance of capital budgeting

High amount of investment

Permanent and Irreversible commitment offunds

Long – term impact on profitability

Growth and Expansion

Cost over runs

Alternatives

Multiplicity of variables

Top management activity

5.20 METHODS OF CAPITAL BUDGETING (OR) METHODS OF EVALUATION OF INVESTMENT PROPOSALS

A) Traditional methods

1. Pay – back period method
2. Improvement in traditional approach to pay – backperiod method
3. Accounting rate of return or Average rate of returnmethod. (A.R.R)

B) Non Traditional Method (or) Discounted Cash FlowMethod

1. Net Present Value NPV Method
2. Profitability Index P.I (or) Excess Present Value Indexmethod
3. Internal Rate of Return method (I.R.R)

1. PAY – BACK PERIOD METHOD

It is also called pay-out period (or) pay off period. It refers to the time spanin which a project pays for itself through surplus cash flows.

Situations:

1 – When cash inflows are uniform

Formula:

PBP = Initial Cost of Assets / Initial Investment

A

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n

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Note: Annual Cash inflow is the net income from the asset or project aftertax, but before depreciation

Ex: Initial investment Rs.200000 Annual Cash inflow Rs. 50000

PBP =

$$\frac{200000}{50000} = \textbf{4 yrs.}$$

1 **– When Cash Inflows are not uniform**

note: Cumulative cash inflows…..

Ex: If investment in a project is **Rs.80000** and the net cash inflows after tax butbefore depreciation are estimated for the nest 6 yrs as Rs.20000, Rs.25000,Rs.20000, Rs.30000, Rs.35000 and Rs.15000 respectively, pay back period is calculated as follows:

Year	Cash Inflows	Cumulative Cash inflows
1	20000	20000
2	25000	45000
3	20000	65000
4	**30000**	95000
5	35000	130000
6	15000	145000

At the end of the 4th year the cumulative cash inflow exceedsthe investment of **Rs.80000**

PBP = 3yrs + 15000/30000

3 yrs + ½ yrs = 3.5 yrs

1. Calculate the payback period for a project which requires a cash outlay of Rs. 100000 and generate cash inflows Rs.25000, Rs.35000, Rs. 30000 and Rs.25000 in the first, second, third and fourth years respectively.

2. From the following details, calculate Pay Back Period.

   Cost of the project Rs.32000

   Estimated Scrap Rs.3200

   Estimating Value I year Rs.4000, II year Rs 6000, III year Rs.10000,

   IV th year Rs.10000 and V th year Rs 8000 .

ILLUSTRATIONS

(1) PAY-BACK PERIOD METHOD

Illustration 1

A project costs Rs. 15,60,000 and yields annually a profit of Rs. 2,70,400 after depreciation of 12% p.a. but before tax at 25%.

Calculate pay-back period.

Solution:

$$\text{Pay-back period} = \frac{\text{Initial investment}}{\text{Annual cash inflow}}$$

Initial investment (given) = Rs. 15,60,000

Annual cash inflow (W.N.1.) = Rs. 3,90,000

$$\therefore \text{Pay-back period} = \frac{15,60,000}{3,90,000}$$

= 4 years

W.N.1: Calculation of annual cash inflow:

		Rs.
	Annual profit after depreciation, before tax	2,70,400
Less:	Tax at 25%	67,600
	Annual profit, after depreciation and tax	2,02,800
Add:	Depreciation $(15,60,000 \times 12\%)$	1,87,200
	Annual cash inflow	3,90,000

Illustration 2 (Ascertaining cash inflow)

projects.

Illustration 4 (Projects with equal pay-back period)

Each of the following projects requires a cash outlay of Rs. 10,000. You are required to suggest which project should be accepted if the standard pay-back period is 5 years.

	Cash inflows		
Year	*Project X*	*Project Y*	*Project Z*
	Rs.	*Rs.*	*Rs.*
1	2,500	4,000	1,000
2	2,500	3,000	2,000
3	2,500	2,000	3,000
4	2,500	1,000	4,000
5	2,500	–	–

Solution:

Statement showing cumulative cash inflows and pay-back period of projects

Year	*Project X*		*Project Y*		*Project Z*	
	Cash inflow Rs.	*Cumulative cash inflow* Rs.	*Cash inflow* Rs.	*Cumulative cash inflow* Rs.	*Cash inflow* Rs.	*Cumulative cash inflow* Rs.
1	2,500	2,500	4,000	4,000	1,000	1,000
2	2,500	5,000	3,000	7,000	2,000	3,000
3	2,500	7,500	2,000	9,000	3,000	6,000
4	2,500	10,000	1,000	10,000	4,000	10,000
5	2,500	12,500	–	–	–	–
Initial investment		10,000		10,000		10,000
Pay-back period		4 years		4 years		4 years

Conclusion: When standard pay-back period is 5 years, all the three projects are equally acceptable under traditional pay-back period method.

However, when two or more projects have the same pay-back period, the project with higher initial cash inflows should be preferred.

Project Y is better than X and Z because it has higher cumulative cash inflow at the end of each of the first 3 years.

...tation of cash inflows)

2. Improvement in traditional approach to pay – back period method

a) Post pay- back profitability method.

Post pay-back period profitability index =

$$\frac{\text{Post pay – Back profits}}{\text{I n i}} \times 100$$

Pay-back Reciprocal (or) Unadjusted Rate of Return =

$$\frac{\text{Annual Cash inflow}}{\text{Investment}} \times 100$$

3. ACCOUNTING RATE OF RETURN (A.R.R)

Meaning:

It uses the accounting principles or concepts of profit i.e.,income after depreciation and tax as the criterion for calculation of return.

Formula:

a) Total Income Method:

$$\text{A.R.R} = \frac{\text{Total earnings (after depreciation and Tax)}}{\text{Original Cost of investment} - \text{Scrap value}} \times 100$$

b) Annual Return on original investment method:

$$\text{A.R.R} = \frac{\text{Value} \quad \times 100}{\frac{\text{Annual average net earnings}}{\text{Original investment} - \text{Scrap}}}$$

c) Annual Return on average investment method:

A.R.R = $\dfrac{\text{Annual average net earnings}}{\text{Average investment}} \times 100$

DISCOUNTED CASH FLOW METHOD

DISCOUNT FACTOR = $\dfrac{1}{(1+r)^{n}}$

r = Discounting rate

n = No.of.years

Ex : discounting factor at 10% for a period of 2 yrs

= $\dfrac{1}{(1+r)^{n}}$

= 1/ (1 + .1)2

= 1/1.21 = .826

4. NET PRESENT VALUE (NPV)

The net present value of all inflows and outflows of cash occurring during the entire life of a project is determined by discounting these flows by the firm's cost of capital.

Cut – off rate or discount rate

NPV = P.V. of Cash inflows – Cash outflows

Accept when NPV > Zero

Reject When NPV < Zero

5. PROFITABILITY INDEX (PI)

It is also called "Benefits Cost (B/C) Ratio" it is only a refinement of the NPV method. It shows the relationship between P.V. of cash inflows and P.V. of cash outflows.

$$\textbf{Profitability Index} = \frac{\text{Present Value of future cash inflows}}{\textbf{Present Value of future cash outflows}}$$

Accept when P.I > 1

Reject when P.I < 1

(3) DISCOUNTED CASH FLOW METHODS

(A) Ascertaining present value factors

Illustration 13

Calculate present value factors at 10% p.a. for a period of 5 years.

Solution:

Present value factor $= \frac{1}{(1+r)^n}$ where r = Interest rate

n = No. of years

P.V. factor for 1st year $= \frac{1}{(1+.1)^1} = \frac{1}{1.1} = 0.909$

P.V. factor for 2nd year $= \frac{1}{(1+.1)^2} = \frac{1}{1.21} = 0.826$

P.V. factor for 3rd year $= \frac{1}{(1+.1)^3} = \frac{1}{1.331} = 0.751$

P.V. factor for 4th year $= \frac{1}{(1+.1)^4} = \frac{1}{1.4641} = 0.683$

P.V. factor for 5th year $= \frac{1}{(1+.1)^5} = \frac{1}{1.61051} = 0.621$

Note: If interest rate is say 12%;

P.V. factor for say 2nd year $= \frac{1}{(1+.12)^2} = \frac{1}{1.2544} = 0.797$

In problems where the P.V. factor is not given, it can be calculated for any rate for any number of years with the help of the above method.

Illustration 15

An investment of Rs. 10,000 (having scrap value of Rs. 500) yields the following returns:

Years	Yields Rs.
1	4,000
2	4,000
3	3,000
4	3,000
5	2,000

The cost of capital is 10%. Is the investment desirable? Discuss it according to net present value method assuming the P.V. factors for 1st, 2nd, 3rd, 4th and 5th years – .909, .826, .751, .683, .621 respectively.

[Madras, MCA(PEC3A) Nov. 2010; B.Com., Sep. 1988]

Solution:

Statement showing net present value of investment

	Year	*Cash inflows Rs.*	*P.V. factors at 10% p.a.*	*Present value Rs.*
	1	4,000	.909	3,636
	2	4,000	.826	3,304
	3	3,000	.751	2,253
	4	3,000	.683	2,049
	5	2,500 (including scrap value)	.621	1,552
	Present value of future cash inflows			12,794
Less:	Initial investment ((or) present value of cash outflows)			10,000
	Net present value =			Rs. 2,794

Conclusion: The investment is desirable because of positive net present value of Rs. 2,794 on the investment of Rs. 10,000.

Note: Scrap value has to be added to the cash inflow of the last year of the investment.

(C) Profitability index method and NPV

Illustration 16

Two projects M and N which are mutually exclusive are being under consideration. Both of them require an investment of Rs. 1,00,000 each. The net cash inflows are estimated as under:

Year	M Rs.	N Rs.
1	10,000	30,000
2	40,000	50,000
3	30,000	80,000
4	60,000	40,000
5	90,000	60,000

The company's targeted rate of return on investments is 12%. You are required to assess the projects on the basis of their present values, using (1) NPV method and (2) Profitability index method.

Present values of Re. 1 at 12% interest for five years are given below:

1st year : 0.893; 2nd year : 0.797; 3rd year : 0.712; 4th year : 0.636; 5th year : 0.567.

Solution:

Statement showing present values of projects

Year	P.V. of Re. 1 at 12% p.a.	Project M		Project N	
		Cash inflows	Present value	Cash inflows	Present value
1	2	3 Rs.	4(2 × 3) Rs.	5 Rs.	6(2 × 5) Rs.
1	0.893	10,000	8,930	30,000	26,790
2	0.797	40,000	31,880	50,000	39,850
3	0.712	30,000	21,360	80,000	56,960
4	0.636	60,000	38,160	40,000	25,440
5	0.567	90,000	51,030	60,000	34,020
Present value of cash inflows			1,51,360		1,83,060

(1) *Net present value method (NPV)*

	Project M Rs.	Project N Rs.
Present value of cash inflows	1,51,360	1,83,060
Less: Initial investment	1,00,000	1,00,000
Net present value =	Rs. 51,360	83,060

Conclusion: Both the projects have positive NPV and are desirable or acceptable.

However, since they are 'mutually exclusive, project 'N' should be taken up becau of its higher NPV of Rs. 83,060 compared to that of project M Rs. 51,360.

(2) *Profitability index method (P.I.)*

$$\text{Profitability index} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outflows}}$$

	Project M Rs.	Project N Rs.
Present value of cash inflows	1,51,360	1,83,060
Present value of cash outflows (initial investment)	1,00,000	1,00,000
Profitability index =	$\frac{1,51,360}{1,00,000}$	$\frac{1,83,060}{1,00,000}$
	= 1.5136	1.8306

Conclusion: Both projects are acceptable since the P.I. is more than 1.

However, since they are mutually exclusive, project 'N' with higher P.I. of 1.830 should be taken up and project 'M' with lower P.I. of 1.5136 may be rejected.

Illustration 19

Calculate discounted pay-back period from the details given below:

Cost of project Rs. 6,00,000; Life of the project 5 years; Annual cash inflow Rs. 2,00,000; Cut-off rate 10%.

Year	*Discounting factor*
1	.909
2	.826
3	.751
4	.683
5	.621

[Madras, M.Com., (ICE) May 1994]

Solution:

Statement showing present values of cash inflows

Year	*Cash inflows*	*Discounting Factor at 10% p.a.*	*Present value of cash inflows*
1	*2*	*3*	*4(2 × 3)*
	Rs.		*Rs.*
1	2,00,000	0.909	1,81,800
2	2,00,000	0.826	1,65,200
3	2,00,000	0.751	1,50,200
4	2,00,000	0.683	1,36,600
5	2,00,000	0.621	1,24,200

Statement showing discounted pay-back period

Year	*Cash inflow* Rs.	*Cumulative cash inflow* Rs.
1	1,81,800	1,81,800
2	1,65,200	3,47,000
3	1,50,200	4,97,200
4	1,36,600	6,33,800
5	1,24,200	7,58,000
		6,00,000

Initial cost of project

Discounted pay-back period = $3 \text{ years} + \frac{102800}{136600} \text{ years} = 3.75 \text{ years}$

6. INTERNAL RATE OF RETURN (I.R.R)

It is that rate of return at which the present values of cash inflows and cash outflows are equal. IRR the total of discounted cash inflows equalsthe total of discounted cash outflows.

Cut – Off rate are discounted at predetermined

$$I.R.R = \frac{\text{Cash Inflows}}{\text{Cash Outflows}} = 1$$

Accepted and Rejection Criteria

- Accept when IRR > Cut –off rate
- Reject when IRR < Cut-off rate

1. When Cash Inflows are uniform

$$F = \frac{I}{C}$$

I = Original Investment, C = Cash Inflow per year

2. When Cash Inflows are NOT uniform

$$F = \frac{I}{C}$$

I = Original Investment, C = Average Cash flow per year

1. A project costs Rs. 80,00 0 and is estimated to generate cash inflows ofRs.20,000 for a period of 5 yrs. Ascertain the IRR.

2. Arnold Ltd is considering a project which requires investment of Rs.1,50,000. the cost of capital is 12 %. The net estimated cash inflows are as follows.

Year	Estimated Cash inflows
1	40000
2	50000
3	50000
4	40000
5	30000

Calculate the IRR and decide whether the project can be taken up for implementation