COST ACCOUNTING

THEORY, PROBLEMS AND SOLUTIONS

CHAPTER 1

Introduction

Chapter Outline

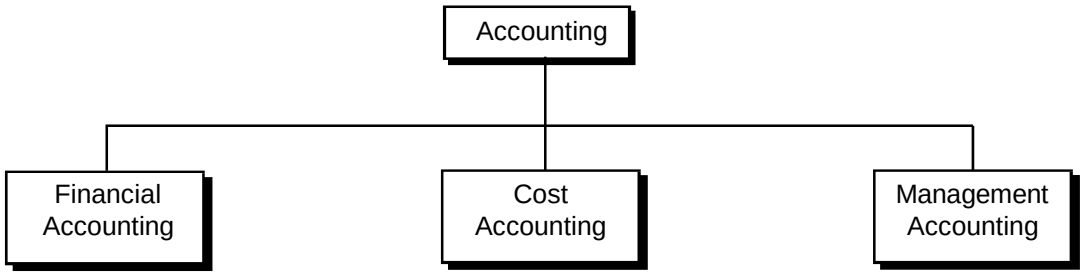
Type of Accounting, Cost Accounting — Meaning, Scope, Objectives, Cost Accounting and Financial Accounting — Comparison, Installation of Costing System; Advantages and Limitations of Cost Accounting, Application, Concept of Cost, Cost Centre, Cost Unit, Cost object, Methods and Techniques of Costing, Classification of costs, Elements of Cost, Cost Sheet, Examination Questions.

This introductory chapter provides a framework of cost accounting, explaing its basic concepts, cost classifications, elements of costs and preparation of cost sheet, etc.

Types of Accounting

Accounting serves the purpose of providing financial information relating to activities of a business. Such information is provided to shareholders, managers, creditors, debentureholders, bankers, tax authorities and others. Broadly speaking, on the basis of type of accounting information and the purpose for which such information is used, accounting may be divided into two categories:

1. Financial Accounting (or General Accounting),
2. Cost Accounting. and
3. Management Accounting



1 1 Types of accounting

a c a acc t g s mainly concerned with recording business transactions in the books of account and prepare:

(a) ***r t a ss cc t*** showing the net profit or loss during the year and

(b) ***a a c t*** showing the financial position of the company at a point of time.

st acc t g is a branch of accounting which specialises in the ascertainment of cost of products and services. It is for use by management. It has been explained in detail in this book.

a ag t acc t g is the modern concept of accounts as a tool of management. It is concerned with all such accounting information that is useful to management.

COST ACCOUNTING

Cost accounting has primarily developed to meet the needs of management. Profit and Loss Account and Balance Sheet are presented to management by the financial accountant. But modern management needs much more detailed information than supplied by these financial statements. Cost accounting provides detailed cost information to various levels of management for efficient performance of their functions. The information supplied by cost accounting acts as a tool of management for making optimum use of scarce resources and ultimately add to the profitability of business.

Meaning of Costing, Cost Accounting and Cost Accountancy

Costing. The terms *'costing'* and *'cost accounting'* are often used interchangeably. The Chartered Institute of Management Accountants (CIMA) of UK has defined costing as, *"the techniques and processes of ascertaining costs".* Wheldon* has defined costing as, *"the classifying, recording and appropriate allocation of expenditure for the determination of costs, the relation of these costs to sales value and the ascertainment of profitability'."* Thus, costing simply means cost finding by any process or technique. It consists of principles and rules which are used for determining:

(a) the cost of manufacturing a product; *e.g.,* motor car, furniture, chemical, steel, paper, etc. and
(b) the cost of providing a service; *e.g.,* electricity, transport, education, etc.

Cost Accounting. Cost accounting is a formal system of accounting for costs in the books of account by means of which costs of products and services are ascertained and controlled. An authoritative definition of cost accounting has been given by CIMA of UK as follows: *"Cost accounting is the process of accounting for costs from the point at which expenditure is incurred or committed to the establishmentof' 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 ascertainment of profitabilityof activities carried out or planned."*

Costing and Cost Accounting—Difference. Though the terms 'costing' and 'cost accounting' are interchangeably used, there is a difference between the two. Costing is simply determining costs by using any method like arithmetic process, memorandum statements, etc. Cost Accounting, on the other hand, denotes the formal accounting mechanism by means of which costs are ascertained by recording them in the books of account. In simple words, costing means finding out the cost of product or service by any technique or method, cost accounting means costing using double entry system.

Cost Accountancy. Cost accountancy is a very wide term. It means and includes the principles, conventions, techniques and systems which are employed in a business to plan and control the utilisation of its resources. It is defined by CIMA of UK, as "*the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived therefrom for the purposes of managerial decision-making.*" Cost accountancy is thus the *science, art* and *practice* of a cost accountant.

Scope. Cost accountancy is a wide term and includes costing, cost accounting, cost control and cost audit.

Cost control involves establishing pre-determined standards of cost for different elements *i.e.* material, labour and overhead. These standard costs are then compared with actual costs and differences between the two are analysed and the necessary corrective action is taken.

Cost audit is the application of auding principles and procedures in the field of cost accounting. It is defined by CIMA, London as "verification of cost accounts and a check on the adherence to the cost accounting plan."

OBJECTIVES AND FUNCTIONS OF COST ACCOUNTING

The main objectives of cost accounting are as follows:

1. Ascertainment of cost. This is the primary objective of cost accounting. In other words, the basic objective of cost accounting is to ascertain the cost of products and services. For cost ascertainment different techniques and systems of costing are used in different industries.

2. Control and reduction of cost. Cost accounting aims at improving efficiency by controlling and reducing cost. This objective is becoming increasingly important because of growing competition.

3. Guide to business policy. Cost accounting aims at serving the needs of management in conducting the business with utmost efficiency. Cost data provide guidelines for various managerial decisions like make or buy, selling below cost, utilisation of idle plant capacity, introduction of a new product, etc.

4. Determination of selling price. Cost accounting provides cost information on the basisof which selling prices of products or services may be fixed. In periods of depression, cost accounting guides in deciding the extent to which the selling prices may be reduced to meet the situation.

5. Measuring and improving performance. Cost accounting measures efficiency by classifying and analysing cost data and then suggest various steps in improving performance so that profitability is increased.

In order to realise these objectives, the data provided by cost accounting may have to be re-classified, re-organised and supplemented by other relevant business data from outside the formal cost accounting system.

COST ACCOUNTING AND FINANCIAL ACCOUNTING — COMPARISON

Both cost accounting and financial accounting are concerned with systematic recording and presentation of financial data. The two systems rest on the same principles concerning debit and credit and have the same sources of recording the transactions. But cost accounting is much more detailed than financial accounting. This is because in financial accounting profit or loss is ascertained for the business as a whole whereas in cost accounting detailed cost and profit data for various parts of business like departments. products, etc., are shown. This is explained in the following example :

Suppose a company is manufacturing three products — A, B and C. Under financial accounting and cost accounting the following types of statements are prepared.

Under Financial Accounting. A Profit and Loss Account is prepared to compute profit as shown below (data is assumed):

*Cost Accounting and Costing Methods —— Wheldon.

Profit and Loss Account for the year ending 31st March, 2013

	`		`
To Materials	75,000	By Sales	1,50,000
To Wages	20,000		
To Other expenses	25,000		
To Profit (Balancing figure)	30,000		
	1,50,000		1,50,000

This statement shows that total profit is ` 30,000 but it does not disclose the details of profit/loss of each of products A, B and C in the total profit. This is revealed by cost accounting.

Under Cost Accounting. A detailed statement is prepared as follows : (Data of above Profit and Loss Account with further assumptions).

Statement of Cost and Profit for the year ending 31st March, 2013

	Total `	*Product A* `	*Product B* `	*Product C* `
Materials	75,000	40,000	12,000	23,000
Wages	20,000	10,000	5,000	5,000
Other expenses	25,000	20,000	3,000	2,000
Total cost	1,20,000	70,000	20,000	30,000
Sales	1,50,000	96,000	28,000	26,000
Profit/Loss (–)	30,000	26,000	8,000	(–) 4,000

In cost accounts, detailed costs are compiled for each product so that cost and profit on each product can be known. In the above Statement of Cost and Profit, it can be seen that total profit is ` 30,000 i.e. the same amount as in financial Profit and Loss Account. In addition, cost accounts show that in the total profit of ` 30,000, Product A is contributing ` 26,000 and Product B ` 8,000, whereas Product C is showing a loss of ` 4,000. When management gets this information, it should investigate to find out the reasons of loss in Product C. If Product C cannot be made profitable, its production should be stopped to improve the overall profit picture of the company. However, this types of information is not revealed by financial accounting.

The **main points of difference** between Cost Accounting and Financial Accounting are explained below:

Basis	***Financial Accounting***	***Cost Accounting***
1. ***Purpose***	The main purpose of Financial accounting is to prepare Profit and Loss Account and Balance Sheet for reporting to owners or shareholders and other outside agencies, i,e., external users.	The main purpose of cost accounting is to provide detailed cost information to management, i.e., internal users.
2. ***Statutory requirements***	These accounts are obligatory to be prepared according to the legal requirements of Companies Act and Income Tax Act.	Maintenance of these accounts is voluntary except in certain industries where it has been made obligatory to keep cost records under the Companies Act.

3. ***Analysis of cost and profit***	Financial accounts reveal the profit or loss of the business as a whole for a particular period.It does not show the figures of cost and profit for individual products, departments and processes.	Cost accounts show the detailed cost and profit data for each product line, department, process,etc.
4. ***Periodicity of reporting***	Financial reports (Profit and Loss Account and Balance Sheet) are prepared periodically, usually on an annual basis.	Cost reporting is a continuous process and may be on daily, weekly, monthly basis, etc.
5. ***Control aspect***	It lays emphasis on the recording of financial transactions and does not attach importance to control aspect.	It provides for a detailed system of controls with the help of certain special techniques like standard costing and budgetary control.
6. ***Historical and pre-determined costs***	It is concerned almost exclusively with historical records. The historical nature of financial accounting can be easily understood in the context of the purposes for which it was designed.	It is concerned not only with historical costs but also with pre-determined costs. This is because cost accounting does not end with what has happened in the past. It extends to plans and policies to improve performance in the future.
7. ***Format of presenting information***	Financial accounting has a single uniform format of presenting information, i.e., Profit and Loss Account, Balance Sheet and Cash FlowStatement.	Cost accounting has varied forms of presenting cost information which are tailored to meet the needs of management and thus lacks a uniform format.
8. ***Types of transactions recorded***	Financial accounting records only external transactions like sales, purchases, receipts, etc., with outside parties. It does not record internal transactions.	Cost accounting not only records external transactions but also internal or inter-departmental transactions like issue of materialsby store-keeper to production departments.
9. ***Types of statements prepared***	Financial accounting prepares general purpose statements like Profit and Loss Account and Balance Sheet. That is to say that financial accounting must produce information that is used by many classes of people, none of whom have explicitly defined informational needs.	Cost accounting generates special purpose statements and reports like Report on Loss of Materials, Idle Time Report, Variance Report, etc. Cost accounting identifies the user, discusses his problems and needs and provides tailored information.

APPLICATION OF COST ACCOUNTING

Cost accounting is generally considered as being applicable only to manufacturing concerns. This is not so. Its applications are in fact much wider. All types of activities, manufacturing and non-manufacturing, in which costs are incurred and monetary value is involved, should consider the use of cost accounting. Wholesale and retail business, banking and insurance companies, railways, airways,

shipping and road transport companies, hotels, hospitals, schools, colleges, universities, farming and cinema houses, all may employ cost accounting techniques to operate efficiently. It is only a matter of recognition by the management of the applicability of these costing concepts and techniques in their own fields of endeavour.

ADVANTAGES OF COST ACCOUNTING

Financial accounting has certain limitations which have given rise to cost accounting. In other words, the emergence of cost accounting is because of the limitations of financial accounting. Cost accounting has many advantages but the extent of the advantages obtained will depend upon the efficiency with which cost system is installed and also the extent to which the management is prepared to accept the system.

The principal advantages of cost accounting are as follows:

Advantages to Management

1. Reveals profitable and unprofitable activities. A system of cost accounting reveals profitable and unprofitable activities. On this information, management may take steps to reduce or eliminate wastages and inefficiencies occurring in any form such as idle time, under-utilisation of plant capacity, spoilage of materials, etc.

2. Helps in cost control. Cost accounting helps in controlling costs with special techniques like standard costing and budgetary control.

3. Helps in decision making. It supplies suitable cost data and other related information for managerial decision-making, such as introduction of a new product line, determining export price of products, make or buy a component, etc.

4. Guides in fixing selling prices. Cost is one of the most important factors to be considered while fixing prices. A system of cost accounting guides the management in the fixation of selling prices, particularly during depression period when prices may have to be fixed below cost.

5. Helps in inventory control. Perpetual inventory system, which is an integral part of cost accounting. helps in the preparation of interim profit and loss account. Other inventory control techniques like ABC analysis, level setting, etc., are also used in cost accounting.

6. Aids in formulating policies. Costing provides such information as enables the management to formulate production and pricing policies and preparing estimates of contracts and tenders.

7. Helps in cost reduction. It helps in the introduction of a cost reduction programme and finding out new and improved ways to reduce costs.

8. Reveals idle capacity. A concern may not be working to full capacity due to reasons such as shortage of demand, machine breakdown or other bottlenecks in production. A cost accounting system can easily work out the cost of idle capacity so that management may take immediate steps to improve the position.

9. Checks the accuracy of financial accounts. Cost accounting provides a reliable check on the accuracy of financial accounts with the help of reconciliation between the two at the end of the accounting period.

10. Prevents frauds and manipulation. Cost audit system, which is a part of cost accountancy, helps in preventing manipulation and frauds and thus reliable cost data can be furnished to management and others.

Advantages to Workers

Workers are benefited by introduction of incentive plans of wage payment which is an integral part of a cost system. This results not only in higher productivity but also higher earnings for workers.

Advantages to Society

An efficient cost system is bound to lower the cost of production. The benefits of cost reduction and cost control accrue to the public at large in the form of lower prices of products and services.

Advantages to Government Agencies and Others

A cost system produces ready figures for use by government, wage tribunals, trade unions, etc., for use in problems like price fixing, wage level fixation, settlement of industrial disputes, etc.

LIMITATIONS OR OBJECTIONS AGAINST COST ACCOUNTING

Despite the fact that the development of cost accounting is one of the most significant steps to improve performance, certain objections are raised against its introduction. These are as follows:

1. It is unnecessary. It is argued that maintenance of cost records is not necessary and involves duplication of work. It is based on the premise that a good number of concerns are functioning prosperously without any system of costing. This may be true, but in the present world of competition, to conduct a business with utmost efficiency, the management needs to know detailed cost information for its decision-making. Only a cost accounting system can serve this need of the management and thus help in the more efficient conduct of a business.

2. It is expensive. It is pointed out that installation of a costing system is quite expensive which only large concerns can afford. It is also argued that installation of the system will involve additional expenditure which will lead to a diminution of profits. In this respect, it may be said that a costing system should be treated as an investment and the benefits derived from the system must exceed the amount spent on it. It should not prove a burden on the finances of the company.

3. It is inapplicable. Another argument sometimes put forward is that modern methods of costing are not applicable to many types of industry. This plea is not very apt. The fault lies in an attempt to introduce a readymade costing system in a firm. A costing system must be specially designed to meet the needs of a business. Only then the system will work successfully and achieve the objectives for which it is introduced. In fact, applications of costing are very wide. All types of activities, manufacturing and non-manufacturing, should consider the use of cost accounting.

4. It is a failure. The failure of a costing system in some concerns is quoted as an argument against its introduction in other undertakings. This is a very fallacious argument. If a system does not produce the desired results, it is wrong to jump to the conclusion that the system is at fault. The reasons for its failure should be probed. In order to make the system a success, the utility of the system should be explained and the cooperation of the employees should be sought by convincing them that the system is for the betterment of all.

INSTALLATION OF A COSTING SYSTEM

There cannot be a readymade costing system for every undertaking. In order to meet the special needs of a business, a costing system has to be specially devised to give it a blend of efficiency and economy. The installation of a costing system requires a thorough study and understanding of all the

aspects involved as otherwise the system may be a misfit and enterprise will not be able to derive full advantage from it.

To start with, it is important to make cost benefit analysis, i.e., weigh the cost of the system against the likely benefits to be derived from it. The benefits from the system must exceed the amountspent on it. The management must feel the need for it and should be able to make full use of the information available from the system in the conduct of business. In other words, the system should bejustified on the basis of its value to management.

Steps in Installation

The installation of a costing system requires the following steps to be taken:

1. Preliminary investigations should be made relating to the technical aspects of the business. For instance, the nature of the product and methods of production will determine the type of costing system to be applied.
2. The organisation structure of the business should be studied to ascertain the scope of authority of each executive. The existing organisation should be disturbed to the minimum as may be advisable after full consideration.
3. The methods of purchase, storage and issue of materials should be examined and modified as per the requirements.
4. The existing methods of remunerating labour should be examined for the purpose of introducing any incentive plans.
5. Forms and accounting records should be so designed so as to involve minimum clerical labour and expenditure.
6. The size and layout of the factory should be studied.
7. The costing system should be effecitve in cost control and cost reduction.
8. Costing system should be simple and easy to operate. Unnecessary details should be avoided.
9. The installation and operation of the system should be economical.
10. The system should be introduced gradually.

Practical Difficulties

Apart from technical costing problems, a cost accountant is confronted with certain practical difficulties in installing a costing system. These are:

1. Lack of support of top management. In order to make the costing system a succss, it must have the whole-hearted support of every member of the management. Many a time, the costing system is introduced at the behest of the Managing Director or the Financial Director without the support of functional managers. They view the system as an interference in their work and do not make use of the system.

Before the system is installed, the cost accountant should ensure that the management is fully committed to the costing system. A sense of cost consciousness should be created in their minds by explaining them that the system is for their benefit.

2. Resistance from the accounting staff. The existing accounting staff may not welcome the new system. This may be because they look with suspicion at a system which is not known to them. The cooperation of the employees should be sought by convincing them that the system is needed to supplement the financial accounting system and that it is for the betterment of all.

3. Non-cooperation of working and supervisory staff. Correct activity data which is supplied by supervisory staff and workers is necessary for a successful costing system. They may not cooperate and resist the additional paper work arising as a result of the introduction of the system. Such resistance generally arises out of ignorance. Proper education should be given to the staff regarding benefits of the system and the important roles they have to play to make it successful.

4. Shortage of trained staff. In the initial stages, there may be shortage of trained costing staff. The staff should be properly trained so that costing department can run efficiently.

CONCEPT OF COST

The term 'cost' does not have a definite meaning and its scope is extremely broad and general. It is, therefore, not easy to define or explain this term without leaving any doubt concerning its meaning. Cost accountants, economists and others develop the concept of cost according to their needs because one complete description of 'cost' to suit all situations is not possible.

According to Oxford Dictionary, cost means *"the price paid for something".* However, some of the definitions of cost are given below:

1. Cost is *"the amount of expenditure (actual or notional) incurred or attributable to a given thing".* (*CIMA, UK*)
2. *"Cost is a measurement, in monetary terms, of the amount of resources used for the purpose of production of goods or rendering services ".* (Cost Accounting Standards of *ICWA of India*)
3. *"A cost is the value of economic resources used as a result of producing or doing the things costed".* (*W.M. Harper*)
4. *"Cost means economic sacrifice, measured in terms of standard monetary unit, incurred or potentially to be incurred, as a consequence of a business decision to achieve a specific objective".* (Committee on Cost Concepts and Standards of **American Accounting Association**).

Cost Vs. Expense and Loss

Often the terms 'cost' and 'expense' are used interchangeably. But cost should be distinguished from expense and loss.

Expense is defined as *"an expired cost resulting from a productive usage of an asset ".* It is that cost which has been applied against revenue of a particular accounting period in accordance with the principle of matching costs to revenue. In other words, an expense is that portion of the revenue earning potential of an asset which has been consumed in the generation of revenue. Unexpired or unconsumed part of the cost is recorded as an asset in the balance sheet. Such an unexpired cost is converted into an expense when it expires while helping to earn revenue. Depreciation of plant is an example of expired cost while prepaid insurance is an example of unexpired cost.

Loss is defined as *"reduction in firm's equity, other than from withdrawals of capital for which no compensating value has been received".* A loss is an expired cost resulting from the decline in the service potential of an asset that generated no benefit to the firm. Obsolescence or destruction of stockby fire are examples of loss.

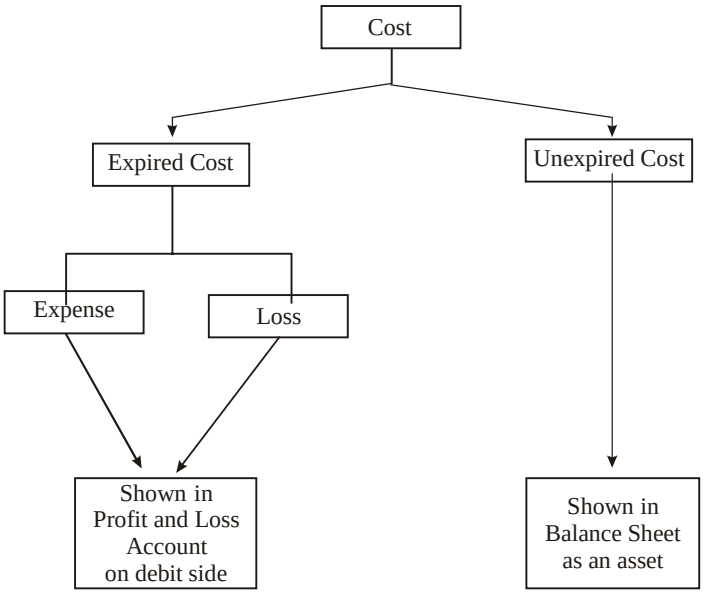


FIG. 1.2. Relation of Cost, Expense and Loss.

COST CENTRE

A cost centre is defined by CIMA of UK as "a *location, person, or item of equipment (or group of these) for which costs may be ascertained and used for the purpose of control".* Thus, a cost centre refers to a section of the business to which costs can be charged. It may be a location (a department, a sales area), an item of equipment (a machine, a delivery van), a person (a salesman, a machine operator) or a group of these (two automatic machines operated by one workman). The main purpose of ascertaining the cost of a cost centre is control of cost.

Cost centres are primarily of two types:

(a) **Personal cost centre—**which consists of a person or a group of persons,

(b) **Impersonal cost centre—**which consists of a location or an item of equipment or group of these. From functional point of view, cost centres may be of following two types:

(a) **Production cost centre**—This is that cost centre where actual production work takes place. Examples are melting shop, machine department, welding department, finishing shop, etc.

(b) **Service cost centre—**This is that cost centre which are ancillary to and render services to production cost centres. Examples of service cost centres are power house, tool-room, stores department, repair shop, canteen, etc. Costs incurred in service cost centres are of indirect type.

A cost accountant sets up cost centres to enable him to ascertain the costs he needs to know. A cost centre is charged with all the costs that relate to it; *e.g.,* if a cost centre is a machine, it will be charged with the costs of power, light, depreciation and its share of rent, etc. The purpose of ascertaining the cost of a cost centre is cost control. The person in charge of a cost centre is held responsible for the control of cost of that centre.

COST UNIT

It has been seen above that cost centres help in ascertaining the cost by location, equipment or person. Cost unit is a step further which breaks up the cost of a cost centre into smaller sub-divisions and helps in ascertaining the cost of saleable products or services.

A cost unit is defined by CIMA as a *"unit of product, service or time in relation to which cost may be ascertained or expressed".* Cost units are the 'things', that the business is set up to provide of which cost is ascertained. For example, in a sugar mill, the cost per tonne of sugar may be ascertained, in a textile mill the cost per metre of cloth may be ascertained. Thus 'a tonne' of sugar and 'a metre' of cloth are cost units. In short, cost unit is unit of measurement of cost.

All sorts of cost units are adopted, the criterion for adoption being the applicability of a particular cost unit to the circumstances under consideration. Broadly, cost units may be :

(i) **Units of production,** *e.g.,* a kilogram of a chemical, a ream of paper, a tonne of steel, a metre of cable, etc. or

(ii) **Units of service,** *e.g.*, a km. or a tonne km., a cinema seat, a consulting hour, etc.

A few more examples of cost units in various industries are given below:

Industry	***Normal Cost Unit***
Cement	Tonne of cement
Chemicals	Tonne, kilogram, litre, gallon, etc.
Bricks	1,000 bricks or 500 bricks
Soft drink	Crate of 24 bottles or 12 bottles
Nursing home	Bed per day
Flour	Tonne of flour
Shoes	Pair or dozen pairs
Pencils	Dozen or gross
Electricity	Kilowatt hour (KWH)
Transport	Passenger kilometre/tonne kilometre
Automobile	Per Car/Scooter, Bus, etc.
Printing press	Thousand copies
Cotton or jute	Bale
Timber	Cubic foot
Mines	Tonne of mineral
Carpets	Square foot
Hotel	Room per day
Gas	Cubic foot/cubic metre
Ship-buding	Ship
Steel	Tonne of steel
Interior decoration	Job
Construction	Building, Flat etc.
Textile	Metre of cloth
Sugar	Tonne of sugar
Petroleum	Barrel/litre

The cost units and cost centres should be those which are natural to the business and which are readily understood and accpted by all concerned.

COST OBJECT

Cost object may be defined as "*anything for which a separate measurement of cost may be desired".* A cost accountant may want to know the cost of a particular 'thing' and such a 'thing' is called a cost object. A cost object may be a product, service, activity, department or process etc. Examples of cost objects are given below:

Cost object	***Examples***
Product	Car, shaving razor, TV
Service	Telephone hotline, taxi service, electricity
Process	Melting process in a steel mill, weaving process in a textile mill.
Activity	Developing a webside on the Internet, Purchasing raw material.
Department	Purchasing department, Personnel department, Production department

CLASSIFICATION OF COSTS

Classification is the process of grouping costs according to their common characteristics. It is a systematic placement of like items together according to their common features. There are various ways of classifying costs as given below. Each classification serves a different purpose.

1. Classification into Direct and Indirect Costs

Costs are classified into direct costs and indirect costs on the basis of their identifiability with cost units or jobs or processes or cost centres.

Direct costs. These are those costs which are incurred for and conveniently identified with a particular cost unit, process or department. Cost of raw materials used and wages of machine operator are common examples of direct costs. To be specific, cost of steel used in manufacturing a machine can be conveniently ascertained. It is, therefore, a direct cost. Similarly, wages paid to a tailor in a readymade garments company for stitching a piece of trouser is a direct cost because it can be easily identified in the cost of a trouser.

Indirect costs. These are general costs and are incurred for the benefit of a number of cost units, processes or departments. These costs cannot be conveniently identified with a particular cost unit or cost centre. Depreciation of machinery, insurance, lighting, power, rent, managerial salaries, materials used in repairs, etc., are common examples of indirect costs. For example, depreciation of machine for stitching a piece of trouser cannot be known and thus it is an indirect cost.

Costs are not traced or identified directly with a cost unit for one of the three reasons:

1. It is impossible to do so; *e.g.*, rent of building, etc.
2. It is not convenient or feasible to do so; *e.g.*, nails used in furniture, sewing thread, etc.
3. Management chooses not to do so; *i.e.*, many companies classify certain items of cost as indirect because it is customary in the industry to do so; *e.g.*, carriage inward may be treated as an indirect expense. (Alternatively, it is treated as a part of the cost of direct material purchased).

The terms direct and indirect should be used in relation to the object of costing. An item of cost may be direct in one case and the same may be indirect in another case. It is the nature of business and the cost unit chosen that will determine whether a particular cost is direct or indirect. For example, depreciation of plant used by a contractor at site is direct cost whereas depreciation of plantused in a factory is indirect cost. It is because in the factory, plant would probably benefit more than one cost unit and it may not be convenient to allocate depreciation to various cost units with any degree of accuracy.

This classification is important from the point of view of accurate ascertainment of cost. Direct costs of a product can be conveniently determined while the indirect costs have to be arbitrarily apportioned to various cost units. For example, in readymade garments, the cost of cloth and wages of tailor are accurately ascertained without any difficulty and are thus direct costs. But the rent of factory building, managerial salaries, etc., which are indirect costs, have to be distributed to various cost units on some arbitrary basis and cannot be accurately ascertained.

2. Classification into Fixed and Variable Costs

Costs behave differently when level of production rises or falls. Certain costs change in sympathy with production level while other costs remain unchanged. As such on the basis of behaviour or variability, costs are classified into fixed, variable and semi-variable.

Fixed Costs
- Rent and lease
- Managerial salaries
- Building insurance
- Salaries and wages of permanent staff
- Municipal taxes

(i) Fixed costs. These costs remain constant in 'total' amount over a wide range of activity for a specified period of time; *i.e.,* these do not increase or decrease when the volume of production changes. For example, building rent, managerial salaries remain constant and do not change with change in output level and thus are fixed costs. But fixed cost 'per unit' decreases when volume of production increases and *vice versa,* fixed cost per unit increases when volume of production decreases. For example, if total fixed cost is ` 10,000 per month, per unit fixed cost will be as follows:

Total fixed cost (a)	*No. of units produced (b)*	*Fixed cost per unit (a ÷ b)*
` 10,000	1	` 10,000
` 10,000	2	` 5,000
` 10,000	10	` 1,000
` 10,000	100	` 100
` 10,000	1,000	` 10

The line representing fixed cost per unit will not touch X-axis because the fixed cost per unit cannot be zero.

The characteristics of fixed costs are :

(a) Total fixed cost does not change within a relevent range of output.

(b) Per unit fixed cost decreases when output increases and vice-versa, it increases when output decreases.

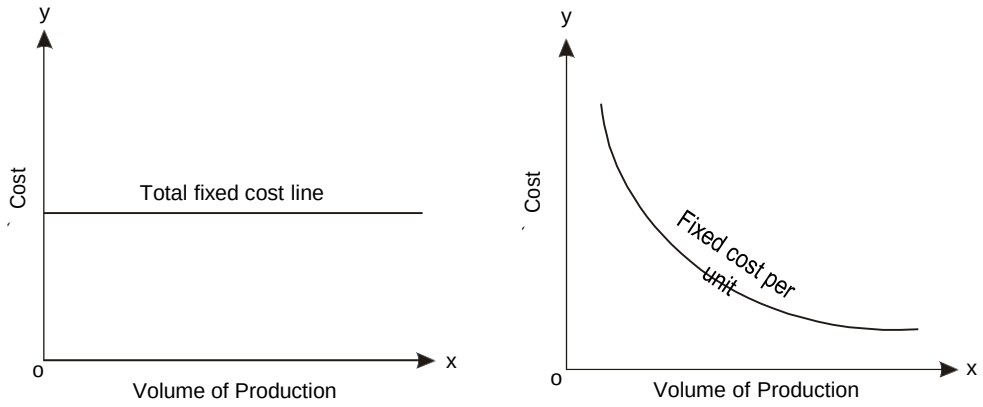


FIG. 1.3. Behaviour of Fixed Costs.

(ii) Variable costs. These costs tend to vary in direct proportion to the volume of output. In other words, when volume of output increases, total variable cost also increases, and *vice versa,* whenvolume of output decreases, total variable cost also decreases. But, the variable cost per unit remains fixed. It is shown in Fig. 1.4.

Thus, in general, variable costs show the following characteristics :

(a) Total amount of variable cost increases or decreases in direct proportion to the volume of output.

(b) Variable cost per unit does not change.

The following Table shows the per unit and total variable cost behaviour.

Variable cost per unit (a)	*No. of units produced (b)*	*Total variable cost (a × b)*
`50	1	`50
`50	2	`100
`50	10	`500
`50	100	`5000
`50	500	`25000

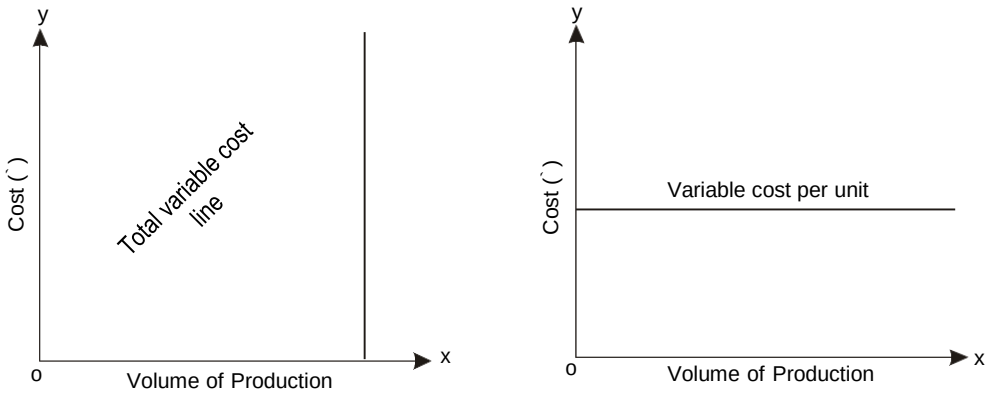


FIG. 1.4. Behaviour of Variable Costs.

(iii) Semi-variable or semi-fixed costs (Mixed costs). These costs include both a fixed and a variable component; *i.e.,* these are partly fixed and partly variable. A semi-variable cost has often a fixed element below which it will not fall at any level of output. The variable element in semi-variable costs changes either at a constant rate or in lumps. For example, introduction of an additional shift in the factory will require additional supervisors and certain costs will increase by jumps. In the case of telephone, there is a minimum rent and after a specified number of calls, the charges are according to the number of calls made. Thus, there is no fixed pattern behaviour of semi-variable costs. This is shown in the Fig. 1.5.

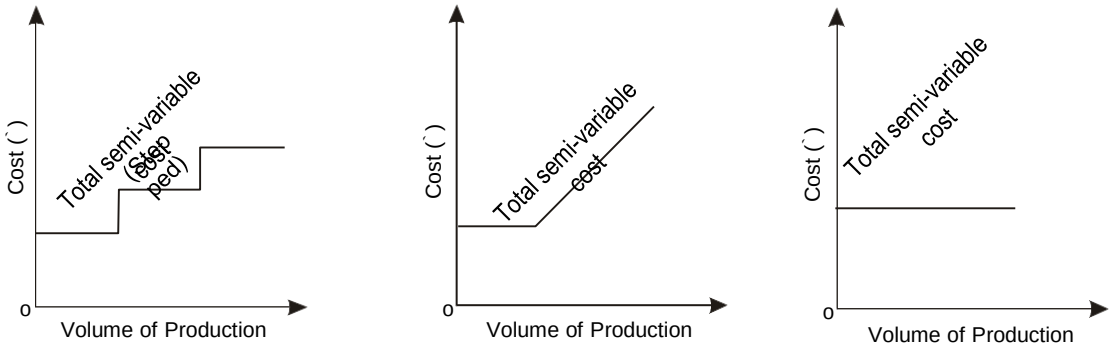


FIG. 1.5. Behaviour of Semi-variable Costs

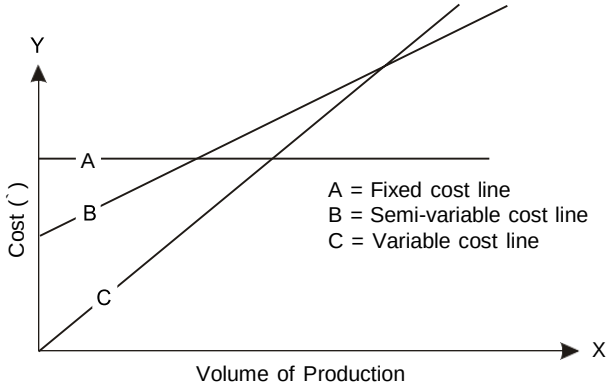


FIG. 1.6. Comparative Behaviour of Total Fixed, Variable and Semi-variable Costs

3. Classification into Controllable and Non-controllable Costs

From the point of view of controllability, costs are classified into controllable costs and non-controllable costs.

Controllable costs. These are the costs which may be directly regulated at a given level of management authority. Variable costs are generally controllable by department heads. For example, cost of raw material may be controlled by purchasing in larger quantities.

Non-controllable costs. These are those costs which cannot be influenced by the action of a specified member of an enterprise. For example, it is very difficult to control costs like factory rent, managerial salaries, etc.

Two important points should be noted regarding this classification. *First,* controllable costs cannot be distinguished from non-controllable costs without specifying the level and scope of management authority. In other words, a cost which is uncontrollable at one level of management may be controllable at another level of management. For example, a departmental manager may have no control over the number of supervisors employed in his department, but this decision may have to be taken by the production manager. Thus supervision cost will be non-controllable at the departmental manager's level, but it will be controllable at the level of production manager. *Second,* all costs are controllable in the long run and at some appropriate management level.

It is a misconception that variable costs are controllable and fixed costs are non-controllable. However, variable costs are more prone to control than fixed costs.

4. Classification into Historical Costs and Pre-determined Costs

On the basis of time of computation, costs are classified into historical costs and pre-determined costs.

Historical costs. These are past costs which are ascertained after these have been incurred. Historical costs are thus nothing but actual costs. These costs are not available until after the completion of the manufacturing operations.

Pre-determined costs. These are future costs which are ascertained in advance of production on the basis of a specification of all the factors affecting cost. These costs are extensively used for the purpose of planning and control.

5. Classification into Normal and Abnormal Costs

Normal cost may be defined as cost which is normally incurred on expected lines at a given level of output. This cost is a part of cost of production. Abnormal cost is that which is not normally incurred at a given level of output. Such cost is over and above the normal cost and is not treated as a part of the cost of production. It is charged to costing Profit and Loss Account.

CLASSIFICATION OF COSTS FOR DECISION MAKING

There are certain costs which are specially computed for use by the management for the purpose of decision-making. These costs may not be recorded in the books of account.

Sunk Costs

A sunk cost is a cost that has already been incurred and that cannot be changed by any decision made now or in the future. Such costs are not relevant for decision-making about the future. To illustrate the concept of such cost, assume that a firm has just paid ` 1,00,000 for a special purpose machine. Since the cost outlay has been made, ` 1,00,000 investment in the machine is a sunk cost. Even though afterwords the decision to buy the machine is found unwise, no amount of regret can relieve the company of its decision, nor any future decision can cause the costs to be avoided. Despitethe fact that sunk costs, which are historical costs, are irrelevant for making decisions, they are frequently analysed in detail before decisions about future courses of action are made. For example, historical costs may affect future tax payments which will differ depending on the course of action selected by management. Moreover, an analysis of historical costs may provide information about howfuture costs will differ under alternative courses of action.

Sunk cost and irrelevant costs are not synonymous and one should understand the difference between these two. Not all irrelevant costs are sunk costs but all sunk costs are irrelevant. To take an

example, in choosing from the two alternative methods of production, if direct material cost is the same under the two alternatives, it is an irrelevant cost. But direct material cost is not a sunk cost because it will be incurred in future and is a future cost. In the opinion of *Horngren,* a well known authority on the subject, *sunk cost has the same meaning as the past cost and all past costs are irrelevant.*

Differential (or Incremental) Costs

This cost may be regarded as the difference in total cost resulting from a contemplated change. In other words, differential cost is the increase or decrease in total cost that results from an alternative course of action. It is ascertained by subtracting the cost of one alternative from the cost of another alternative. The alternative choice may arise because of change in method of production, in sales volume, change in product mix, make or buy decisions, take or refuse decision, etc.

For differential cost analysis, we need to know the incremental revenues (the change in revenue) and incremental cost (the change in cost) arising from the decision.

Marginal Cost

Marginal cost is the additional cost of producing one additional unit. Marginal cost is the same thing as variable cost. Marginal costing (or variable costing) is a technique of charging only variable costs to products. Inventory is also valued at variable cost only. Fixed cost is treated as period cost and written off in Profit and Loss Account of the period. Marginal costing is also a very important analytical and decision- making tool in the hands of management. It helps in decisions like make or buy, pricing of products, selection of sales mix, etc. (The technique of marginal costing is discussed in this book in a separate chapter).

Imputed Costs (Notional cost)

These are hypothetical costs which are specially computed outside the accounting system for the purpose of decision-making. Interest on capital invested is a common type of imputed cost. As interest on capital is usually not included in cost, it is considered necessary to take it into account when deciding about the alternative capital investment projects. The failure to consider imputed interest cost may result in an erroneous decisions. For example, project A requires a capital investment of ` 50,000 and project B ` 40, 000. Both the projects are expected to yield ` 10,000 as additional profit. Obviously, these two projects are not equally profitable since project B requires less investment and thus, it should be preferred. Similarly, rental value of building owned by a firm is also an imputed cost.

Opportunity Cost

An opportunity cost may be defined as the potential benefit that is lost or sacrificed when the selection of one course of action makes it necessary to give up competing course of action. In other words, an opportunity cost is the sacrifice involved in accepting an alternative under consideration. For example, a company has deposited ` 1 lakh in bank at 10% p. a. interest. Now, it is considering a proposal to invest this amount in debentures where the yield is 12% p. a. If the company decides to invest in debentures, it will have to forego bank interest of ` 10,000 p. a., which is the opportunity cost.

Opportunity cost is a pure decision-making cost. It is an imputed cost that does not require cash outlay and it is not entered in the accounting books.

Replacement Cost

This is the cost at which there could be purchased an asset identical to that which is being replaced. In simple words, replacement cost is the current market cost of replacing an asset. When the management considers the replacement of an asset, it has to keep in mind its replacement cost and not the cost at which it was purchased earlier. For example, a machinery purchased in 1995 at ` 10,000 is discarded in 2003 and a new machinery of the same type is purchased for ` 15,000. So the replacement cost of the machinery is ` 15,000.

Out-of-pocket Cost (Explicit Cost and Implicit Cost)

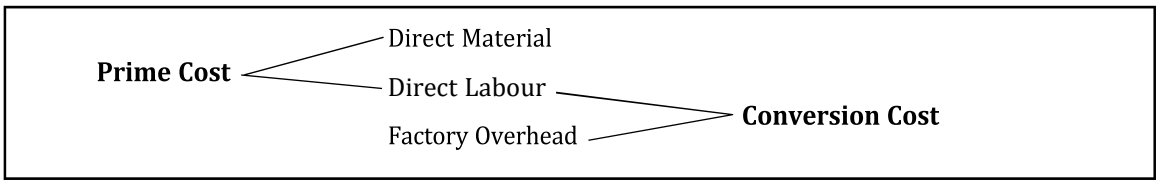
There are certain costs which require cash payment to be made (such a wages, rent) whereas many costs do not require cash outlay (such as depreciation). Out-of-pocket costs, also known as explicit costs, are those costs that involve cash outlays or require the utilisation of current resources. Examples of out-of-pocket costs are wages, material cost, insurance, power cost, etc. Out-of-pocket cost may be either fixed (manager's salary) or variable (raw materials and direct wages). Depreciationon plant and machinery does not involve any cash outlay and therefore is not an out-of-pocket cost. Such costs are also known as implicit costs. Out-of-pocket cost is frequently used as an aid in make or buy decision, price fixation during depression and many other decisions.

Future Cost

No decision can change what has already happened. The past is history and decisions made now can affect only what will happen in the future. Thus, the only relevant costs for decision-making are predetermined or future costs. But it is the historical costs which generally provide a basis for computing future costs. However, changing relationships in the future are also given due consideration while estimating future costs.

Conversion Cost

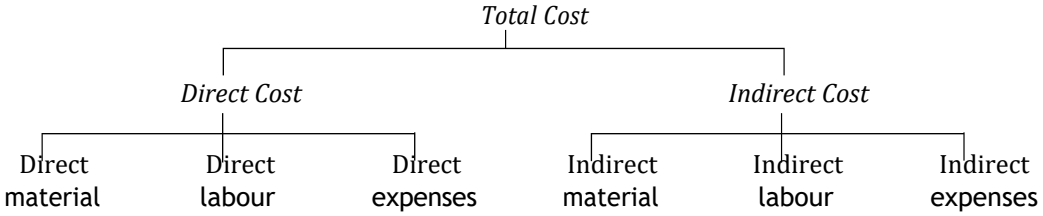
It is the total cost of converting' a raw material into finished product. This term is used to denote the sum of direct labour and factory overhead costs in the production of a product. In other words, conversion cost is the factory cost minus direct material cost. Appropriate use of this cost can be made in certain managerial decisions.



It should be noted that labour cost is a part of prime cost as well as conversion cost.

ELEMENTS OF COST

A cost is composed of three elements, i.e., material, labour and expenses. Each of these elements may be direct or indirect. This is shown below :



Material Cost

According to CIMA, UK, material cost is *"the cost of commodities supplied to an undertaking. "* Materials may be direct or indirect.

Direct materials. Direct material cost is that which can be conveniently identified with and allocated to cost units. Direct materials generally become a part of the finished product. For example, cotton used in a textile mill is a direct material. However, in many cases, though a material forms a part of the finished product, yet, it is not treated as direct material; *e.g.,* nails used in furniture, thread used in stitching garments, etc. This is because value of such materials is so small that it is quite difficult and futile to measure it. Such materials are treated as indirect materials.

Indirect materials. These are those materials which cannot be conveniently identified with individual cost units. These are minor in importance, such as (*i*) small and relatively inexpensive items which may become a part of the finished product; *e.g.,* pins, screws, nuts and bolts, thread, etc., (*ii*) those items which do not physically become a part of the finished products; *e.g..* coal, lubricating oil and grease, sand paper used in polishing, soap, etc:

Direct Materials
- Clay in bricks
- Leather in shoes
- Steel in machines
- Cloth in garments
- Timber in furniture

Indirect Materials
- Lubricating oil
- Sand paper
- Nuts and bolts
- Coal
- Small tools
- Office stationery

Labour Cost

This is *"the cost of remuneration (wages, salaries, commissions, bonuses, etc.), of the employees of an undertaking".* CIMA

Direct labour. Direct labour cost consists of wages paid to workers directly engaged in converting raw materials into finished products. These wages can be conveniently identified with a particular product, job or process. Wages paid to a machine operator is a case of direct wages.

Indirect labour. It is of general character and cannot be conveniently identified with a particular cost unit. In other words, indirect labour is not directly engaged in the production operations but only to assist or help in production operations.

Direct Labour
- Machine operator
- Shoe-maker
- Carpenter
- Weaver
- Tailor

Indirect Labour
- Supervisor
- Inspector
- Cleaner
- Clerk
- Peon
- Watchman

Expenses

All costs other than material and labour are termed as expenses. It is defined as *"the cost of services provided to an undertaking and the notional cost of the use of owned assets."* (CIMA)

Direct expenses. According to CIMA, UK, "*direct expenses are those expenses which can be identified with and allocated to cost centres or units.*" These are those expenses which are specifically incurred in connection with a particular job or cost unit. Direct expenses are also known as *chargeable expenses.*

Direct or Chargeable Expenses

- Hire of special plant for a particular job
- Travelling expenses in securing a particular contract
- Cost of patent rights
- Experimental costs
- Cost of special drawings, designs and layouts
- Carriage paid for materials purchased for a specific job
- Royalty paid in mining
- Depreciation or hire of a plant used on a contract at site

Indirect expenses. All indirect costs, other than indirect materials and indirect labour costs, are termed as indirect expenses. These cannot be conveniently identified with a particular job, process or work order and are common to cost units or cost centres.

Indirect Expenses

- Rent and rates
- Depreciation
- Lighting and power
- Advertising
- Insurance
- Repairs

Prime Cost

This is the aggregate of direct material cost, direct labour cost and direct expenses. Thus,

Prime Cost = Direct Materials + Direct Labour + Direct Expenses.

Overhead

This is the aggregate of indirect material cost, indirect labour cost and indirect expenses. Overhead is also known as oncost. Thus,

Overhead = Indirect Materials + Indirect Labour + Indirect Expenses.

Overheads are divided into production overhead, office overhead and selling overhead as follows :

1. Production overhead. Also known as factory overhead, works overhead or manufacturing overhead, these are those overheads which are concerned with the production function. It includes indirect materials, indirect wages and indirect expenses in producing goods or services.

(a) *Indirect material* — Examples : Coal, oil, grease, etc., stationery in factory office, cotton waste, brush, sweeping broom etc.

(b) *Indirect labour* — Examples : Works manager's salary, salary of factory, office staff, salary of inspector and supervisor, wages of factory sweeper, wages of factory watchmen.

(c) *Indirect expenses* — Examples : Factory rent, depreciation of plant, repair and maintenance of plant, insurance of factory building, factory lighting and power, internal transport expenses.

2. Office and administration overhead. This is the indirect expenditure incurred in general administrative function, *i.e.,* in formulating policies, planning and controlling the functions, directing and motivating the personnel of an organisation in the attainment of its objectives.

These overheads are of general character and have no direct connection with production or sales activities. This category of overhead is also classified into indirect material, indirect labour and indirect expenses.

(a) *Indirect material* — Examples : Stationery used in general administrative office, postage, sweeping broom and brush, etc.

(b) *Indirect labour* — Examples : Salary of office staff, salary of managing director, rumuneration of directors of the company.

(c) *Indirect expenses* — Examples : Rent of office building, legal expenses, office lighting and power, telephone expenses, depreciation of office furniture and equipments, office air-conditioning, sundry office expenses.

3. Selling and distribution overhead. Selling overhead is the cost of promoting sales and retaining customers. It is defined as *"the cost of seeking to create and stimulate demand and of securing orders."* Examples are advertisement, samples and free gifts, salaries of salesmen, etc.

Distribution cost includes all expenditure incurred from the time the product is completed until it reaches its destination. It is defined as *"the cost of sequence of operations which begins with making the packed product available for despatch and ends with making the reconditioned returned empty packages, if any, available for re-use".* Examples are carriage outwards, insurance of goods in transit, upkeep of delivery vans, warehousing, etc.

Selling and distribution overheads are also grouped into indirect material, indirect labour and indirect expenses.

(a) *Indirect material* — Examples : Packing material, stationery used in sales office, cost of samples, price list, catalogues, oil, grease, etc., for delivery vans, etc.

(b) *Indirect labour* — Examples : Salary of sales manager, salary of sales office staff, salary of warehouse staff, salary of drivers of delivery vans, etc.

(c) *Indirect expenses* — Examples : Advertising, travelling expenses, showroom expenses, carriage outwards, rent of warehouse, bad debts, insurance of goods in transit, etc.

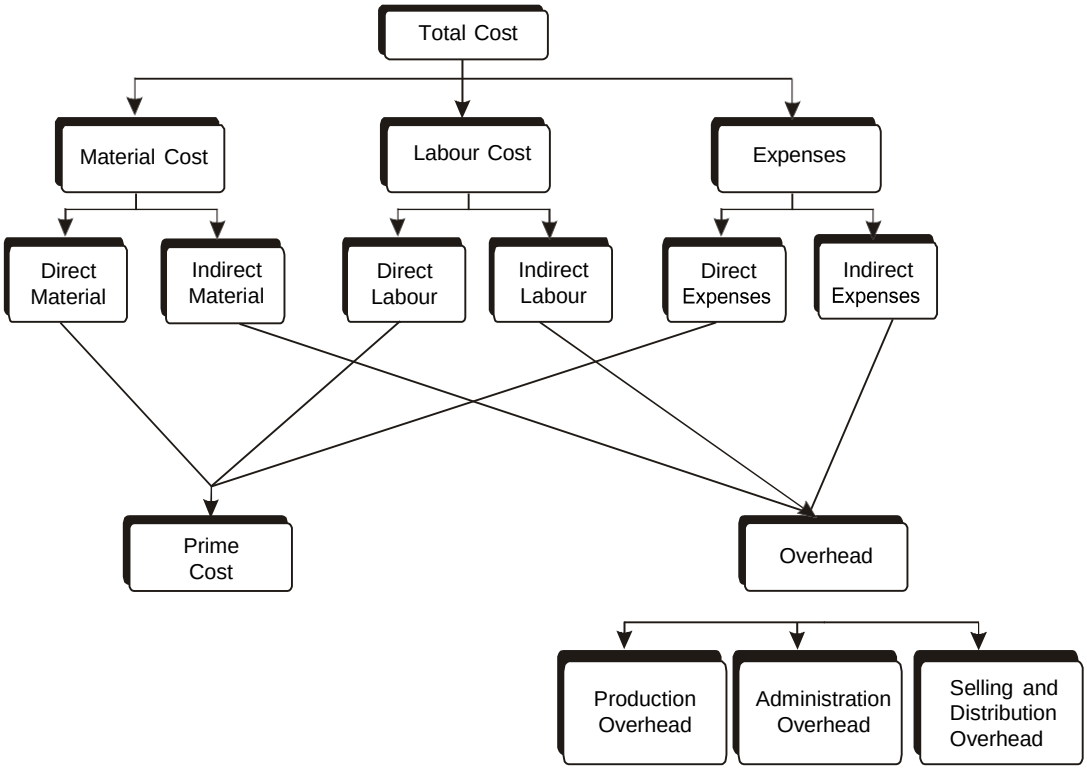


FIG. 1.7. Elements of Cost

Illustration 1.1

A manufacturer has shown an amount of ` 19,310 in his books as 'Establishment' which really include the following expenses:

Interest on debentures	1,200
Agents' commission	6,750
Warehouse wages	1,800
Warehouse repairs	1,500
Lighting of office	70
Office salaries	1,130
Director's remuneration	1,400
Travelling expenses of salesmen	1,760
Rent, rates and insurance of warehouse	310
Rent, rates and insurance of office	230
Lighting of warehouse	270
Printing and stationery	1,500
Trade magazines	70
Donations	150
Bank charges	100
Cash discount allowed	770
Bad debts	300

From the above information prepare a statement showing in separate total:

(a) Selling expenses, (*c*) Administration expenses.

(b) Distribution expenses, (*d*) Expenses which you would exclude from costs.

(*B.Com., Kerala*)

Solution

(*a*)	***Selling Expenses :***		`
	Agents' commission		6,750
	Travelling expenses of salesmen		1,760
	Bad debts		300
		Total	8,810
(*b*)	***Distribution Expenses :***		`
	Warehousing wages		1,800
	Warehouse repairs		1,500
	Rent, rates and insurance of warehouse		310
	Lighting of warehouse		270
		Total	3,880
(*c*)	***Administration Expenses :***		`
	Office salaries		1,130
	Office lighting		70

Director's remuneration		1,400
Rent, rates and insurance of office		230
Printing and stationery		1,500
Trade magazines		70
	Total	4,400
(*d*) ***Items not included in costs***		`
Donations		150
Cash discount allowed		770
Bank charges		100
Interest on debentures		1,200
	Total	2,220

Note: List of items not included in cost is given on Page 5.4 Chapter 5.

Components of Total Cost—Elements of cost may be grouped as follows:

(i) **Prime Cost** = Direct material + Direct labour + Direct expenses.

(ii) **Works Cost or Factory Cost** = Prime cost + Factory overhead.

(iii) **Cost of Production** = Works cost + Administration overhead.

(iv) **Total Cost or Cost of Sales** = Cost of production + Selling and distribution overhead.

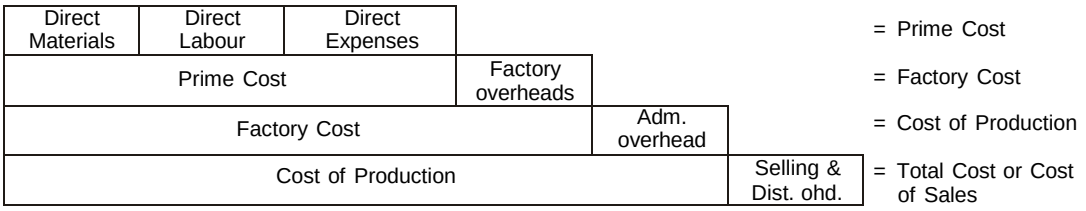


FIG. 1.9. Components of Total Cost

COST SHEET

Cost sheet is defined by C1MA, U.K. as *"a document which provides for the assembly of the detailed cost of a cost centre or cost unit."*

Thus cost sheet is a periodical statement of cost designed to show in detail the various elements of cost of goods produced like prime cost, factory cost of production and total cost. It is prepared at regular intervals, *e.g.,* weekly, monthly, quarterly, yearly, etc. Comparative figures of the previous period may also be shown in the cost sheet so that assessment can be made about the progress of the business.

Production Statement

Though the term *Production Statement* is used interchangeably with cost sheet, the former is an expanded form of the latter. In addition to cost elements, a production statement includes items of sales, stocks and profits. When the details of cost sheet or production statement are shown in a T-shape

account, it is known as *Production Account.* Other names used are *Cost Statement* and *Statement of cost and Profit.*

Purposes. Cost sheet serves the following purposes:

1. It reveals the total cost and cost per unit of good0s produced.
2. It discloses the break-up of total cost into different elements of cost.
3. It provides a comparative study of the cost of current period with that of the corresponding previous period.
4. It acts as a guide to management in fixation of selling prices and quotation of tenders.

Method of Preparing Cost Sheet

A cost sheet is prepared by clarifying costs according to elements — materials, labour and overhead.

1. *Materials* — Cost of materials includes cost of materials purchased plus all expenses relating to purchases, *e.g.,* carriage inward, octroi, custom duty on imported materials, etc.

2. *Labour* — A distinction is to be made between direct labour and indirect labour. Direct labour cost which is also known as productive wages, is taken in the prime cost. Indirect labour cost or unproductive wages are added in the factory overhead.

3. *Overheads* — Overheads are classified into three broad categories :

(i) Factory Overhead.
(ii) Office Overhead.
(iii) Selling and Distribution Overhead.

Specimen of a simple cost sheet is given below:

Cost Sheet (or Statement of Cost) for the period.....

No. of units produced.....

Particulars	*Total cost* `	*Cost per unit* `
Direct Materials		
Direct Labour		
Direct (or Chargeable) Expenses		
Prime Cost		
Works Overheads		
Works Cost		
Office and Administrative Overheads		
Cost of Production		
Selling and Distribution Overheads		
Total Cost or Cost of Sales		
Profit or Loss		
Sales		

Illustration 1.2

Prepare a cost sheet of the following data relating to the manufacture of Jeans:

Number of Jeans manufactured during the month	1,000
	`
Direct materials consumed	20,000
Direct labour	8,000
Indirect labour (in factory)	2,500
Supervision costs (in factory)	1,000
Factory premises rent	1,600
Factory lighting	600
Oil for machines	100
Depreciation of machines	500
Office overheads	8,000
Office salaries	2,000
Misc. office expenses	1,000
Selling and distribution overheads	6,000

Note: A profit margin of 20% on the total cost of goods is expected on the sale of Jeans.

Solution

Cost Sheet (for the period ....)

Particulars			*Total for1,000 units*	*Per unit*
			`	` P.
Direct materials		20,000		
Direct labour		8,000		
	Prime Cost		28,000	28.00
Works/Factory Overheads:				
Indirect labour		2,500		
Supervision costs		1,000		
Factory rent		1,600		
Factory lighting		600		
Oil for machines		100		
Depreciation of machines		500	6,300	6.30
	Works Cost		34,300	34.30
Office and Adm. Overheads:				
Office overheads		8,000		
Office salaries		2,000		
Misc. expenses		1,000	11,000	11.00
	Cost of Production		45,300	45.30
Selling and Distribution Overheads:			6,000	6.00
	Total Cost		51,300	51.30
Profit 20% of Total Cost			10,260	10.26
	Sales		61,560	61.56

Illustration 1.3

From the following information for the month of January, prepare a Cost Sheet to show the following components : (*a*) Prime Cost, (*b*) Factory Cost, (*c*) Cost of Production, (*d*) Total Cost.

Direct material	57,000
Direct wages	28,500
Factory rent and rates	2,500
Office rent and rates	500
Plant repairs and maintenance	1,000
Plant depreciation	1,250
Factory heating and lighting	400
Factory manager's salary	2,000
Office salaries	1,600
Director's remuneration	1,500
Telephone and postage	200
Printing and stationery	100
Legal charges	150
Advertisement	1.500
Salesmen's salaries	2,500
Showroom rent	500
Sales	1,16,000

Solution

Cost Sheet for the month of Jan. .....

Direct materials			57,000
Direct wages			28,500
	Prime Cost		85,500
Factory Overhead :			
Factory rent and rates		2,500	
Plant repair and maintenance		1,000	
Plant depreciation		1,250	
Factory heating and lighting		400	
Factory manager's salary		2,000	7,150
	Factory Cost		92,650
Office and Administration Overhead:			
Office salaries		1,600	
Director's remuneration		1,500	
Telephone and postage		200	
Office rent and rates		500	
Printing and stationery		100	
Legal charges		150	4,050
	Cost of Production		96,700
Selling and Distribution Overhead :			
Advertisement		1,500	
Salesmen's salaries		2,500	
Showroom rent		500	4,500
	Total Cost (or Cost of Sales)		1,01,200
	PROFIT		14,800
Sales			1,16,000

Treatment of Stocks

Stocks may be of three types : (*a*) Stocks of raw materials. (*b*) Stocks of work-in-progress. (*c*) Stocks of finished goods.

(a) **Stock of Raw Materials.** In cost sheet, materials consumed in production are shown. In calculating the value of raw materials consumed during the period, opening stock of raw material is added in purchases and the value of closing stock is subtracted from purchases. In the following example with assumed figures, the treatment of stock of raw material has been shown :

		`
	Opening stock of raw materials	30,000
Add:	Purchases	80,000
		1,10,000
Less:	Closing stock of raw materials	17,000
	Cost of materials consumed	93,000

(b) **Stock of Work-in-Progress.** This is the stock of semi-finished goods, *i.e.,* the goods which are in manufacturing process. The cost of work-in-progress consists of cost of materials consumed, direct wages and a proportionate part of the factory overhead. Therefore, in the preparation of cost sheet, opening and closing stocks of work-in-progress are adjusted at the stage of factory cost. Opening stock of work-in-progress is added to works cost and closing stock is subtracted from this figure. In the following example, figures have been assumed to show the treatment of the stock of work-in-progress.

			`
	Direct materials consumed		93,000
	Direct wages		22,000
	Direct expenses		5,000
		Prime Cost	1,20,000
Add:	Factory overhead		24,000
			1,44,000
Add : Opening stock of work-in-progress			14,000
			1,58,000
Less: Closing stock of work-in-progress			8,000
		Works Cost or Factory Cost	1,50,000

(c) **Stock of Finished Goods.** This stock is adjusted after the calculation of cost of production. The opening stock is added to and closing stock is subtracted from the cost of production. The resulting figure will be the Cost of Goods Sold. This is shown below, continuing the same assumed figures :

		`
	Factory cost	1,50,000
Add: Administration overhead		10,000
	Cost of Production	1,60,000
Add : Opening stock of finished goods		30,000
		1,90,000
Less: Closing stock of finished goods		22,000
	Cost of Goods Sold	1,68,000

Note. In case the value of closing stock of finished goods is not given in the question, it will be valued at the current cost of production.

The treatment of the above three types of stocks is illustrated in the following specimen cost sheet.

Cost Sheet for the period.....

Production..... units.

Particulars			*Total cost* `	*Cost per unit* `
	Opening stock of raw materials	XXX		
Add:	Purchases	XXX		
Add :	Expenses on purchases	XXX		
		XXX		
Less :	Closing stock of raw materials	XXX		
	Cost of material consumed			
	Direct wages			
	Direct expenses			
	Prime Cost			
Add .	Factory overhead			
Add :	Opening stock of work-in-progress			
Less:	Closing stock of work-in-progress			
	Factory or Works Cost			
Add :	Administrative overhead			
	Cost of Production			
Add :	Opening stock of finished goods			
Less :	Closing stock of finished goods			
	Cost of Goods Sold			
Add :	Selling and distribution overhead			
	Cost of Sales			
	Profit (or Loss)			
	Sales			

Illustration 1.4

The Bangalore Ltd. supplies you the following information and requires you to prepare a cost sheet.

	`
Stock of raw materials on 1st Sept., 2013	75,000
Stock of raw materials on 30th Sept., 2013	91,500
Direct wages	52,500
Indirect wages	2,750
Sales	2,00,000
Work-in-progress on 1st Sept., 2013	28,000
Work-in-progress on 30th Sept., 2013	35,000
Purchases of raw materials	66,000
Factory rent, rates and power	15,000
Depreciation of plant and machinery	3,500
Expenses on purchases	1,500
Carriage outward	2,500
Advertising	3,500
Office rent and taxes	2,500
Travellers' wages and commission	6,500

Stock of finished goods on 1st Sept., 2013 54,000
Stock of finished goods on 30th Sept., 2013 31,000
(*B. Com., Delhi, Andhra*)

Solution

Cost Sheet

for the Month ending 30th Sept., 2013

		`	`
	Opening Stock of raw material (1st Sept.)	75,000	
Add:	Purchases	66,000	
	Expenses on purchases	1,500	
		1,42,500	
Less:	Closing Stock of raw material (30th Sept.)	91,500	51,000
	Materials consumed		52,500
	Direct wages		
	Prime Cost		1,03,500
Add:	Opening Work-in-progress (1st Sept.)		28,000
	Factory Overheads :		
	Indirect wages	2,750	
	Factory rent, rates and power	15,000	
	Depreciation of plant and machinery	3,500	21,250
			1,52,750
Less:	Closing Work-in-progress (30th Sept.)		35,000
	Works Cost		1,17,750
	Office and Administration Overheads :		
	Office rent and taxes		2,500
	Cost of Production		1,20,250
Add:	Opening Stock of finished goods (1st Sept.)		54,000
			1,74,250
Less:	Closing Stock of finished goods (30th Sept.)		31,000
	Cost of Goods Sold		1,43,250
	Selling and Distribution Overheads :		
	Carriage outward	2,500	
	Advertising	3,500	
	Travellers' wages and commission	6,500	12,500
	Cost of Sales		1,55,750
	Profit		44,250
	Sales		2,00,000

ITEMS EXCLUDED FROM COST

The following items are of financial nature and thus not included while preparing a cost sheet:

1. Cash discount
2. Interest paid
3. Preliminary expenses written off
4. Goodwill written off
5. Provision for taxation
6. Provision for bad debts
7. Transfer to reserves
8. Donations
9. Income-tax paid
10. Dividend paid
11. Profit/loss on sale of fixed assets
12. Damages payable at law, etc.

Exhaustive Cost Sheet (Detailed)

Units produced .....

Particulars	*Total cost* `	*Cost per unit* `
Opening Stock of Direct Raw Materials		
Add : Purchases	...	...
Add : Carriage Inward	...	...
Add : Octroi, Customs Duty and other expenses on purchases	...	...
Less : Closing Stock of Direct Raw Materials	...	...
Cost of Direct Materials Consumed	...	...
Direct or Productive Wages	...	...
Direct (or Chargeable) Expenses	...	...
Prime Cost	...	...
Add : Works or Factory Overheads :	...	
Indirect Materials	...	
Indirect Wages	...	
Leave Wages	...	
Overtime Premium	...	
Fuel and Power	...	
Coal	...	
Factory Rent and Taxes	...	
Insurance	...	
Factory Lighting	...	
Supervision	...	
Works Stationery	...	
Canteen and Welfare Expenses	...	
Repairs	...	
Haulage	...	
Works Salaries	...	
Depreciation of Plant & Machinery	...	
Works Expenses	...	
Gas and Water	...	
Drawing Office Salaries	...	
Technical Director's Fees	...	
Laboratory Expenses	...	
Works Telephone Expenses	...	
Internal Transport Expenses	...	
Less : Sale of Scrap	...	
Add : Operating Stock of Work-in-progress	...	
Less : Closing Stock of Work-in-progress	...	
Works Cost	...	
Add : Office and Administrative Overheads :	...	
Office Salaries	...	
Director's Fees	...	
Office Rent and Rates	...	
Office Stationery and Printing	...	

(*Contd...*)

Particulars	*Total cost* `	*Cost per unit* `
Sundry Office Expenses	...	
Depreciation and Repairs of Office Equipment	...	
Depreciation of Office Furniture	...	
Subscription to Trade JournalsOffice	...	
Lighting	...	
Establishment Charges Director's	...	
Travelling ExpensesPostage	...	
Legal ChargesAudit Fees	...	
Cost of Production	...	
Add : Opening Stock of Finished Goods		
Less : Closing Stock of Finished Goods	...	
Cost of Goods Sold	...	
Add : *Selling and Distribution Overheads* :	...	
Advertising	...	
Showroom ExpensesBad Debts	...	
Salesmen's Salaries and ExpensesPacking	...	
Expenses	...	
Carriage Outward Commission of Sales	...	
AgentsCounting House Salaries Cost of	...	
Catalogues	...	
Expenses of Delivery VansCollection	...	
Charges Travelling Expenses	...	
Cost of Tenders Warehouse	...	
Expenses	...	
Cost of Mailing LiteratureSales	...	
Manager's Salaries Sales Director's	...	
Fees Showroom Expenses	...	
Sales Office Expenses	...	
Depreciation and Repairs of Delivery VansExpenses	...	
of Sales Branches	...	
Cost of Sales (or Total Cost)	...	
PROFIT	...	
Sales	...	
	...	
	...	
	...	
	...	
	...	
	...	

UNIT II MATERIALS

Material is a very important factor of production. It includes physical commodities used to manufacture the products. It is the starting point from which the first operations start. The material is the most flexible and controllable input. It is the first and the most important element of cost. Materials account for nearly 60% of the cost of production of any product.

Direct and Indirect material:

Materials which form part of a finished product are known as direct materials. In other words, direct materials can be conveniently and accurately allocated to a particular unit of cost.

Indirect materials cannot be treated as part of the finished product because it cannot be conveniently and accurately allocated to a particular unit of product.

Material control:

It can be defined as a comprehensive framework for the accounting and control of material cost designed with the object of maintaining material supplies at a level so as to ensure uninterrupted production but at the same time minimizing investment of funds. In simple material control is a systematic control over the purchasing, storing and using of materials so as to have the minimum possible cost of materials.

Stock Control through ABC Analysis:

Manufacturing units find it useful to divide materials into three categories for the purpose of exercising selective control on materials. An analysis of the material costs will show the following:

1. A smaller percentage of items of materials in the stores may contribute to a large percentage of the value of consumption.

2. A large percentage of items may represent a smaller percentage of the value of items consumed.

3. Some other materials in between the above two extremes will fall, the percentage number of which is more or less equal to their value of consumption.

The organization exercises discriminating control over different items of stores classified on the basis of investment involved. Usually they are divided into three categories according to their importance, namely, their value and frequency of replenishment (restoration of stock) during a period.

'A' category of items consists of only a small percentage i.e. about 10% of total items handles by the stores but require heavy investment about 70% of inventory value, because of their high price or heavy requirement or both.

"B" category of items are relatively less important - 20% of the total items of material handled by stores and percentage of investment required is about 20% of total investment in inventories.

'C' category of items are 70% of total items handled and 10% of value.

Such an analysis of material is known as ABC analysis. This technique of stock control is also known as stock control according to value method or Always Better Control method or proportional parts Value Analysis method. Thus, under this technique of material control, materials are listed in 'A', 'B' and 'C' categories in descending order based on money value of consumption.

Manufacturing Companies procure materials well in advance for output and keep them in Stores. Such material should be issued to the production department on the material requisition made by the manager. The issues are made on the basis of nature, availability, marketing, etc. So, there are different issuing methods. They are:

1. **First In First Out Method (FIFO),**
2. **Last In First Out Method (LIFO),**
3. **Average Price Methods:**
   a) **Simple Average Price,**
   b) **Weighted Average Price,**
4. **Base Stock Price Method,**
5. **Market Price Method,**
6. **Standard Price Method.**

1. First in First Out Method (FIFO): Under this method, the materials received first are to be issued to the production first and priced at the cost at which they purchased. So, issues are made on chronological order. Opening stock if any is issued first, the units from the first

purchase issued next, and so on until the units left in the stores. Closing stock of materials are valued at the latest cost of purchases.

Advantages:

1. It is advantageous when prices are falling.
2. Actual cost can be recovered from production.
3. Valuation of stock balance is a fair one.
4. No profit or loss arises.
5. It is easy to operate if prices do not fluctuate too often.

Disadvantages:

1. This method involves more calculations.
2. Issue Price may not reflect current economic value.
3. In times of raising prices, this method is not suitable.
4. It doesn't permit useful comparison of the costs of different work orders.

This method is suited in the case of material of slow consumption, high unit price and where the prices are constant.

2. Last In First Out Method (LIFO): Under this method, the latest purchases are issued first at its purchase price. This method operates in reverse to FIFO. This method is known as the replacement cost method because the materials are issued at the current cost .

Advantages:

1. Production is charged at the most recent prices.
2. It is advantageous at the time of raising prices.
3. Neither profit nor loss is usually made.

Disadvantages:

1. It involves more clerical work.
2. It tends to inflate profits in times of falling prices.
3. Even if closing stock is valued at cost, it does not represent the current price.
4. Comparison of Job costs amounts to unfair.

3. Average Price Method: The principle on which the average cost method is based is that all of the materials in stores are so mixed up that an issue cannot be made from any particular lot of purchases. Under this method, the issues are made at Simple Average or Weighted Average.

a) **Simple Average Price:** This is the price which is calculated by dividing the total of the prices in the stock by the number of lots.

Advantages:

1. It is simple.
2. It may bring profits in the issue of materials.
3. It can be used satisfactorily where price of materials is comparatively low.

Disadvantages:

1. It may produce unfair results.
2. It produces an element of profit or loss.
3. It gives only Average cost but not actual cost.

b) Weighted Average Price: This is the price which is calculated by dividing the total cost of material in stock from which the material has been drawn, by the total quantity of material in the stock.

Advantages:

1. It can be used with advantage where prices more fluctuate.
2. It can be used where the units are homogeneous and of small sizes.
3. Stock records give a fair indication of the stock value.

Disadvantages:

1. It is more complicated to operate.
2. It introduces an element of profit or loss.
3. It involves more calculations.

4. Specific Price Method: Under this method, issues are priced at either replacement or market price on the date of issue.

Advantages:

1. The result of good or bad buying is disclosed.
2. A more comparative price may be given when tenders are made.
3. This method facilitates to measure the efficiency of the purchase department.
4. The cost of stock reflects the current market price.

Disadvantages:

1. This method is wrong on principle.
2. Substantial differences must arise on Stores account.

5. Standard Price Method: It is a pre-determined price fixed on the basis of specification of all the factors affecting that price. A Standard Price for each material is set and the actual price paid compared the standard.

If actual price exceeds the standard, a loss will be realised. If the actual price is less, a profit will be obtained.

Advantages:

1. It is relatively easy to operate.
2. The efficiency of purchasing department can be determined by comparing the actual and standard prices.
3. The effect of price variations is eliminated.
4. It reduces clerical work.
5. This method may be employed in Standard Costing.

Disadvantages:

1. It does not reflect the price trend.
2. The issue of materials is not made at current values.
3. The profit or loss which arises has to be duly adjusted.
4. It is difficult to set a Standard Price.

6. Base Stock Price Method: This is essentially a method of valuing stock. It assumes that the very first purchases were solely to provide a working buffer stock. Since, in theory this Base Stock is never issued, it is always in Stock and therefore should appear in every stock taking at its original cost. Excess stock above the base stock is valued on cost or market value whichever is lower.

PROBLEMS

1. From the following receipts and issues of materials, calculate the price of issues charged out under LIFO and FIFO methods.

1995

April 1 Opening balance - 100 tons at Rs.50 per ton
5 Issues - 60 tons
6 Received - 120 tons at Rs.50.5 per ton
7 Issues - 50 tons
8 Received back from completed jobs - 2 tons (Previously issued at Re.50.25 per ton
9 Issued – 80 tons
10 Purchases – 500 tons at Rs.52 per ton
12 Purchases – 200 tons at Rs.55 per ton
15 Issues – 710 tons

2. From the following particulars of a Company, prepare Stores Ledger A/c. under FIFO and LIFO methods.

Jan.2 Purchases – 4000 units at Rs.4 per unit
20 Purchases – 500 units at Rs.5 per unit
Feb.5 Issues – 2000 units
10 Purchases – 6000 units at Rs.6
12 Issues – 4000 units
Mar.2 Issues - 1000 units
5 Issues – 2000 units
15 Purchases – 4500 units at Rs.5.5

20 Issues – 2500 units

3. From the following materials of receipts and issues, prepare Stores Ledger A/c. under FIFO and LIFO methods.

Jan.1 Opening Stock – 500 units at Rs.4
5 Receipts – 200 units at Rs.4.25
12 Receipts – 150 units at Rs.4.10
20 Receipts – 300 units at Rs.4.50
25 Receipts – 400 units at Rs.4
Jan.4 Issues - 200 units
10 Issues - 400 units
15 Issues - 100 units
19 Issues - 100 units
26 Issues - 200 units
30 Issues - 250 units

4. From the following receipts and issues of materials, prepare Stores Ledger A/c. under FIFO method and LIFO methods.

1985
Jan.1 Purchases – 4000 units at Rs.4
20 Purchases – 500 units at Rs.5
Feb.10 Purchases – 6000 units at Rs.6
Mar.15 Purchases – 4500 units at Rs.5.5
Feb.5 Issues - 2000 units
12 Issues - 4000 units
Mar.2 Issues - 1000 units
5 Issues - 2000 units
20 Issues - 3000 units
Also find out value of Closing Stock.

5. From the following details of materials, prepare Stores Ledger A/c. under LIFO method.

1980
Jan.1 Opening balance – 500 Quintals at Rs.25 each
3 Issues – 70 Qts.
6 Issues – 100 Qts.
9 Issues – 80 Qts.
13 Receipts – 200 Qts. at Rs.24.5
14 Returns from work order – 15 Quts. at Rs.24 each
16 Issues – 180 Qts.
20 Receipts – 240 Qts. at Rs.24.3
24 Issues – 304 Qts.
26 Issues – 112 Qts.
27 Returns from work order – 12 Qts. at Rs.25

28 Receipts – 100 Qts. at Rs.25

Stock verification revealed that shortage of 5 quintals and 8 quintals on 15th and 27th respectively.

6. Prepare Stores Ledger A/c. under LIFO method.

1992

May Opening balance – 12000 Kgs. at Rs.7500 per ton
1 Purchases – 22000 Kgs. at Rs.7600 per ton
1 Issues – 20000 Kgs. vide M.R.No.95
5 Returns from production dept. – 2000 Kgs.
13 Issues – 12000 Kgs. vide M.R.No.105
18 Purchases – 27000 Kgs. at Rs.7400 per ton
22 2000 Kgs. returned to suppliers out of purchases of 22nd
24 Issues – 13000 Kgs. vide M.R.No.120
28 It was revealed that 500 Kgs. excess material on
31 verification

Simple and Weighted Average Methods:

1. From the following particulars of materials, prepare Stores Ledger A/c. under Simple Average Price Method and Weighted Average Price Method.

1990

Jan.1 Purchases – 1000 units at Rs.4.50
5 Purchases – 2000 units at Rs.4
8 Issues - 2000 units
19 Purchases – 1500 units at Rs.4.2
22 Issues - 1000 units
24 Purchases – 1600 units at Rs.4.5
30 Issues - 1200 units
31 Purchases – 500 units
31 Issues - 500 units

2. The following transactions took place in respect of a material item.

Date	Receipts (Units)	Rate Rs.	Issues (Units)
1994			
Mar.2	200	2	-
10	300	2.4	-
15	-	-	250
18	250	2.6	-
20	-	-	200
24	300	2.75	-
30	-	-	350

Prepare a Stores Ledger pricing the issues at Simple Avg. Rate and Weighted Avg. Rate.

3. Show the Stores Ledger A/c. by using a)Weighted Avg. Method, b)LIFO Method.

Date	Particulars	Units	Value Rs.
1997			
Apr.1	Balance	300	600
2	Purchases	200	440
4	Issues	150	-
6	Purchases	200	460
11	Issues	150	-
19	Issues	200	-
22	Purchases	200	480
27	Issues	250	-

4. The following transactions took place in respect of a material.

Date	Quantity Received (Units)	Unit Rate Rs.	Issue Quantity (Units)
1999			
Jan.3	400	4	-
10	600	4.8	-
15	-	-	500
18	500	5.2	-
30	-	-	400

Prepare the Stores Ledger A/c. pricing issue at a)Simple Avg. Rate and b)Weighted Avg. Rate.

5. Prepare a Stores Ledger Statement from the following particulars adopting Weighted Avg. method and FIFO methods of pricing out issues.

1994
Jan.1 Balance 500 units at Rs.25 per unit
3 Issues 250 units
10 Purchases 200 units at Rs.26 per unit
12 Returns from work order – 15 units at Rs.24 per unit
15 Issues 180 units
16 Stock verification reveals a loss of 5 units
20 Purchases 320 units at Rs.30 per unit
28 Stock verification reveals a loss of 8 units
30 Issues 112 units

6. On 1.1.1990 Quality Bearing Company had in stock 10,000 bearings valued at Rs.10 each. During the month, the following purchases were made.

Jan.5 4000 bearings @ Rs.12.50 each
14 6000 bearings @ Rs.15
24 8000 bearings @ Rs.16.5

Issues to production departments were as follows:

Jan.16 16000
28 bearings
10000
bearings

Prepare Stores Ledger A/c. under a)FIFO and b)Weighted Avg. methods.

7. Imports during July to December, 1985 are as follows:

July 15 200 Typewriters @ Rs.3200 each
Sep.20 40 Computers @ Rs.16500 each
Oct.12 100 Typewriters @ Rs.3400 each
Nov.21 60 Computers @ Rs.17500 each
Dec.25 300 Typewriters @ Rs.3500 each

The following is the opening balance as on 1st July, 1985:

400 Typewriters Rs.12,00,000;
100 Computers Rs.15,00,000

8. Bombay Oil Company has two kerosene pumps. Books are closed at the end of each month. The details for the month of December, 1985 are given below.

Sales Rs.945,000
Administration expenses 25,000
Opening Stock on 1st Dec. – 10,000 Lts. at Rs.3 each

Purchases:

Dec.5 200,000 Lts. @ Rs.2.85 each
Dec.30 100,000 Lts. @ Rs.3.03
Closing balance 130,000 Lts.

Prepare Stores Ledger A/c. by using FIFO and LIFO methods and find the following:

1. **Inventory value on 31st Dec.**
2. **Cost of goods sold during the month.**
3. **Profit for the month of December**

9. The following particulars have been extracted in respect of a material. Prepare the Stores Ledger A/c. showing the receipts and issues, pricing the materials issued on the basis of a)Simple Average Method, b)Weighted Average Method.

Year	Quantity	Kg.	Rate per Kg. Rs.
1994			
Jan.2	Received	2000	10
6	Received	300	12
9	Issued	1200	-
10	Received	200	14
11	Issued	1000	-
22	Received	300	11
31	Issued	200	-

Techniques of Material Control:

Material control aims at eliminating and minimizing all kinds of wastages and losses while the materials are being purchased, stored, handled, issued or consumed. A number of techniques are used at planning, procuring and holding stage of material. The following are the various techniques of material control:

1. Level setting
2. Economic Ordering Quantity (EOQ)
3. ABC Analysis
4. Inventory turnover Ratio
5. Double Bin system etc.

Stock Level settings:

In order to have proper control on materials, the following levels are set:

a. Re-order Level b. Minimum Level c. Maximum Level
d. Danger Level e. Average Stock Level.

a) Re-ordering Stock Level: This is that level of material at which a new order for material is to be placed. In other words this is the level at which a purchase requisitions is made. This level will be fixed somewhere between maximum level and minimum level. The following factors are taken into consideration while determining Re-ordering Level.

1) Rate of consumption of material
2) Minimum level
3) Delivery time

Formula: Re-ordering Stock Level = Max. Usage x Max. Delivery period

Formula: $ROQ = \frac{2AO}{C}$

b) Minimum Stock Level: This represents the quantity below which stock should not be allowed to fall. This is essentially the safety stock and will not normally be touched. This level avoids the possibility of suspension of production due to shortage of material. This level is fixed by taking into account the following factors.

1) Average rate of consumption
2) Time required to obtain fresh supply of material
3) Reordering level

Formula: Min. Stock Level = ROL-(Normal consumption X Avg. Delivery period)

c) Maximum Stock Level: The maximum stock level is that quantity of material above which stock should not generally be allowed to exceed. This maximum level may be exceeded in certain special cases. For example if a particular lot is purchased at a reasonably low price, the maximum level may be crossed. Over stock is avoided by fixing maximum level. The maximum level is fixed by taking into account the following factors.

1) Availability of finance
2) Rate of consumption of materials
3) Storage space available and cost of storage
4) Govt. policies and restrictions
5) Price fluctuations
6) Economic order quantity(EOQ)

Formula: Max. Stock Level
= ROL + ROQ - (minimum consumption X minimum re-order period)

d) Re-order Quantity: Re-ordering quantity is the quantity for which orders are usually placed. Small order mean unnecessary clerical Labour, loss of trade discount and economies in freight. Too big orders lead to overstocking. But fixing this quantity the buyer is saved the work of recalculating how much he should buy each time he orders.

e) Average Stock Level: This level is in between maximum and minimum levels of stock. Normally this much quantity must be maintained in stores. It is determined by dividing the total maximum and minimum stocks.

Formulae: Avg. stock Level = $\frac{\text{Max. Level + Min. Level}}{2}$ or

= Minimum stock level + ½ of ROQ

f) Danger Level: This is the least stock level to be maintained for emergencies.

Formula: Danger Level = Lead time consumption x Emergency Delivery time

(OR)

Danger Level = Avg. consumption x Max. Period

Economic Ordering Quantity: (EOQ)

This is an important item of inventory control. In these days of inflationary trend, the buying cost, carrying cost and ordering cost are very high. So, firms should minimize these costs to control and reduce the cost of production. EOQ depends on many factors like cost of purchasing and receiving, normal consumption, interest on capital, ordering and carrying costs. EOQ is the reorder quantity, which is the quantity to be purchased each time an order is placed.

EOQ aims at minimizing both carrying cost and cost of ordering.

Formula: EOQ = (square root of) 2CO / I

Where

EOQ = Economic Order Quantity

C = Consumption of material in units per annum

O = Ordering cost or cost of placing one order

I = Interest payment including variable cost of storing per unit per year or Carrying cost per unit per year.

1. Two components A and B are used as follows.
   Normal usage – 50 units per week each
   Minimum usage – 25 units
   Maximum usage – 75 units

Re-order Quantity:	Re-order period:
A - 300 units	A - 4 to 5 weeks
B - 500 units	B - 2 to 4 weeks

   Calculate for each component, a) Re-order Level, b)Minimum Stock Level, c)Maximum Stock Level, d) Average stock Level.

2. Calculate the Min. Stock Level, Max. Stock Level and Re-order Level from the following information.
   Minimum consumption – 100 units per day
   Maximum consumption – 150 units per day
   Normal consumption - 120 units per day
   Re-order period - 10 to 15 days
   Re-order quantity - 1500 units
   Normal Re-order period – 12 days

3. Find out the Economic Ordering Quantity from the following particulars.

Annual usage - 6000 units
Cost of material per unit Rs.20
Cost of placing and receiving one order Rs.60
Annual carrying cost of one unit 10% of inventory value.

4. You have been asked to calculate the following levels for Part number 809013 from the information given under.

a) Re-ordering level, b) Max. Level, c) Min. Level, d) Danger Level, e) Avg. Stock Level

The Re-ordering quantity is to be calculated from the following data.

1) The cost of purchasing relating to the order Rs.20
2) No. of units to be purchased during the year – 5000 units
3) Purchase price per unit including transportation cost Rs.50
4) Annual cost of storage of one unit Rs.5
5) Lead time Average – 10 days
6) Maximum – 15 days, Minimum – 6 days
7) Maximum for emergency purchases – 4 days
8) Rate of consumption:
Average – 15 units per day
Maximum – 20 units per day

5. Find out 1) Max.Stock Level, 2) Min.stock Level, 3) Re-order Stock Level 4) Danger Level, 5) Avg. stock level.

Average daily requirement – 12 units
Usual time required for optioning supply – 2 weeks
Maximum required in a month of 4 weeks – 400 units
Minimum requirements in this period – 200 units
Economic Orders – 240 units
Time sufficient for emergency supply – 2 days

6. Two components A and B are used as follows.

Re-ordering quantity:			Re-order period:		
A	-	3000 units	A	-	4 - 6 weeks
B	-	4000 units	B	-	2 - 4 weeks

Normal usage – 3000 units per week each
Minimum usage – 1500 units per week each
Maximum usage – 4500 units per weed each

You are required to calculate for each of the component. 1)Re-ordering level, 2)Max.Stock level, 3)Min.stock level, 4)Avg.stock level

7. Find out the Minimum Stock Level, Maximum Stock Level and Ordering Level from the following particulars:
Min. Consumption – 100 units per day
Max. Consumption – 175 units per day
Normal consumption – 125 unit per day
Re-order quantity - 1500 units
Min. Period for receiving goods – 7 days
Max. Period for receiving goods – 15 days
Normal period for receiving goods – 10 days

8. A manufacturer buys certain equipment from outside supplier at Rs.30 per unit. Total annual need is 800 units. The following further data available.
Annual return on investments 10%
Rent, Insurance, Taxes per unit per year Re.1
Cost of placing an order Rs.100
Determine the Economic Order Quantity.

9. Monthly consumption – 100 units
Cost of placing order Rs.100
Annual carrying cost per unit Rs.15
Normal usage per week – 50 units
Minimum usage per week – 25 units
Maximum usage per week – 75 units
Re-order period - 4 to 6 weeks
Compute, 1) Re-order quantity, 2) Re-order level, 3) Min.level, 4) Max. Level, 5) Avg. stock level

10. In Sapthagiri manufacturing Co. a material by name Anantha is used as follows.
Maximum consumption - 24000 units per week
Minimum consumption – 8000 units per week
Normal consumption – 16000 units per week
Re-order quantity – 96000 units
Minimum time required for the supply of material – 4 weeks
Maximum time required for the supply of material – 6 weeks
Calculate 1) Re-order level, 2) Min. level, 3) Max. Level, 4)Danger level, 5)Avg. Stock level.

UNIT 3 LABOUR (WAGES)

Labour (DIRECT WAGES) refers to the human element in production. Labour cost not only forms a significant portion of total cost but can also influence other elements of cost. Labour is divided into direct and indirect Labour.

Direct Labour is defined as "all labour expended in altering the construction, composition and condition of the product".

Indirect Labour (INDIRECT WAGES) is the amount of wages paid to work-men who are not engaged in production.

Methods of Remuneration Labour:

There are two principal systems of remunerating Labour. They are:

1) Time Wage System
2) Piece Wage System

1) Time Wage System: The time wage system is the simplest and the oldest method of wage payment. Under this system the worker is paid on hourly, daily, weekly or monthly basis. It is not related to output. Thus payment is made according to the time worked irrespective of work done.

Time Wages = Hours worked x Rate per Hour

This method is commonly adopted in the following cases:

a) Where the quality of work is more important than the quantity of production
b) Where the output of individual workers cannot be measured. For example watchman, general Laborers etc.
c) Where work demands high degree of skill.

Advantages:

1. This system is very simple and it is easily understood by the workers.
2. The remuneration under this system is certain. Therefore, it gives a sense of security to the workers.
3. In those cases where the productivity of a worker cannot be accurately measured, time wage is only the method of wage payment.
4. The calculation of wages is very simple and this method requires minimum clerical work.
5. Labour unions favour it, because it does not distinguish between efficient and inefficient workers.

Disadvantages:

1. It does not distinguish between the efficient and inefficient workers. All are paid alike. Therefore, there is no incentive to the workers to improve their performance.
2. Effective supervision is necessary in order to see that the workers do not waste their time. This increases the cost of production.

2. Piece Wage System (Payment by Results): It is also the oldest method remunerating labour. Under this method, the worker is paid for the amount of work performed rather than for the time spent on the job. A specified rate of wage may be fixed per unit and the earnings of a worker depend on the number of units produced by the worker.

Earnings = No. of units produced x Rate per Unit

Advantages:

1. This system is very simple and easy to understand.
2. It provides strong intensive because the remuneration is in direct ratio of workers' effort. It distinguishes between efficient and less efficient and offers positive encouragement to the workers.
3. It ensures fairness to everyone by relating wage to output.

Disadvantages:

1. This system makes the workers unsecured because the wages are paid on the basis of output.
2. Workers in their plan to maximize output may mishandle under damage to the machinery.
3. This system lays stretch on the quantity and not on the quality of the production. So, it requires rigid inspection and quality control.
4. Trade Unions adopt this method of wage payment because it creates unhealthy reliabilities and jealousy among the workers.

3. Incentive Plan Method: It is defined as Stimulation of effort and effectiveness by offering monetary inducement enhanced facilities. The followings are the plans:

1. **Halsey Premium Plan,**
2. **Rowan Plan,**
3. Taylor's Differential Piece Rate System,
4. Merrick's Differential Piece Rate System.

1. Halsey Premium Plan: This Plan was introduced by F.N.Halsey, an American engineer. It is the simple combination of time and piece basis of payment. The object of this Plan is to encourage efficiency

among workers and also to guarantee their wages according to time basis. Under this method, Standard time is fixed for each job.

Time Rate is guaranteed to a worker who takes Standard time or more than the Standard time.

A worker who performs the job in less than the Standard Time, is paid an additional amount as a fixed percentage of the saving in time. The total earning of a worker under this Plan consists of Wages for time spent plus bonus of 50% of time saved.

Total Earnings =
(Hours worked x Hourly Rate) + 50% of (Time saved x Hourly Rate)

Advantages:

1. It is simple to understand and relatively simple to operate.
2. It guarantees time wages to workers.
3. The wages of the time saved are shared by both employers and workers. So, it is helpful in reducing labour cost per unit.
4. It makes distinction between efficient and inefficient workers because it provides increasing incentive to efficient workers.
5. Fixed overhead cost per unit is reduced with increase in production.

Disadvantages:

1. Quality of the work suffers because workers are in a hurry to save more and more time to get more and more bonus.
2. Workers criticize this method on the ground that the employees get a share of wages of the time saved.

b) Rowan Plan: This system was introduced by James Rowan. Under this plan, a time rate is guaranteed, a Standard time is determined and a bonus is paid according to time saved. This plan is quite similar to Halsey Plan. The only difference between Halsey and Rowan Plan is related to the calculation of bonus.

Under this Plan, bonus is based on that proportion of the time saved which the time taken bears to the Standard time.

$$\text{Total Earnings} = \text{Hours worked} \times \text{Rate per hour} + \frac{\text{Time saved}}{\text{Standard Time}} \times \text{Time taken} \times \text{Rate per hour}$$

Advantages:

1. It assures minimum time wage.
2. It provides good incentive for slow workers and learners.
3. This plan protects the employer from loose rate setting.

Disadvantages:

1. This plan is more complex and expensive.
2. Calculation of bonus is not followed by the workers. This may give rise to the suspicion in the minds of the workers.
3. This plan does not provide incentive to more efficient workers.

Comparative study of Halsey Plan and Rowan Plan:

Halsey Plan	Rowan Plan
1. It guarantees minimum time wages.	1. It assures minimum time wages.
2. Bonus increases steadily with increase in effectively.	2. Bonus is in that proportion of time taken which the time saved bears to the Standard time.
3. Bonus is 50% of the time saved.	3. Bonus increases upto a certain stage and starts decreasing.
4. Gains of efficiency are shared equally (1:1).	4. Gains of effectively are not shared equally.
5. If the time saved is more than 50% of the Standard time, this plan is better.	5. If the time saved is less than 50% of the Standard time, this plan is better.

PROBLEMS

1. Calculate the earnings of a worker from the following information under 1.Time Rate Method, 2.Piece Rate Method, 3.Halsey Plan and 4.Rowan Plan.

Standard time 30 hours
Time taken 20 hours
Hourly Rate of wages Re.1 per hour plus a D.A. at Re.0.50 per hour worked. Ans. 1-Rs.30; 2. Rs.40 3. Rs.35 4. Rs36.67

2. The Standard time to complete a product is 12 hours at Re.0.25 per hour. Time wages are allowed to workers taking more than the time allowed. But workers who complete the job in Standard time or less received a straight piece rate plus 10% bonus i.e., 12 hours at Re.0.275.

Calculate the wages earned by A,B,C and D who complete the job in 15,12,10 and 8 hours respectively. What will be their effective hourly rate? If the overhead rate chargeable to production is Re.0.50 per hour, what will be the cost of conversion (labour and overheads) per piece produced by each worker? (A-11.25; B-9.30; C-8.30; D-7.30)

3. A worker takes 9 hours to complete a job on daily wages and 6 hours on a scheme of payment by result. His daily rate is Re.0.75 an hour, the material cost of the product is Rs.4 and the overheads are recovered at

150% of total direct wages. Calculate the factory cost of the product under a) Piece Work Plan, b) Rowan Plan and c) Halsey Plan. (a.Rs.15.25; b.19 & c.18.07).

4. A worker completes a job in a certain number of hours. The Standard time allowed for the job in 10 hours and the hourly rate of wages is Re.1. The worker earns at the 50% rate a bonus of Rs.2 under Halsey plan. Ascertain his total wages under the Rowan Premium Plan.

5. During one week, a workman manufactured 200 articles. He receives wages for a guaranteed 44 hours a week at the rate of Re.1.50 per hour. The estimated time to produce one article is 15 minutes and under incentive scheme time allowed is increased by 20%. Calculate his gross wages under each of the following methods of remuneration.

1. Time Rate, 2.Piece Rate with a guaranteed weekly wages, 3.Rowan Premium Bonus,

4. Halsey Premium bonus 50% to the workers.

6. During first week of April 2021 the workman Mr. Kalyan produced 300 articles. . He receives wages for a guaranteed 48 hours a week at the rate of Rs.4 per hour. The estimated time to produce one article is 10 minutes and under incentive scheme time allowed is increased by 20%. Calculate his gross wages under each of the following methods of remuneration.

1. Piece Rate with a guaranteed weekly wages,

3. Rowan Premium Bonus,

4. Halsey Premium bonus 50% to the workers. Ans:240;230;216.

7. Compute the earnings of a worker under a)Time Wage method, b)Piece Rate Method, c)Halsey Plan, d)Rowan Plan.

Information given:

Wage Rate	**Rs.2 per hour**
D.A.	**Re.1 per hour**
Standard hours	**80 hours**
Actual hours	**50 hours**

8. For a certain work order, the Standard time is 20 hours, wages Rs.5 per hour, the actual time taken is 13 hours and factory overhead charges are 80% of Standard time. Set out a Comparative statement showing the effect on paying wages under 1.Halsey Plan, 2.Rowan Plan.

9. Calculate the earnings of a worker under a) Rowan Premium Bonus System, b) Halsey Wire Premium Bonus System (40% to worker) from the following particulars.

Hourly Rate of Wages (guaranteed) Re.0.75,
Standard time for producing 1 dozen articles is 3 Hours,
Actual time taken by the worker to produce 20 dozen articles is 48 Hours. Ans. A. Rs.43.20; b. Rs.39.60

10. A worker under the Halsey method of remuneration has a day rate of Rs.12 per week of 48 hours plus a cost of living bonus of Re.0.10 per hour worked. He is given an 8 hours' task to perform, which he accomplishes in 6 hours. He is allowed 30% of the time saved as premium bonus. What would be his total hourly rate of earnings and what difference would it make if he was paid under the Rowan method.

11. A workman's wage for a guaranteed 44 hours a week is Re.0.19 per hour. The estimated time to produce 1 article is 30 minutes and under incentive scheme. The time allowed is increased by 20%. During the one week, the workman manufactured 100 articles. Calculate his gross wages under each of the following methods of remuneration: 1.Time Rate Method, 2.Piece work with a guaranteed weekly wage,
3. Rowan Premium Bonus, 4.Halsey Premium Bonus, 50% to workman.

12. Calculate the normal and overtime wages payable to a workman on the following data.

Day	Hours worked
Monday	8
Tuesday	10
Wednesday	9
Thursday	11
Friday	9
Saturday	4
	51

Normal working hours – 8 per day
Normal wage rate - Re.0.50 per hour
Overtime Rate:
a) upto 9 hours in a day at Single rate and over 9 hours in a day at Double rate (Or)
b) upto 48 hours in a week at Single rate and over 48 hours at Double rate whichever is more beneficial to the workman.
Working hours on Saturday are only 4 hours.

CONTRACT COSTING

Contract Costing is that form of specific order costing which applies where the work is undertaken to consumers' requirements and each order is of long duration as compared to Job Costing. The work is generally of constructional nature. This method is generally used by Builders, Civil engineering Contractors, Constructional and mechanical engineering firms.

Contracts are classified into two categories in determination of profit. They are: 1.Completed Contracts & 2.Incompleted Contracts.

1.Completed Contracts: Profits on Completed Contracts are directly transferred to P&L A/c. It means that the difference in Contract A/c. is shown as P&L A/c. Generally all the expenses are recorded on debit side, closing balance of Material, Plant and Contract Price are shown on credit side.

2.Incompleted Contracts: In case of Incompleted Contracts, profit is determined by comparing Contract Price and Work certified on the following basis:

a) If the Work certified is 1/4th or less than 1/4th of Contract Price – No profit is transferred to P&L A/c.

b) If the Work certified is more than 1/4th but less than 1/2 of the Contract Price – Profit is calculated as follows:

$$\text{Profit transferred to P\&L A/c.} = \text{Notional Profit} \times \frac{1}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$$

(OR)

$$= \text{Notional Profit} \times \frac{1}{3} \times \frac{\%\text{ of Cash}}{\text{received}}$$

c) If the Work certified is 1/2 or more:

$$= \text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$$

d) If the Contract is near to completion:

$$= \text{Estimated Profit} \times \frac{\text{Work Certified}}{\text{Contract Price}}$$

(OR)

$$= \text{Estimated Profit} \times \frac{\text{Cash received}}{\text{Contract Price}}$$

Specimen of Contract A/c.:

Particulars	Amount Rs.	Particulars	Amount Rs.
To Materials purchased		By Materials returned to Stores	
Materials issued		Materials returned to Suppliers	
Wages		Closing Materials	
Chargeable expenses		Materials transferred to other Contracts	
Establishment expenses		Closing Plant	
P&L A/c. (Profit on sale of Material, Plant, etc.)		Plant returned to Stores	
Notional Profit c/d			
To P&L A/c.			
Work in Progress (Reserve)			

P&L A/c. (Loss on sale of Material, Plant, etc.)	
Sale of Material, Plant, etc.	
Work in progress:	
Work certified	xx
Work uncertified	xx
By Notional Profit b/d	

PROBLEMS

1. The following was the expenditure on a contract for Rs.60,00,000 commenced in February, 1998.

Materials	Rs.120,000
Wages	164,400
Plant	20,000
Business charges	8,600

Cash received on account up to 31.12.1998 amounted to Rs.240,000 being 80% of Work certified. The value of Materials in hand was Rs.10,000. Prepare Contract A/c. for 1998 showing the profit to be credited to P&L A/c. Plant is to be depreciated at 10%.

2. A firm of Building Contractors begin to trade on 1st April, 1998. The following is the expenditure on the contract for Rs.300,000.

Materials issued to Contract	Rs.51,000
Plant issued to Contract	15,000
Wages paid	81,000
Other expenses	5,000

Cash received on account on 31.3.1999 amounted to Rs.128,000 being 80% of work certified. Of Plant and Materials charged to the contract Plant costing Rs.3000 and Materials which cost Rs.2500 were returned to Stores. The cost of work done but uncertified was Rs.1000 and Materials costing Rs.2300 were in hand.

Charge 15% depreciation on Plant and take to the P&L A/c. 2/3rds of the profit received. Prepare Contract A/c., Contractee's A/c. and Balance Sheet.

3. Construction Ltd. is engaged on two contracts A and B during the year. The following particulars are obtained at the year end 31st December.

Particulars	**Contract A Rs.**	**Contract B Rs.**
Date of Commencement	April 1	September 1
Contract Price	600000	500000
Materials issued	160000	60000
Materials returned	4000	2000
Materials at site on 31st Dec.	22000	8000
Direct Labour	150000	42000
Direct expenses	60000	35000
Establishment expenses	25000	7000
Plant installed	80000	70000
Value of Plant on 31st Dec.	65000	64000

Cost of Contract not yet certified	23000	10000
Value of Contract certified	420000	135000
Cash received from Contractees	378000	125000
Architect's fee	2000	1000

During the period, Materials amounting to Rs.9000 have been transferred from Contract A to Contract B. A supervisor is appointed at a salary of Rs.12000 p.a. to look after Contract B. You are required to show,

a) Contract Accounts,
b) Contractees' Accounts,
c) Extract from Balance Sheet clearly showing the calculation of Work in Progress.

4. 3 Contracts commenced on 1st January, 1st July and 1st October, 1994 respectively and the position of contracts on 31.12.1994 is as follows:

Particulars	**Contract 1 Rs.**	**Contract 2 Rs.**	**Contract 3 Rs.**
Contract Price	400000	270000	300000
Expenditure:			
Materials	72000	58000	20000
Wages	110000	112400	14000
General charges	4000	2800	1000
Plant installed	20000	16000	12000
Materials in hand	4000	4000	2000
Wages accrued	4000	4000	1800
Work certified	200000	160000	36000
Cash received	150000	120000	27000
Work finished but not certified	6000	8000	2100

The Plant was installed on the date of commencement of each contract, depreciation thereon is to be taken at 10% p.a. Prepare the Contract A/c. in tabular form and show how they would appear in Balance Sheet as on 31.12.1994.

5. The following balances are extracted from the books of Murali Construction Pvt. Ltd. as on 31.3.1998.

	Rs.
Materials issued to site	65700
Materials purchased directly	3000
Wages paid	72500
Wages outstanding on 31.3.1997	2000
Wages outstanding on 31.3.1998	1000
Plant on 31.3.1997	16000
Plant on 31.3.1998	12800
Direct charges paid	2750
Establishment expenses	6400
Stock of Materials at site on 31.3.1998	7200
Value of Work certified on 31.3.1998	160000
Work done between 1.3.98 and 31.3.98	8000
Cash yet to be received	16000

The Contract Price was Rs.2,00,000. Prepare Contract Accounts and Contractees' Accounts.

6. You are required to prepare a Contract A/c. for the year ending 31.12.1989 from the following particulars.

	Rs.	
Materials	405000	
Wages	500000	
Expenses	100000	
Outstanding expenses	20000	
Plant	210000	
Work certified	1600000	(90% received in cash)
Materials at site on 31.12.1989	40000	

Plant costing Rs.10,000 sold for Rs.12000 and Material costing Rs.5000 sold for Rs.4000. Depreciation on Plant Rs.20,000. 10% of Materials issued and 5% of Wages may be taken as incurred for the portion of work completed but not yet certified. Expenses are to be charged as a percentage to direct wages. Ignore depreciation on the uncertified portion on the work. Ascertain the amount to be transferred to P&L A/c.

7. The following Trial Balance was extracted on 31.12.2001 from the books of S Ltd., contractors.

Particulars	**Dr. Rs.**	**Cr. Rs.**
Share Capital		351800
P&L A/c. on 1.1.2001		25000
Provision for dep. on Machinery		63000
Cash received on account of Contract No.7		1280000
Creditors		81200
Land & Buildings at cost	74000	
Machinery at cost	52000	
Bank	45000	
Contract No.7:		
Materials	600000	
Direct Labour	830000	
Expenses	40000	
Machinery at site	160000	
	1801000	**1801000**

Contract No.7 was begun on 1.1.2001. The Contract Price is Rs.24,00,000 and the customer has so far paid Rs.12,80,000 being 80% of the work certified. The cost of the work done since certification was estimated at Rs.16,000.

On 31.12.2001 after preparing the Trial Balance, Machinery costing Rs.32,000 returned to Stores and Materials at site were valued at Rs.27,000. Provision is to be made for Direct Labour due Rs.6000 and for the depreciation on all Machinery at 12 1/2% on cost.

You are required to prepare,

a) The Contract A/c.,

b) A Statement of Profit,

c) The Balance Sheet as on 31.12.1998.

8. The Construction Ltd. commenced its business on 1.4.1994 showed the following balances.

Particulars	Dr. Rs.	Cr. Rs.
Paid up Share Capital		100000
Cash received on account of Contract (80% of Work certified)		120000
Land & Buildings	30000	
Machinery at cost (75% at site)	40000	
Bank	4000	
Lorries & Vehicles	30000	
Furniture	1000	
Office equipment	10000	
Materials at site	40000	
Direct Labour	55000	
Items relating to Contract:		
Expenses at site	2000	
Postage & Telegrams	500	
Office expenses	2000	
Rates & Taxes	3000	
Power & Fuel	2500	
	220000	**220000**

The Contract Price is Rs.3,00,000 and Work certified is Rs.1,50,000. The work completed since certified is estimated at Rs.1000. Machinery costing Rs.2000 was returned to Stores at the end of the year. Stock of Materials at site on 31.3.1995 was Rs.5000. Wages outstanding were Rs.200. Depreciation on Machinery at 10%.

You are required to calculate the profit from the Contract and show Contract A/c., Balance Sheet.

9. A contractor who prepares his accounts on 31st December each year, commenced a contract on 1st April, 1994. The costing records concerning the said contract reveal the following information on 31st Dec., 1994.

Materials used	Rs.258100
Labour	560500
Foremen' Salary	79300

Plant costing Rs.260,000 had been on site for 146 days. Their working life is estimated at 7 years and their final scrap value at Rs.15000. A supervisor who is paid Rs.4000 per month has devoted approximately 3/4th of his time to this contract. The Administrative and other expenses amounts to Rs.140,000. Materials in hand at the end of the year Rs.25,400. Some of the Materials costing Rs.4500 was found unsuitable and was sold for Rs.4000 and a part of the Plant costing Rs.5500 (on 31st Dec.,1994) unsuited to the contract was sold at a profit of Rs.1000.

Contract Price was Rs.22,00,000 but it was accepted by the contractor for Rs.20,00,000. On 31st Dec.,1994, 2/3rd of the cost of work done was completed. Architect's certificate had been issued covering 75% of the cost of contract and Rs.750,000 has so far paid on account. Prepare Contract A/c. and state how much profit should be included in the financial accounts to 31st Dec.,1994. Working should be clearly given. Depreciation is charged on time basis. Also prepare Contractee's A/c. and show how

their Accounts would appear in the Balance Sheet as on 31st Dec.,1994.

10. The following information relates to a Building Contract for Rs.10,00,000 and for which 80% of the value of Work certified is being paid by the Contractee.

Particulars	1996 Rs.	1997 Rs.	1998 Rs.
Materials issued	120000	145000	84000
Direct Wages	110000	155000	110000
Direct expenses	5000	17000	6000
Indirect expenses	2000	2600	500
Work certified	235000	750000	1000000
Work done but not certified	2800	8000	-
Materials at site	2000	5000	8000
Value of Plant issued	14000	-	-
Plant at site	11200	7000	3000

Prepare Contract A/c. and Contractee's A/c.

11. Priyanka undertook a contract on 1.1.1988 for 150 lakhs. It is agreed that 80% of the value of work certified by the architect of the contractee should be paid immediately and the remaining 20% be retained until the completion of the contract. The following is the information relating to the contract.

Particulars	1988 Rs.	1989 Rs.	1990 Rs.
Materials	1920000	2200000	1260000
Wages	1700000	2300000	1700000
Carriage	70000	250000	60000
Sundry expenses	70000	40000	30000
Work done but uncertified	Nil	200000	Nil

Work certified by the architect Rs.37,50,000 in 1988, Rs.75 lakhs in 1989 and Rs.37,50,000 in 1990.

You are required to show the Contract A/c. and the Contractee's A/c. in the books of Priyanka for 3 years.

12. A Company of Contractors began to trade on 1.1.1996. During 1996, the Company was engaged on only one contract, the price being Rs.500,000.

Of the Plant and Materials charged to contract, Plant costing Rs.5000 and Materials Rs.4000 were lost in an accident.

On 31.12.1996, Plant costing Rs.5000 was returned to Stores, Cost of work uncertified is Rs.2000 and Materials in hand were Rs.4000. Charge 10% depreciation on Plant and compile Contract A/c. and Balance Sheet from the following.

Particulars	Dr. Rs.	Cr. Rs.
Share Capital	-	120000
Creditors	-	10000
Cash received (80% of work certified)	-	200000

Land & Buildings	43000	
Bank	25000	
Charged to Contract:		
Materials	90000	
Plant	25000	
Wages	140000	
Expenses	7000	
	330000	**330000**

13. Mr. Sri Ram commenced contract business on 1.1.1995. The details of his business are:

	Rs.		**Rs.**
Contract Price	750000	Cash received (80% of	
Materials purchased	120000	work Certified)	300000
Materials issued	150000	Work uncertified	75000
Labour on site	45000	Plant in hand	45000
Plant installed	60000	Materials returned	7500
Direct expenses	30000	O/s Wages	9000
Establishment charges	7500	O/s Direct expenses	12000

Prepare Contract A/c., Contractee's A/c. and also show how they would appear in Balance sheet.

14. The following figures are supplied to you by Contractors for the year ending 31.12.1991.

	Rs.
Work in Progress on 31.12.1990	850000
Less: Cash received from Contractees	550000
	300000
Material Purchases	60000
Materials issued from Stores	105000
Wages	85000
Work expenses	15000
Administrative expenses	12500
(Rs.2500 chargeable to P&L A/c.)	
Materials returned to Suppliers	4500
Materials returned to Stores	5500
Work certified	150000
Contracts finished	225000
Profits taken upon Contracts	115000
Advances from Contractees	400000
Plant	25000

Prepare Contract Account and Total Contractee's Account.

15. From the following information relating to Building Contract for Rs.20,00,000 obtained from the books of Mr.Srinivas, a contractor. Prepare Building contract and the contractee A/c. for the two years 1989 and 1990.

Particulars	**1989** **Rs.**	**1990** **Rs.**
Materials	600000	168000
Wages	46000	210000
Direct Expenses	44000	20000
Indirect Expenses	12000	2000
Work Certified	1500000	2000000

Work Uncertified	16000	-
Materials at Site	10000	14000
Plant issued	28000	4000
Cash received	1200000	2000000

Value of the plant at the end of 1989 & 1990 was Rs.14000 & Rs.10000 respectively.

16. Mr. Das undertook a contract for Rs.15,00,000 on an arrangement that 80% of value of work done as certified by the architect of the contractee should be paid immediately and that the remaining 20% retained and the contract was completed.
In 1998 :

Expenses were : Materials – Rs.180000, Wages – Rs.170000, Carriage – Rs.6000, Cartage – Rs.1000, Sundry Expenses – Rs.3000. The work was certified for Rs.3,75,000.
In 1999 :

The amounts expended were : Materials – Rs.220000, Wages – Rs.230000, Carriage – Rs.23000, Cartage – Rs.2000, Sundry Expenses – Rs.4000.

3/4th of the contract was certified by 31st Dec. and value of the work uncertified was Rs.20000.
In 2000 :

The Expenses and the closing balances were : Materials – Rs.126000, Wages – Rs.170000, Carriage – Rs.6000, Sundry Expenses – Rs.3000 on 30th June, the whole contract was completed. Prepare contract A/c., contractee's A/c. and show work in progress. How it would it appear in Balance Sheet.

4. 3 Contracts commenced on 1st January, 1st July and 1st October, 1994 respectively and the position of contracts on 31.12.1994 is as follows:

Particulars	**Contract 1 Rs.**	**Contract 2 Rs.**	**Contract 3 Rs.**
Contract Price	400000	270000	300000
Expenditure:			
Materials	72000	58000	20000
Wages	110000	112400	14000
General charges	4000	2800	1000
Plant installed	20000	16000	12000
Materials in hand	4000	4000	2000
Wages accrued	4000	4000	1800
Work certified	200000	160000	36000
Cash received	150000	120000	27000
Work finished but not certified	6000	8000	2100

The Plant was installed on the date of commencement of each contract, depreciation thereon is to be taken at 10% p.a. Prepare the Contract A/c. in tabular form and show how they would appear in Balance Sheet as on 31.12.1994.

Unit v MARGINAL COSTING AND BREAK-EVEN ANALYSIS

Marginal Costing is also known as Direct Costing or Variable Costing etc. It is comparatively new area in the field of accounting and it is gaining more and more importance recently.

Concept of Marginal Cost: Marginal Cost is derived from the word Margin which is a well-known concept in Economics. Thus, the meaning is described in simple words as the cost which arises from the production of additional increments of output.

Definition: According to the Institute of Cost and Works Accountants, London, the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit.

Basic Characteristics of Marginal Costing: The concept of Marginal Costing is based on the important distinction between product costs (variable costs) and period costs (fixed costs), the former being related to the volume of output and the latter to the period of time.

Marginal Costing regards as Product Cost. Only those manufacturing costs which have a tendency to vary directly with the volume of output. This is incomplete contrast to the conventional system of costing under which all the costs fixed as well as variable are treated as Product Cost. Variability with volume is the criterion for the classification of costs into product and period categories.

Marginal Cost Equation: It is the very important equation which is a tool in the hands of management in decision making regarding prices, output, sales, etc.

Marginal Cost Equation = $S - V = C = F \pm P$ (Or)

$S = V + C$ (Or)

$S = V + F + P$ (Or)

$S - V = F \pm P$

Where, S = Sales

V = Variable Cost or Marginal Cost

C = Contribution

F = Fixed Cost

P = Profit

With the help of the above equation, we can find the following:

1. P/V Ratio = $\frac{C}{S} \times 100$

(Or)

$$\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

(Or)

F = C at BEP

2. BEP in units = $\frac{F}{C \text{ per unit}}$

3. BEP Sales in Rs. = $\frac{F}{C} \times S$

4. Desired Sales to get required profit = $\frac{(F+P)}{C} \times S$

5. Margin of Safety (M/S) = Actual Sales – BEP Sales

(or)

$$\frac{P}{P/V \text{ Ratio}}$$

Profit Volume Ratio: P/V Ratio is useful to know the relationship between output and profit. With the help of this ratio, we can find the following:

1. BEP Sales in Rs. = $\frac{F}{P/V \text{ Ratio}}$

2. Desired Sales to get the required profit = $\frac{F+P}{P/V \text{ Ratio}}$

3. Margin of Safety = $\frac{P}{P/V \text{ Ratio}}$

Contribution: Contribution is of vital importance for the system of Marginal Costing. The rationale of contribution lies in the fact that where a business manufactures more than one product, the net profit realized on individual products cannot possibly be calculated due to the problem of apportionment of fixed costs to the different products which is done away with under Marginal Costing. Therefore, the Contribution solves the problem of decision making without considering fixed cost.

Contribution is the difference between Sales and Variable Cost and it is also called as Gross Margin. The concept of Contribution in useful in the fixation of Selling Prices, determination of BEP, selection of Product mix, etc.

BEP: The study of **Cost-Volume-Profit relationship** is referred to as Break Even Analysis. In the opinion of some management experts, the Break Even Point is only incidental to these studies. Contrary to this, there are others who hold the view that, up to the point of activity where total revenues equal to total expenses, the study can be termed as Break Even Analysis. While beyond this point, it is the application of **Cost-Volume-Profit relationship**.

Thus, the term Break Even Analysis may be interpreted in two senses – narrow sense and broad sense. In its narrow sense, it refers to a system of determining that level of operations where total revenues equal to total expenses i.e., the point of Zero profit. In its broad sense, it denotes a system of analysis that can be used to determine the probable profit at any level of operations.

Assumptions of Break Even Analysis: Cost-Volume-Profit data are based upon certain assumed conditions which are rarely found in practice. Some of the assumptions are as follows:

1. The principle of Cost variability is valid.
2. Costs can be divided into fixed and variable.
3. Fixed cost remain constant.
4. Variable cost varies proportionately with Volume.
5. Selling Price does not change as Volume changes.
6. There will be no change in general price level.
7. The efficiency of plant can be predicted.

1. Sales of a commodity 200 units per month, selling price is Rs.10 per unit. Fixed cost per month Rs.400 and Variable cost Rs.6 per unit.

If price is reduced by 10%, Calculate P/V Ratio at present under proposal. Also find out BEP in units under both conditions and profit at present sales.

2. Calculate 1)P/V Ratio, 2)BEP in units, 3)BEP in Rupees, 4)Profit when Sales are Rs.200,000 (20,000 units) from the following particulars.

Selling Price per unit	Rs.10
Variable Cost per unit	Rs.7
Total Fixed Cost	Rs.50,000

3. Calculate the Break Even Point from the following particulars.

Budgeted output	70,000 units
Fixed cost	Rs.400,000
Variable cost per unit	Rs.12
Selling price per unit	Rs.22

If the Selling price is reduced to Rs.20 per unit. What will be the revised BEP?

4. Sale of a product amounts to 200 units per month at Rs.10 per unit, Fixed cost is Rs.400 per month and Variable cost is Rs.6 per unit. There is a proposal to reduce price by 10%. Calculate present and future P/V Ratio. How many units must be sold to earn the present total profit? Also find out BEP for both conditions.

5. From the following information, calculate the Break Even Point in units and in Sales at present and proposal of 5% increase in selling price. Also calculate the amount of sales to earn the present profit at increased price.

Output-3000units Selling price per unitRs.30,

Variable cost per unitRs.20.Total fixed cost Rs.20,000

6. From the following data, you are required to calculate a) P/V Ratio, b) Break even Sales with the help of P/V Ratio, c) Sales required to earn a profit of Rs.450,000.

Fixed expenses	Rs.90000
Variable cost per unit:	
Direct Materials	Rs.5
Direct Labour	Rs.2
Direct Overhead	100% of Direct Labour
Selling price per unit	Rs.12

7. Calculate 1)the amount of fixed expenses and variable expenses for both periods, 2)the number of units to Break even, 3)the no. of units to earn a profit of Rs.40,000. The Selling price per unit can be assumed at Rs.100. The Company sold in two successive periods 7000 units and 9000 units and has incurred a loss of Rs.10,000 and earned Rs.10,000 profit respectively.

Particulars	Period I	Period II
	Rs.	Rs.
Sales	700000	900000
Profit	-10000	10000

8. Sales and Profits for 1994 and 1995 are given below:

Year	Sales	Profit
1994	140000	15000
1995	160000	20000

Calculate 1)P/V Ratio, 2)Fixed Cost and Variable Cost for both years, 3)Amount of Sales to earn a profit of Rs.50,000, 4)Profit at a sale of Rs.120,000.

9. The following are the Sales and Total cost of a factory.

Year	Sales	Total Cost
	Rs.	Rs.
1998	200000	140000
1999	240000	160000

Calculate 1)P/V Ratio, 2)Desired Sales to get a profit of Rs.20,000, 3)BEP, 4)Variable costs in both years.

10. From the following particulars, find out BEP.

Variable cost per unit Rs.15

Fixed expenses Rs.54000
Selling price per unit Rs.20

a)What should be the Selling price per unit of the Break Even Point is brought down to 6000 units, b)find margin of safety at sales of Rs.250,000.

11. A Company is making a loss of Rs.40,000 and relevant information is as follows:

Sales Rs.120,000
Variable Cost 60,000
Fixed Cost 100,000

Loss can be made good either by increasing the sale price or by increasing sales volume. What are Break even sales if a) Present Sales level is maintained and Selling price is increased, b) if present selling price is maintained and the sales volume is increased, what would be sales if a profit of Rs.100,000 is required?

12. The trading results of a Limited Company for the last two years were as under:

Year	Sales (in Lakhs)	Profit (in lakhs)
1991	200	10
1992	180	2

You are required to a)forecast the expected profit or loss with sales of i)Rs.1,50,00,000 , ii)Rs.300 lakhs, b)determine P/V Ratio, c)find out margin of safety for point (a) and (d). Ascertain the Break Even Point.

15. The cost structure and selling prices for the two periods are given below. Find out 1)P/V Ratio, 2)BEP Sales, 3)Profit or loss when Sales are Rs.100,000, 4)Margin of Safety for the first period.

Period	Sales	Total Cost
	Rs.	Rs.
I	120000	111000
II	140000	127000

16. Modern Company has a maximum capacity of 440,000 units p.a. Normal capacity is regarded as 360,000 units in a year. Variable manufacturing cost (including materials and labour) is Rs.2.20 per unit. Fixed Factory Overhead is Rs.108,000 p.a. Selling and Distribution cost of the fixed nature is Rs.50,400 p.a. whereas Variable is Re.0.60 per unit. Sale price is Rs.4 per unit.

Calculate:

1. Breakeven point, P/V Ratio and Margin of Safety,
2. No. of units to be sold to earn a profit of Rs.12,000 in a year.
3. Sale value needed to earn a profit of 10% on Sales.
4. Selling price per unit to bring down BEP to Rs.120,000 units of the product.

Application of Marginal Costing: Marginal Costing technique and Contribution approach are used by the management in taking decisions in respect of number of ticklish issues like,

1. Accepting a Bulk order,
2. Decisions to Make or Buy,
3. Choice of Profitable Mix,
4. Selling or further processing,
5. Dropping a Product line,
6. Operating Additional Shifts,
7. Deciding about the minimum price to be charged,
8. Key Factor, etc.

1. Accepting a Bulk Order:

1. A Company is currently producing 40,000 units of a product operating at 80% capacity. It now receives an order from a foreign customer for the supply of 10,000 units at Rs.50 per unit whereas the local price is Rs.90 per unit. The present cost sheet is given as under:

	Rs.
Materials	20 per unit
Labour:	
Skilled	10
(Fixed)	10
Unskilled	10
Variable	20
Overhead	**70**
Fixed Overhead	

1. Advice the management whether to accept the order or not.
2. What is your advice if the order had come from a local merchant?
3. If there is a temporary fall in demand, what would be the minimum price?

2. The following is the cost structure of a product.

	Rs.Per Unit
Direct Materials	5.00
Direct Labour	3.00
Factory Overhead:	

Fixed	0.50
Variable	0.50
A.O.H.	0.75
Selling & Distribution Overhead:	
Fixed	0.25
Variable	0.50
	10.50

The above figures are obtained at the output of 50,000 units and the capacity of the firm is 65,000 units. A foreign customer is desired of buying 15,000 units @ Rs.10 per unit. Advice the management whether the order should be accepted. What will be your advice if the order has come a local merchant?

3. The Everest Snow Company manufactures and sells direct to customers 10,000 jars of Everest Snow per month at Re.1.25 per jar. The Company's normal production capacity is 20,000 jars of Snow per month. An analysis of cost for 10,000 jars is given below.

	Rs.
Direct Materials	1000
Direct Labour	2475
Power	140
Jars	600
Other Variable expenses	430
	7955
Fixed expenses	**12600**

The Company has received an offer for the export under a different brand name of 120,000 jars of Snow p.a. at Re.0.75 a jar. Write a short report on the advisability or otherwise of accepting the offer.

4. The cost details of a factory at 50,000 units are given below. Its installed capacity is 75,000 units.

	Rs.
Materials per unit	2
	2
Direct Wages	1
Variable	1
Overhead	7
Fixed expenses	
Selling Price	

The Company received a foreign order to supply 50,000 units at Rs.5 each. The management is contemplating whether to accept or not. Advice the management.

2. Make or Buy decisions: Sometimes a concern has to decide whether a certain product or component should be made in the factory itself or bought from outside. In taking such a Make or Buy decision, the technique of Marginal Costing is most useful. While deciding to make or buy, a distinction must be made between fixed cost and variable cost and the variable cost should be compared with the price at which this component can be bought from outside. If the marginal cost is lower than the Purchase Price, making of the product is better. Otherwise, it is better to purchase the product.

1. A manufacturing company finds that while the cost of making a Component No.051 in its own workshop is Rs.8 each. The same is available in market at Rs.6.50 with an assurance of continuous supply. Give your suggestion whether to make or buy this component. Give also your views in case the supplier reduces the price from Rs.6.50 to Rs.5.50. The cost data is as follows:

	Rs.
Materials per Component	3
Direct Labour	2
Other Variable expenses	1
Dep. and Other fixed expenses	2
	8

2. The following is the cost structure of a part.

	Rs.
Materials	4
Labour	1
Variable	2
Overhead	3
Fixed Overhead	**10**

The part is available in the market at the rate of Rs.8. The management is contemplating whether to make or buy the component. Advice the management. If the market price is Rs.6 per unit, what is your suggestion?

3. A Ltd. is making a certain product using component X-23 in its own workshop. The component can be made internally or it can be purchased in the local market at a price of Rs.20 per unit. The costing department has estimated the cost of making component X-23 and furnished the following details.

	Rs.
Direct Materials	10
Direct Labour	7
Variable Overhead	1
Fixed Cost	5
	23

Advice the management whether to make or buy the component. The supplier assures to continue supply and reduce the selling price to Rs.17.5. What is your advice?

3. Problem of Key Factor (Limiting Factor): A Limiting Factor is a factor which limits or restricts production or sales and thus prevents a concern from making unlimited profits. Limiting factor is also known as Key Factor. The Limiting factor may be any factor of production such as Materials, Labour, Capital, Plant capacity and even Sales. In case a concern has two or more product lines and there is a Key factor, a problem may arise as to which product should be produced more so as to utilise the limiting factor in the best possible manner and to miximise the profits when limiting factor is in operation, Contribution per unit of limiting factor should the criterion to assess the profitability of a product.

The product which gives highest contribution per unit of Limiting Factor should be preferred. When tow or more limiting factors are in operation, it is necessary to take all of them into consideration.

1. In a factory producing two different kinds of articles, the limiting factor is the availability of labour. From the following information, show which product is more profitable?

Particulars	Product A (Cost per Unit)	Product B (Cost per Unit)
Materials	5.00	5.00
Labour at Re.0.50	3.00	1.50
Overheads:		
Fixed 50% of Labour	1.50	0.75
Variable	1.50	1.50
Total Cost	**11.00**	**8.75**
Selling Price	14.00	11.00
Profit	3.00	2.25
Total Production for the month	500 units	600 units

Maximum capacity per month is 4800 hours. Give proof in support of your answer.

2. A firm is producing two products S and T. The relevant particulars are given below.

Particulars	S Rs.	T Rs.
Selling Price	80	100
Materials (Rs.10 per Kg.)	20	40
Direct Wages (Rs.4 per hour)	28	20
Variable Overhead	4	10

The Fixed Overhead Rs.12,000. Which of the above products you recommend under each of the following circumstances.

1. Total Sales potential in units is a limiting factor.
2. Total Sales potential in rupees is a limiting factor.
3. Raw Material is in short supply.
4. Production capacity (Hours) is a limiting factor.

3. The following factors are taken from the records of a Company engaged in manufacturing two products AD and BI from a certain Raw Material.

Particulars	Product AD (Per Unit) Rs.	Product BI (Per Unit) Rs.
Sales	125.00	250.00
Materials (Rs.2.50 per Kg.)	25.00	62.50
Direct Labour (Rs.1.50 per hour)	37.50	75.00
Variable Overheads	12.50	25.00

Total Fixed Overheads Rs.50,000.

Comment on the profitability of each product when a)Sales in value is limited, b)Raw material is in short supply, c)Production capacity is the Key factor, d)When total availability of Raw material is 20,000 Kgs. and maximum sales potential of each product is 1000 units, find the product mix to yield maximum profit.

4. Choice of a Profitable Mix: Sometimes the management will be confronted with the problem of deciding the most profitable mix. Then the Contribution is the key item to decide the mix.

1. The following information is presented to you relating to two products A & B.

Particulars	Product A Rs.	Product B Rs.
Materials	10	9
Labour	3	2
Selling Price	20	15

The fixed expenses Rs.800.

Variable Overhead expenses are estimated at 100% on Wages. The following mixes are available.

1)A – 100 Units; B – 200 Units,
2)A – 150 Units; B – 150 Units,
3)A – 200 Units; B – 100 Units.

Suggest a profitable mix.

2. From the following information, suggest the best alternative.

Particulars	Product X Rs.	Product Y Rs.
Selling Price	30	50
Direct Labour hours	20 Hours	30 Hours
Labour hour rate	0.25	0.25
Materials	10	12.50

Variable Overheads 150% on Labour cost.
Total fixed overheads Rs.10,000.

The following alternatives are available:
a) X – 1800 Units,
b) Y – 1200 Units,
c) 1200 Units of X and 400 Units of Y,
d) 900 Units of X and 600 Units of Y.

3. From the following information, you are required to 1)calculate and present marginal product cost and contribution per unit, 2)state which of the alternative sales mix you would recommend the management and why?

Particulars	X Rs.	Y Rs.
Selling Price per unit	25	20
Direct Material per unit	8	6
Direct Wages	24 Hrs. @ Re.0.25	16 Hrs. @ Re.0.25

Fixed Overhead Rs.750.
Variable Overhead 150% of Direct Wages.

Alternative Sales mix:
a) 250 units of X and 250 units of Y,
b) 400 units of Y,
c) 400 units of X and 100 units of Y.

Effect of changes in Selling Price:

1. The following date is available from the records of a Company.

Sales	Rs.60,000
Variable Cost	30,000
Fixed Cost	15,000

You are required to a)calculate P/V Ratio, b)BEP and Margin of Safety at this level, c)calculate the effect of 10% increase in Selling Price, d)calculate the effect of 10% decrease in Selling Price.

2. The price structure of a Cycle made by the Cycle Company is as follows:

	Rs.
Materials	60
Labour	20
Variable	20
Overhead	**100**
	50
Fixed	50
Overhead	**200**
Profit	
Selling Price	

This is based on the manufacture of 100,000 cycles p.a. The Company expects that due to competition, they will have to reduce the Selling Price but they want to keep the total profits. What level of production will have to be made to get the same amount of profit a)if the Selling Price is reduced by 10%, b)if the Selling Price is reduced by 20%.

Also find out Selling Price per Cycle to get present profit if there is 10% decrease in Sales Volume.

Alternative methods of Production: Sometimes the management has to choose from amount alternative methods of production i.e., machine work or hand work etc. The same product may be produced either by employing Machine No.1 or Machine No.2 and the management may be confronted with the problem of choosing one among them. In such circumstances, technique of marginal costing can be applied and the method which gives the highest contribution can be adopted keeping in view the limiting factor.

1. Product A can be manufactured either by Machinery X or Machinery Y. Machine X can produce 50 units per hour and Machine Y 100 units per hour. Total machine hours available

are 2000 p.a. Taking into account the following cost data, determine the profitable method of manufacture.

	Machine X (Per Unit-A)	Machine Y (Per Unit-B)
Materials	8	10
Direct Wages	12	12
Variable	4	4
Overhead	5	5
Fixed Overhead	**29**	**31**
	30	30
Selling Price		

2. Your directors are contemplating the purchase of a new machine to replace an old one which has been in the factory for 5 years. From the following information, prepare a statement for submission to the board of directors showing the effect of installation on costs and profit and comment on the results. Ignore interest.

Particulars	Old Machine Rs.	New Machine Rs.
Purchase Price	40000	60000
Estimated life	10 Years	10 Years
Machine running hours	2000	2000
p.a.	24	36
Units produced per hour	30	52.5
Wages per hour	2000	4500
Power p.a.	6000	7500
Consumable Stores p.a.	8000	9000
Other charges	5	5
Material per unit	12.5	12.5
Selling Price per unit		

3. A Chartered Accountant now spends 90 paise per kilometer on taxi fare for his client's work. He is considering two other alternatives, the purchase of a new small car or an old big car. The estimated cost figures are:

Item	New Small Car Rs.	Old Big Car Rs.
Purchase Price	35000	20000
Sale Price after 5 years	19000	12000
Repairs & Servicing p.a.	1000	1200
Taxes & Insurance p.a.	1700	700
Petrol consumption at Rs.3.50 per liter	10 KMs	7 KMs

He estimates that he goes 10,000 KMs annually. Which of the 3 alternatives will be cheaper? If his practice expands and he has to go 19000 KMs p.a., what should be the decision?

Determination of Optimum Level of Activity: The technique of Marginal Costing also helps the management in determining the optimum level of activity. To make such a decision, contribution at different levels of activity can be found and the level of activity which gives the highest contribution will be the optimum level.

1. A factory engaged in manufacturing Plastic Buckets is working at 40% capacity and produces 10,000 buckets p.a. The present cost break up for one bucket is as under:

	Rs.	
Materials	10	
Labour	3	
Overheads	5	(60% fixed)

The Selling Price is Rs.20.

If it is decides to work the factory at 50% capacity, the Selling Price falls by 3%. At 90% capacity, the Selling Price falls by 5% accompanied by a similar fall in the price of material.

You are required to calculate the profit at 50% and 90% capacities and also calculate BEP for the capacities.

2. Hansa Ltd. manufacturing a single product facing severe competition in selling the product at Rs.50 per unit. The Company is operating at 60% level at which Sales is Rs.12,00,000, Variable cost is Rs.30 per unit, Semi

Variable cost may be considered as fixed at Rs.90,000 when output is nil and the variable element is Rs.250 for each 1% level of activity. Fixed costs are Rs.150,000 at present level but if the level of activity reaches 80% or more, these costs are expected to increase by Rs.50,000.

To cope up with the competition, the management of the Company is considering a proposal to reduce the Selling Price by 5%. You are required to prepare a statement showing the projected profit at the levels of 60%, 70% and 80% assuming that (a)the Selling Price remains at Rs.50 per unit, (b)the Selling Price is reduced by 5%, find the number of units to be sold to get the same total profit at present.

Dropping of a Product or Closure of a Department: When the Company is producing two or more than two products, some products may give low profit or loss but they may be aggregate profit.

By preparing a marginal cost sheet, we can find the product which is to be dropped by comparing Contribution and Profit. The product which gives loss or lease Contribution may be dropped.

1. Cost per unit of the 3 products A,B and C of a factory is furnished below.

Particulars	A	B	C
	Rs.	Rs.	Rs.
Materials	10	8	9
Direct Labour	6	7	6
Variable	4	5	3
expenses	3	3	2
Fixed expenses	**23**	**23**	**20**
	9	7	6
Profit	**32**	**30**	**26**
Selling Price	10000	5000	8000
No.of units produced			

Production arrangements are such that if one product is given up, the production of others can be increased by 50%. The directors propose that Product C should be given up because the profit is the lowest. Do you agree with BOD?