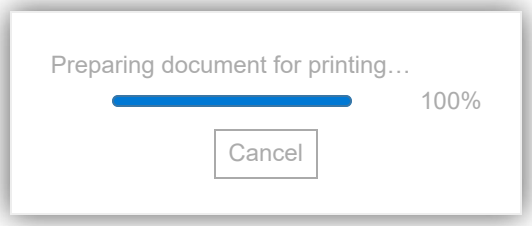
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COST ACCOUNTING

Introduction

This module unit is intended to equip the trainee with knowledge, skills and attitudes that will enable him/her to ascertain costs and prepare performance reports in a business set-up. The course unit introduces students to aspects of cost accounting in the creation of information for management decision making.
It includes Nature and Purpose of Cost Accounting, Cost behavior and Classifications, Material Costs, Labour Costing, Overhead Costs, Costing Techniques, Job Factory Costing, Process costing, Batch costing, Service costing, Contract Costing and emerging issues in Cost accounting.

General objectives

At the end of this module unit, trainee should be able to:

1. Recognize the role of a cost accountant in a supply firm
2. Describe the methods of costing of goods produced or services offered
3. Discuss the pricing of goods and services offered
4. Outline cost allocation procedures of various overheads
5. Apply simple costing techniques as used in modern business set-ups

MODULE UNIT SUMMARY AND TIME ALLOCATION

Code	TOPIC	SUB-TOPIC	TOTAL TIME (HOURS)
17.2.01	INTRODUCTION TO COST ACCOUNTING	• Nature of cost accounting • Importance of cost accounting • Basic terms used in cost accounting • Principles of cost accounting • Distinction between cost accounting and financial accounting • Characteristics of an effective cost accounting systems • Duties of a cost accountant	4

17.2.02	ELEMENTS OF COST AND COST BEHAVIOUR	• Elements of costs of a product • Cost classification • Importance of cost information • Cost statement format	10
17.2.03	MATERIAL COSTING	• Stock taking methods • Control procedures • Aspects material costing • Stock valuing methods • Methods of valuing material issues • Stores ledger/account format	10
17.2.04	LABOUR COSTING	• Meaning of labour costs • Ascertainment of labour costs • Classification of labour costs • Methods of calculating labour costs • Calculation of labour costs using labour costs method • Payroll format	10
17.2.05	COSTING FOR OVERHEADS	• Meaning of overhead • Overheads expenses • Distinction between allocation, apportionment and absorption • Classification of overhead expenses into their respective categories • Overhead analysis sheet format • Calculation of overhead absorption rates	10
17.2.06	PROCESS COSTING	• Definition of process costing • Elements of process costing • Process account format • Abnormal loss account format • Normal loss account format • Scrap debtor account • Finished goods stock account • Work-in-progress calculation • Statement of equivalent production format	10

17.2.07	CONTRACT COSTING	• Definition of contract costing • Features of contract costing • Preparation of contract account • Preparation of contractee account	10
17.2.08	BATCH COSTING	• Definition of batch costing • Procedures for preparation of batch statements	8
17.2.09	FACTORY JOB COSTING	• Nature of factory job costing • Procedures in factory job costing • Job cost card layout • Cost estimates	10
17.2.10	SERVICE COSTING	• Nature of service costing • Common costs units used in service costing • Preparation of operations cost statement	6
17.2.11	EMERGING ISSUES AND TRANDS COST ACCOUNTING	• Emerging issues and trends in cost accounting • Challenges posed by emerging issues and trends in cost accounting • Coping with challenges posed by emerging issues and trends in cost accounting	2
	TOTAL		**90**

Contents

Topic 1

INTRODUCTION TO COST ACCOUNTING

Introduction

This topic introduces the basic concepts of cost accounting, terminologies and distinguishes cost accounting from financial accounting. It is also aimed at making it clear on what cost accounting is all about and introduce some of the terminologies employed throughout this course.

Accounting

Accounting is about giving account of various transactions, that is, explaining the transactions to the satisfaction of interested parties. Accounting has been defined by different experts and different institutions, in different ways. The definition that might probably encompass all other attempts at defining Accounting is the one given by the American Accounting Association (AAA). The Association defines Accounting as the process of identifying, measuring and communicating economic information to permit informed judgments and decisions by users of the information". The AAA definition highlights the need to:

1. Identify users of accounting information and their various needs;
2. Communicate reliable information to users; and
3. Make the information relevant to the decisions they want to make.

Cost Accounting Defined

Different authors have defined cost accounting differently. The following are some of the definitions as given by these authors:

"That part of management accounting, which establishes budgets and standard costs and actual costs of operations, processes, departments or products and the analysis of variances, profitability or social use of funds." (Chartered Institute of Management Accountants- CIMA).

"That which identities, defines, measures, reports and analyzes the various elements of direct and indirect costs associated with producing and marketing goods and services. Cost accounting also measures performance, product quality and productivity." (Leticia Gayle Rayburn).

"A systematic process of collecting, summarizing and recording data regarding the

various resources and activities in a firm so as to calculate the basis of production costs used in financial accounting or making other relevant decisions in a firm." (Horngren C.T)

The main objective of cost accounting is communicating financial information to management for planning, evaluating and controlling performance, and to assist management to make decisions that are more informed. Its data are used by managers to guide their decisions.

Cost accounting aims at providing useful information to decision makers to enable them make better decisions. It helps them in preparing various statements such as cash budgets and Cost accounting is a branch of Management accounting that deals with the determination and ascertainment of operation costs. Operations entail the activities that are carried out by an accounting entity. Accordingly these can be:

1. Production operations
2. Service operations
3. Merchandising operations

- Production is the value addition process of converting raw materials into useful final products. Service operations entail value addition through offering intangible commodities to customers. Merchandising operations involve buying and reselling operations to offer time, place or other forms of utilities.
- Among the important areas of concern in cost accounting include the following:

    1. Determination of costs of operations
    2. Ascertainment of costs of operations
    3. Establishment of budgets and forecasting
    4. Pricing decisions
    5. Analysis of cost and revenue variances
    6. Ascertainment of profitability
    7. Valuation of production output

- Management accounting is a branch of accounting and financial management that involves identification, generation, presentation and interpretation of

financial information for managerial planning, organizing, directing and decision making. It is a branch of accounting that is aimed at providing information for internal use.

Importance of Cost Accounting (purpose/objectives)

i. Ascertainment of costs

With the help of cost accounting tools, an entity is able to ascertain the cost of producing goods and providing services. Such costs include the cost of materials, cost of labour as well as the cost of operation overheads.

ii. Control of costs

Cost accounting tools not only help in ascertaining costs but also in keeping track of such costs. One is able to use cost accounting to ascertain cost behavior and devise tools of controlling the incurrence of costs. This enhances organizational production efficiency.

iii. Decision making

Decision making is the process of making a choice from among many and often competing or conflicting alternatives. Managers often encounter various situations that require a choice from the alternatives. Examples include: Whether to buy or manufacture a spare part, whether to hire employees or outsource services, whether to open a new production line, where to open such a line, or whether to discontinue a current line or range of products and lastly, whether to invest in plant and machinery or lease such items. Cost accounting information is useful in making such decisions and other managerial decisions.

iv. Planning and Budgeting

A plan is a projected course of action. Planning involves deciding in advance what to do, how to do it, when to do it, why to do it, and who to do it. Planning is a future oriented aspect of cost accounting and incorporates budgeting. Planning reduces risk and uncertainty and bridges the gap between the present condition and the future.

v. Estimation of prices

Businesses exist largely to make profits. Profits are only possible if a business sells

its goods and services at a price that is higher than the cost of production. Hence prices are usually set at a price above the production cost.

vi. Cost estimation and forecasting

Cost accounting helps in determination of cost and production trends which can then be used in forecasting future cost and future variations in costs.

vii. Evaluation of profitability

Cost accounting avails cost and turnover information that can be used in evaluating the profitability of organizations.

viii. Disclosure of wastes and measurement of efficiency

Standard costing and analysis of variances help in disclosing production wastages and helps put in place systems that will enhance production and operational efficiency.

Scope of Cost Accounting

Cost accountants interpret results and report them to management and provide analyses that assist decision-making in the following departments of a firm:

a) Manufacturing

Cost accountants work closely with production personnel to measure and report manufacturing costs. The efficiency of the production departments in scheduling and transforming materials into finished units is evaluated for improvements as a result of cost accounting knowledge.

b) Engineering

Cost accountants and engineers translate specifications for new products into estimated costs; by comparing estimated costs with projected sales prices, they help management decide whether manufacturing a product will be profitable.

c) Systems Design

Cost accountants are involved in designing Computer Integrated Manufacturing (CIM) systems and databases corresponding to cost accounting needs. The idea is for cost accountants, engineers and system designers to develop a flexible

production process that suits market needs.

d) Treasury

The treasurer use budgets and related accounting reports developed by cost accountants to forecast cash and working capital requirements. Detailed cash reports indicate where there are excess funds to invest or where cash deficits exist and need to be financed.

e) Financial accounting

Cost accountants work together with financial accountants who use cost information in valuing inventory for external reporting and income determinationpurposes.

f) Marketing Department

Marketing department involves the cost accountant during the product innovation stage, the manufacturing planning stage and the sales process. The marketing department develops sales forecast to facilitate preparing a products manufacturing schedule. Cost estimates, competition, supply, demand, environmental influences and the state of technology determines the sales price that the product will be offered and will command in the market.

g) Personnel Department

Personnel department administers the wage rate and pay methods used in calculating each employees pay. This department maintains adequate labour records for legal and cost analysis purposes. Cost accounting cannot be emphasized as simply an information system designed to produce information to assist the management of an organization in planning and controlling the organization's activities. It also assists the management to make informed decisions so as to enable the organization to operate at maximum efficiency and effectiveness.

Cost Accounting Terminologies

a) Cost

Cost is a measurement of the economic sacrifice made to achieve a given objective. Thus, it is a measurement of the amount of resources sacrificed in attaining a specified goal. In case of a product, cost represents the monetary

measurement of resources used to mention but a few materials, labor and overheads. From a service point of view, cost is the monetary sacrifice made to provide the service. Accountants generally use cost with other descriptive terms, for example, historical, product, prime, labour or material.

b) Cost object or cost unit

This is an activity for which a separate measure of cost is desired. It is therefore, a quantitative unit of the product or service in relation to which costs are ascertained. It is determined by the nature of the business enterprise.

c) Cost Accountant

This is a member of the accounting department responsible for collecting product costs and preparing accurate and timely reports to evaluate and control company operations. The person assembles, classifies and summarizes financial and economic data on the production and pricing of goods and services. Some of the roles that the person plays include:

1. Material cost control which includes tracing materials issued to departments, reporting of the cost of material wasted (variance analysis) and provision of information about ordering and holding costs of stocks.

2. Labour cost control which involves time keeping and payroll operation, establishing of standard labour cost for various products, monitoring productivity of labour and analysis of hours worked.

3. Overhead cost planning and control that entails the understanding the cost behavior of cost items, identifying the expenditure on overheads by various departments and establishing the absorption rate guides.

4. Operational efficiency that is concerned with ensuring that maximum output is achieved at minimum cost.

d) Cost Analysis

This is an activity that engages the use of engineering, time and motion studies, timekeeper's records and planning schedules from production supervisors. Some of the cost analysis techniques include break-even analysis, comparative cost analysis, capital expenditure analysis and budgeting techniques.

e) Cost centre

This is any point at which costs are gathered in order to control cost, fix responsibility and enable costs to be recharged on an equitable basis. A cost centre may be a particular department, a function or items of equipment in respect of which costs may be ascertained and related to cost units for control purposes. For example a manufacturer producing three types of products say A, B and C in separate departments which are called 'A' department, 'B' department and 'C' department. In this scenario, each department can be regarded as a cost centre since the costs incurred in each department will be ascertained separately.

f) Profit centre

This is a cost centre that yields revenue out of the costs incurred. It is further defined as that part of the enterprise which generates revenue. The costs incurred by those cost centres that do not generate revenue are charged to the profit centre.

g) Cost behaviour

This is the pattern of change in cost as a result of change in level of activity or production. When production increases, cost also increases and vice versa. Total cost can be divided into fixed and variable costs. Thus, Total cost = fixed cost + variable cost When production increases, fixed cost remain constant whereas variable cost increases with the increase in production.

h) Marginal cost

This is the cost of a unit of a product or service, which would be avoided if that unit or service was not produced or provided

Differences between Cost Accounting and Financial Accounting

Financial accounting is the preparation and communication of financial information to owners to provide information about how management of the enterprise has discharged its stewardship and custodial responsibilities for the use of resources entrusted to it. Cost accounting can be distinguished from financial accounting in various perspectives as considered below:

a) Legal requirements

There is a statutory requirement for public limited companies (Company's Act Cap. 486 of the laws of Kenya) to provide annual financial accounting reports regardless of whether or not the management of the company regard this information as important. The reports are usually in the form of a balance sheet, an income statement, a cash flow statement and a statement of changes in equity position of the enterprise. However, cost accounting information is entirely optional and information should only be produced if it is considered to be cost beneficial to the organization, that is, the benefits to be derived from such information should exceed the cost of providing the information.

b) The role of the GAAPs

Financial accounting statements must be prepared and published in conformity with the legal requirements and the generally accepted accounting principles (GAAPs) established by the regulatory bodies such as FASB and IASC. Cost accountants are not required to adhere to the GAAPs when providing managerial information for internal purposes. The focus is on servicing management needs and providing information useful to managers relating to their decision making, planning and controlling functions.

c) Time dimension

Financial accounting incorporates historical cost accounting. It reports what has already happened in the past in an organization. Cost accounting is both historical and futuristic. It is concerned with future events and therefore the management requires details of expected future costs and revenues.

d) Report frequency

Financial accounting requires that a detailed set of financial accounts is published annually. Less detailed accounts can be obtained on a semiannual or quarterly basis. On the other hand, cost accounting information reports are prepared on a daily, weekly or other more frequent basis than the financial accounting reports depending on the management needs for such reports in order to trigger decision making processes.

e) Focus of individual parts or segments of the business

Financial accounting reports describe the entire business whereas cost accounting

focuses on small parts of the organization such as cost and profitability of products, services, customers and activities. This shifts the focus on analysis of segments of the business in order to allow examination by job, process, product orservice.

f) Outward versus inward focus

Cost accounting is inwardly focused because it aims at providing information to internal users, the managers and employees. Financial accounting on the other hand is mostly outward focused as it aims at providing information mostly to outside users including shareholders, the government and competitors.

g) Incorporation of non-monetary measures

In financial accounting the monetary base is predominant. However, non-monetary measures are used in the interpretation of cost accounting statements. For example, the act expressing net profit as a percentage of sales revenue. In cost accounting there is greater use of non-monetary measures. Quantitative information may be useful in areas such as material losses (kilos or as a percentage input), machine efficiency (as a percentage of a predetermined standard).

h) The Degree of accuracy required in analysis of information

Basic financial accounting records must record transactions involving cash to the nearest cent. There will be an element of judgment however in areas such as provision for depreciation of fixed assets or valuation of stock and debtors. Cost accounting information will tend to be as accurate as required in a given situation. For example, Management Reports may summarize figures to the nearest thousand shilling whereas the labour cost per product may be expressed to four decimal places.

Elements of product costs

These are the components of the production cost. The sum of these components is the cost of production. They include:

i. Direct labor cost

This is the cost of labour that is directly involved in the production process. It usually incorporates the wages paid to production floor labourers, excluding the supervisors.

ii. Direct material cost

This is the cost of the component parts and raw materials for turning up for turning into finished products so long as they are directly at convenient identifiable to this final product.

iii. Direct expenses

All other costs other than direct materials, direct labour costs that are involved in the production process such as cost of hiring a production machine.

iv. Production overheads

These are also called the indirect production costs. They are all those costs which cannot be identified as direct costs. They include the following:

- Indirect material cost such as lubricating oil
- Indirect labor cost such as cost of factory supervision.
- Indirect expenses such as factory rent.

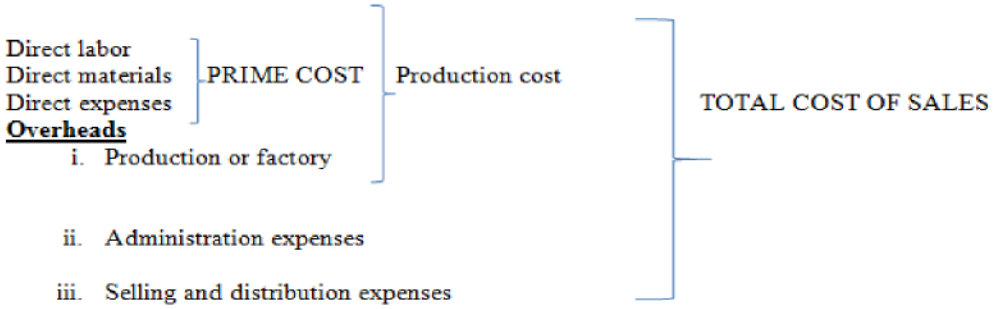
v. Prime cost

This is the sum of all direct costs, that is, direct labour cost, direct material cost and direct expenses.

vi. Total production cost

This is the sum of prime cost and production overheads.

- Prime cost + Factory overheads = Total Production cost



SELECTION OF AN IDEAL COST ACCOUNTING SYSTEM

A system is a set of interdependent parts, which together form a unitary whole that performs certain functions. A number of sub systems make up the whole. In this context of an organization, a management information system may be seen as the overall system with a number of subsystems including the cost and management accounting system that provide the information to management for purposes of planning, organizing, directing and controlling the organization's activities so as to achieve corporate goals, including profit maximization.

The following factors must be taken into account before finalizing the cost accounting system design:

a) The system must be designed in such a way as to meet the managerial information needs. There should be no duplication in reporting. Only relevant management information should be provided. Information is relevant if it has an impact on the decision made by the management.
b) The factory layout and production sequence. This is important for the identification of the sequence of production i.e. the starting and the ending points.
c) Control exercised over production; the cost data must focus on specific areas of control so that the responsibility of any variances between the actual and the standard costs can be identified with an individual manager or department.
d) Nature of raw materials used affect the system adopted. This is because it affects the recording and issuance of raw materials and the method of pricing
e) The deployment of workers, who may work as a team or as individuals. This affects the method of remuneration and the analysis of time worked. For instance, where employees work as a team, there may be group bonus awards, which do not exist in situations where employees work individually.
f) Key personnel and office staff; their cooperation is vital for the success of the system. In addition, the system needs to be simple and easy to understand to enhance acceptability
g) Relative size of cost element; it is only reasonable to analyze cost elements with a significant value. Cost elements of insignificant value may be left out of the analysis depending on the composition of the cost items
h) Need for uniformity; a business needs to observe the industrial norms and thus follow the industrial practices as regards the accounting. If the business, for instance, belongs to a trade association, it will need to follow the association's recommendation on cost accounting principles and in order to facilitate comparison of its data with that of other businesses in the industry.
i) The cost benefit analysis should be carried out and it is only reasonable to run a system whose benefits are more than the costs incurred in terms of money, time spent in designing, installing, testing, running and maintaining the cost accounting system.
j) The system should be capable of adapting to changing conditions. It should be logical and simple. Flexibility is vital to any accounting system bearing in mind that the organization exists in an open system. It is only a subsystem of a larger system.
k) Periodical upgrade of the system is crucial to avoid the danger of going obsolete as the world is rapidly changing.

Characteristics of an efficient Cost Accounting system

An efficient cost accounting system should meet all its objectives and achieve all the advantages of a good cost accounting system. It should possess the following characteristics and should be taken into consideration at the time of installation of a cost accounting system.

1. **Suitability to the business:** Cost accounting system should be made to suit the specific needs of an organization, division department even a product line. The system should be designed according to the needs, requirements and size of the business. It should supply the necessary information for running the business efficiently.
2. **Simplicity**: The system should not be complicated. It should be simple and capable of being understood by the costing staff without much difficulty.
3. **Flexibility:** The cost accounting system should be designed in such a way that it may be flexible enough to be changed according to the fast changing conditions and circumstances of business and industry. Thus, the system must have the capacity of expansion or contraction without much difficulty.
4. **Cost Effective:** The system should be economical both in installation and operation. The benefits to be derived from the system must be more than the costs involved. It must be adapted according to the financial capacity of the business.
5. **Comparability**: The costing system should provide all the necessary facts and figures to the management for evaluating the performance by making a comparison of these figures with the past figures of the same concern or those of other concern or against industry as a whole or other departments of the same concern.
6. **Timely presentation of information:** The system should be capable of providing accurate and timely information so that the management can make decisions for effective cost control.
7. **Minimum changes in the existing organization structure**: The costing system must not disturb much the existing system of delegation and division of authority and responsibility. The system should be designed in such a way that it requires as minimum changes as possible in the organizational set-up.
8. **Uniformity of forms:** All the forms, proformas, procedures etc. used throughout the organization should be uniform in size and quality of paper. This avoids confusion and leads to quicker and better understanding of cost data by staff in different departments.
9. **Minimum clerical work:** Since most of the workers are not well educated, forms and procedures should be designed in such a way that clerical work is reduced to the minimum.
10. **Effective control on materials:** As materials usually account for a greater proposition of the total cost, there should be an efficient system of stores control.
11. **Adequate control on labour cost:** There should be well defined procedures for recording of time, preparation of wage sheets and disbursement of wages. There should be strict control on idle time, holiday with pay and overtime.
12. **Departmentalization of overheads**: There should be an effective system of collection, allocation, apportionment and absorption of overheads so that ascertainment of accurate cost is possible.
13. **Reconciliation of cost and financial Accounts:** Cost accounting should be designed in such a way that it is possible of integrate or reconcile both cost accounting and financial accounting systems. This can be done through control accounts.

14. **Defining duties and Responsibilities of Cost Accountant:** Under a good system of cost accounting the rights, duties and responsibilities, of the cost accountant should be clearly defined. Because of this, he is able to know clearly whom he should approach, which information and which cost reports are to be made ready for whom by what time.
15. **Timely availability of cost reports:** The system should be designed in such a manner that cost reports and other cost information are made available as and when required.

Review Questions (from Knec past papers)

EXERCISE 1; explain five duties of a cost accountant in a manufacturing firm (10 marks)

EXERCISE 2; Highlight four differences between cost accounting and financial accounting (8 marks)

EXERCISE 3; explain four challenges that may be encountered when installing a cost accounting system. (8 marks)

EXERCISE 4; explain five characteristics of an effective cost accounting system. (10 marks)

EXERCISE 5; explain five purposes of cost accounting (10 marks)

EXERCISE 6; explain five benefits of installing effective cost accounting system. (10 marks)

TOPIC 2

Elements of Cost and Cost Behavior

Cost Classifications

Cost classification is defined as the arrangement of cost items in a logical sequence having regard to their nature and purpose to be fulfilled. Costs are classified according to the cost objectives. Cost objective is the activity for which a separate measure of cost is desired. They include, cost stock valuation, cost for decision-making and cost for control purposes. The most common cost classifications include:

Classification based on cost behavior

Cost behavior means how costs will respond or react to changes in the activity level, that is, as we increase output or sales, are the costs rising, dropping or remaining the same. Cost Behavior can be used to produce various classifications of costs such as:

Variable costs

These are costs that increase or decrease, in total, in direct proportion to changes in the total level of activity or number of units produced i.e. that portion of the cost of an activity that change with the level of output. Examples of variable costs include wages paid to casual employees paid on an hourly basis and fuel cost based on mileage. With variable costs, the cost level is zero when production is zero. With variable costs, the cost level is zero when production is zero. For a cost to be variable there should be an activity base which drives it. This activity base is a measure of effort that operates as a casual factor in the incurrence of variable costs. Thus to control these costs, cost accountants should be well acquainted with the various cost drivers (activity bases) within the organization.

Semi variable costs

These are costs with both a fixed and variable cost component. The fixed component is that portion which is constant irrespective of the level of activity. They are variable within certain activity levels but are fixed within other activity levels.

Fixed Costs

These are costs that do not change with the level of output. They are also called autonomous costs, as they remain the same irrespective of the activity level. Fixed costs can be taken to be either committed fixed costs or discretionary fixed costs. Fixed costs that cannot be avoided in the short run are called committed fixed costs. They sometimes are also referred to as capacity costs. Such costs concern senior

managers for strategic decision making. Discretionary fixed costs are those that can entirely be avoided without having an immediate impact on the level of activity. These costs are subject to management decision e.g. advertisement costs.

Semi fixed costs

These are costs that are fixed only within a relevant range of activity level beyond which they rise to a higher fixed level. They are sometimes referred to as step costs.

Semi variable costs

These are costs that are variable only within a relevant range of activity level beyond which they may remain fixed before assuming variability again.

Classification based on controllability

Controllability refers to the degree of influence by a responsible officer over the incurrence of cost. It is concerned with the responsibility of cost incurrence. Here costs can be considered as:

1. Controllable costs

   These are costs for which a company officer is responsible for their incurrence. They are costs subject to the influence of a given responsibility center manager for a given period.

2. Non-controllable cost

   No specific officer has influence over their incurrence.

Classification based on traceability to a cost object

1. Direct costs

   These are costs related to the particular cost object and can be traced to that object in an economically feasible way. Direct costs are usually traced to the cost object. Tracing is the assignment of direct costs to the cost object.

2. Indirect costs

   These are costs that are related to the cost object but cannot be traced to that object in an economically feasible way. Indirect costs are allocated to the cost object. Allocation involves assignment of indirect costs to a cost object. There are several factors that dictate the categorization of cost as either direct

or indirect. These include:

(a) The materiality of the cost immaterial costs can be treated as indirect costs

(b) Information gathering technology advanced technology can enhance the traceability process hence facilitate the classification of a cost item as direct.

(c) Design of operations it is easy to classify costs as direct if a facility is used for a specific cost object than if it is used for several cost objects.

Classification into either Period versus product costs

- Period costs are costs that are incurred on a periodic basis. They are all those costs in the income statement other than the cost of goods sold. These costs are usually treated as expenses in the period in which they are incurred according to the accounting principle of matching.
- Product costs are all those costs that are assigned to a product for a specific purpose i.e. all costs of production. These incorporate both direct production costs as well as manufacturing overheads.

Classification based on relevance

Costs can be classified as relevant costs or irrelevant costs

Classification according to function

This classification will categorize costs according to the organizational function that leads to their incurrence. Hence costs can be:

1. Production costs

   These are costs incurred in the manufacturing process. They include material costs, labour costs and overhead costs. The conversion costs that incorporate the product costs

2. Administration cost

   Is the sum of costs associated with the overall management of the enterprise, which cannot be readily identified with one of the major functional areas such as salary of the factory manager would be seen as a production cost but the

salary of the personnel officer will be viewed as administrative cost since the personnel function does work for all other functions of the enterprise

3. Selling Cost

   This is the sum of costs associated with the securing of orders from customers. Included in this area will be items such as the salaries paid to the salesmen and expenditure on advertising. This also includes costs of availing the manufactured goods to the customers such as freight of finished goods, advertising and salesmen salaries.

4. Distribution costs

   These are costs associated with warehousing the products and their delivery to customers. They are incurred in getting the finished product to customers for instance, depreciation of the distribution van.

5. Finance costs

   These are costs incurred to secure funds to finance the organization's activities. These include interests on loans and overdrafts, dividends to shareholders and interests on debentures.

6. Research and development costs

   These are costs that are incurred to invent new products or to modify the existing ones, as well as costs incurred to acquire more information on such products.

Classification into manufacturing and non-manufacturing costs

1. Manufacturing costs

   These are the costs incurred to produce a product. The elements of manufacturing costs include: direct material costs, direct labour costs; and overhead costs. The three elements make up the total cost of a product.

   It is important to note that direct expenses are expenses incurred for a particular job, project or service such as royalties, franchise, and hire of special equipment, materials and labour. They are traceable to that specific job.

2. Material costs

(a) Material refers to all the physical inputs into the production process. They do not only refer to purely unprocessed materials or natural resources but refers to any material input in the manufacturing process. Finished goods for one company can be raw materials for another for instance; packed wheat flour is a finished good for the milling industry but a raw material to the banking industry. Raw materials can be classified as direct or indirect. Direct materials are those materials that can be easily traced to a product without any extra cost or inconvenience.

Examples include leather and sole for a shoe making industry. Direct expenses are expenses incurred for a particular job, project or service.

3. Indirect materials

These are materials that become an integral part of the finished product but may not be traceable into the product. Examples include glue and thread for a shoe making industry.

4. Labour Labour

is the physical and mental human input into the production process. Labour costs can be divided into direct labour costs and indirect labour costs. Direct labour cost refers to wages paid to workers who are directly involved in the production of each item produced. Such labour cost can be physically traced to the creation of product without undue cost. The cost can be readily identified with specific product or unit. For instance, wages paid to factory supervisors, forklift truck drivers, factory store room clerks. Indirect labor costs, on the other hand, refer to the wages paid to workers whose efforts cannot be readily identified with specific product units or batches to mention but a few laborers paid to maintain all the premises utilized for production of goods and services.

5. Overhead costs

These are also called indirect production costs. They include all costs of manufacturing except direct materials and direct labour. They are incurred for the benefit of all products thus the amount of overhead allocated can only be an estimate. They include indirect materials, indirect labour and other indirect expenses that cannot be traced directly to a product. They are also

referred to as factory burden, factory overheads or manufacturing expenses.

Classification according to time

1. Historical costs

   These are costs that were incurred at a given time in the past. They are irrelevant for decision making. An example is acquisition cost of an asset.

2. Predetermined costs

   These are estimated costs that have been estimated for purposes of decision making. An example of such costs include overheads which are absorbed on a given predetermined overhead absorption rate. They are not always accurate.

Classification according to decision making

1. Sunk costs

   These are costs, which have already been incurred. They cannot be changed by any decision made after incurrence. Such costs are irrelevant for decision making. For example, cost of a delivery van already acquired by the organization shall be irrelevant as it cannot be changed by any course of action taken by management.

2. Marginal cost

   This refers to the additional cost of producing an extra unit of output.

3. Opportunity cost

   This is the cost of the next best foregone alternative or the potential benefit that is lost by taking one course of action and giving up the other. For instance, by deciding to take on a leave and forego wages, the opportunity cost of the decision shall be the foregone wages.

4. Differential cost/incremental cost

   These are costs that differ among alternatives. They are costs relevant for decision making. They may be either variable or fixed. For example, if taking up a different business apartment amounts to an extra Shs.20, 000 rent expenses, the differential (incremental) cost of the decision shall be the Sh.20, 000.

5. Imputed cost

   This refers to an expense not incurred directly, but actually borne. For example, a person who owns a home debt-free has an imputed rent expense equal to the amount of interest that could be earned on the proceeds from the sale of the home if the home were sold.

6. Replacement cost

   This refers to the amount of cost required to replace an asset at current prices. If the cost of replacing an asset in its current physical condition is lower than the cost of replacing the asset so as to obtain the level of services enjoyed when the asset was bought, then the asset is in poor condition and the firm would probably not want it being replaced.

7. Budgeted cost

   This is the cost estimated to be incurred and used for budgeting purposes. It is a cost included in the budget representing cost expected. Budgeted cost is normally derived from standard cost.

8. Standard cost

   This is a management tool used to estimate the overall cost of production, assuming normal operations.

vii. Cost statement

A cost statement is presentation of cost data in the form of a statement. This statement shows costs incurred under appropriate headings. For manufacturing firms this statement indicates prime cost, factory cost and total cost of sales. A cost statement is prepared to show:

1. Factory or production cost
2. Total cost of sales
3. Total cost of sales, profit and sales.

A cost statement takes a format similar to the one that follows:

Cost element	Ksh	Ksh
Material cost		X
Labour cost		X
Direct expenses		X
Prime cost		XX
Production overheads		
Factory rent	X	
Power	X	
Supervision	X	
Depreciation	X	XX
Cost of goods manufactured		XX
Administration overheads		X
Selling and Distribution Overheads		X
Total cost of sales		XX
Profit		X
Sales		XXX

	Ksh.
Raw materials	300, 000
Direct labour	80,000
Factory rent	15,000
Power	5,000
Supervisor's salaries	20,000
Administrative expenses	40,000
Selling and distribution	15,000

Solution:

Solution:

Cost element	**Ksh.**	
Raw materials	300, 000	
Direct labour	80,000	
Prime cost		**380,000**
Factory overheads		
Factory rent	15,000	
Power	5,000	
Supervisor's salaries	20,000	
Production / manufacturing costs		**40,000**
Administrative expenses	40,000	
Selling and distribution	15,000	
Total cost of sales		**475,000**

Example . You are provided with the following information extracted from the books of Dee Ltd:

Cost element	**Ksh.**
Raw materials	80,000
Direct labour	35,000
Factory rent	5,000
Power	3,000
Indirect wages	2,000
Selling and distribution	3,000
Administrative expenses	4,000
Profit 25% of cost	

Required: Prepare a cost statement for Dee Ltd.

Solution:

Cost element	**Ksh.**	
Raw materials	80, 000	
Direct labour	35,000	
Prime cost		**115,000**
Factory overheads		
Factory rent	5,000	
Power	3,000	
Indirect wages	2,000	10,000
Production / manufacturing costs		**125,000**
Administrative expenses	4,000	
Selling and distribution	3,000	7,000
Total cost of sales		**132,000**
Profit (25/100*132,000)		33,000
Selling cost		**155,000**

Review Questions

EXERCISE 6. The following data relate to the production information of Ali Mwenda Pole production facility

		Ksh
Stocks on 1.1.2005:	Raw materials	90,000
	Work in progress	44,000
Stocks on 31.12.05	Raw materials	130,000
	Work in progress	38,000
Purchases of raw materials		1,340,000
Carriage inward		50,000
Returns of raw materials		30,000
Direct wages		560,000
Factory rent		120,000
Power		96,000
Depreciation of plant		70,000
Supervisor's salaries		110,000
Office salaries		140,000
Office expenses		24,000
Depreciation of office equipment		10,000
Salesman's salaries		136,000
Delivery van expenses		44,000
Depreciation of delivery vans		130,000
Advertisement		38,000

Required:

a. Prepare a cost statement

b. Compute the cost of production (12 marks)

EXERCISE 7. Explain in each of the following terms:

a) Fixed costs

b) Direct costs

c) Cost behavior

d) Factory overheads

e) Cost unit

f) Profit centre (12 marks)

EXERCISE 8. Distinguish between each of the following types of cost.

i. Uncontrollable costs and controllable costs

ii. Fixed costs and variable costs

iii. Direct costs and indirect costs

iv. Preliminary costs and periodic costs

v. Prime cost and total costs

vi. Production overheads and administrative overheads. (12 marks)

EXERCISE 8. The following costs were incurred by Komu Manufacturers for the year ended 31 December 2019:

	Ksh
Rent	60,000
Raw material	410,000
Annual subscription	3,000
Royalties	45,000
Fuel	40,000
Power	70,000
Rates	32,000
Sales commission	8,000
Insurance	13,000
Direct wages	250,000
Factory supervisors salary	170,000

Determine:

a) Fixed costs;

b) Variable costs. (8 marks)

EXERCISE 9. The following information relates to Jaza Manufacturers for the year ended 31 December 2018.

	Ksh
Raw materials	2,000,000

Salary to production assistant	150,000
Direct labour	1,500,000
Factory electricity	600,000
Depreciation of plant	650,000
Factory rent	500,000
Administration overheads	870,000
Selling and distribution overheads	690,000
Sales	8,000,000

Prepare a cost statement. (12 marks)

EXERCISE 10. The following costs relate to Ashua Limited for the month of November 2018:

Cost item	Ksh
Raw materials	100,000
Direct expenses	80,000
Wages of factory workers	40,000
Factory rent	15,000
Salary to supervisor	20,000
Maintenance cost of equipment	5,000

Determine the total:

i. Fixed costs;

ii. Variable costs. (8 marks)

TOPIC 3

MATERIAL/INVENTORY COSTING

Introduction

Materials are the tangible inputs into the process of producing useful output. Materials apply to firms that undergo manufacturing processes as part of their operations. Material costs form a large percentage of the cost of production and this is why they are normally incorporated under prime costs.

Definition of Key Terms

1. Materials:

   Materials refer to physical substances used as inputs to production or manufacturing; they can also be defined as any substance used in construction such as building bricks, cement and concrete.

2. Purchase cost

   This is the price charged by the supplier on an item of inventory.

3. Maximum stock level

   This is the upper limit above which stock should not be allowed to exceed.

4. Re-order level

   It is a point that lies between minimum and maximum stock levels at which purchase orders must be placed to ensure that goods ordered are received before the minimum stock level is reached.

Purposes of keeping inventory by firms

1. Buffer inventories

   Firms keep these inventories to protect themselves against the uncertainties of demand and supply. To meet these uncertainties, firms normally hold inventories in excess of average or expected demand. They may also keep excess stocks to meet requirements during the time for which lead-time goes beyond normal.

2. Anticipation inventory

   Firms keep some items of stock in anticipation that future demand for the

item will increase. The whole idea underlying anticipation inventory is to smoothen the production process. This is attained by producing for a longer duration for continuous basis rather than operating with excessive overtime in one period leaving the system to be idle or close down for reason of inadequate or no demand.

3. Appreciation inventory

   Firms hold inventory in anticipation of an increase in price. Some items of inventory such as wines and spirits and jewelry appreciate in value the longer they are kept in the warehouse. However, quantitative models do not take into account the appreciation inventory.

Inventory Decisions

Inventory management is important since most organizations like merchandising and manufacturing firms; inventory represents the largest single investment. The major types of inventory are raw materials, work in progress and finished goods.

Majority of the decisions regarding the inventory are made by the manager in charge of inventory control and management. These decisions include:

1. The optimal quantity to order in order to minimize the inventory total costs.
2. When to make an order.
3. What commodities to stock.
4. The amount of safety stock to be kept in anticipation of variation in demand and supply among others.

The overall objective of inventory control is to maintain stock levels that minimize the total costs. These costs include the holding costs, acquisition or purchase costs, stock out costs and ordering costs.

Material cost control procedures

Materials form a significant cost of output units and, therefore, should be controlled. Material control is includes recording the accounting transactions relating to material cost among other functions. Control should be implemented to ensure that material is available in:

- appropriate quantities
- appropriate quality
- appropriate location
- an appropriate time
- The most economic cost.

Features of an effective cost control system include:

1. Adequate perpetual inventory records that maintains records for each item of inventory held in store. Some form of stock record card will be required for each stock item recording, in addition to a specific materials the debt and quantity of receipts, issues and consequent balancing figure.
2. Checking of perpetual inventory records should be done in order to keep checks and balances of stock. This may be a form of continuous or periodic stock taking.
3. Maintenance of target stock levels should be appropriate and stock management practices should be exercised. The stock level management involves knowing the minimum stock level, maximum stock level and the reorder quantity level.
4. Authorization of orders to purchasing officer for replenishment of stock items should be signed by designated staff in the store. Issues from the store should be made only on receipt of signed material requisition forms.
5. Responsibility and authority relationships of material stores should be clearly delegated to specific individual(s). If more than one individual is required to operate the store, then personnel should be given the responsibility of clearing the designated tasks.
6. Reporting of Quantity or value of items held in store should be done regularly to the organization's management.

    (a) Control in the store personnel should on a regular basis compare targets with actual stock levels and take appropriate action indicated by that comparison to investigate the deviation such as why a particular stock

has fallen below minimum and immediately informing those responsible to take appropriate action. Controls can be exercised in many areas or points in the business cycle, not only the stores. These include:

(b) When the choice is made as to the type and quality of material to be used.

(c) When the purchase order is being placed with the chosen supplier.

(d) On receipt of the material from supplier, check the appropriateness of quality and quantity of materials received.

(e) Where the material is held in store before use: It must be safe from theft and damage.

(f) Where the material is issued from the store: It must be issued to the correct department.

(g) Where the material is being used for intended purposes e.g. the material must be utilized to produce the desired output.

Stock level and its control

Management must make decisions about the control of stock levels with a view to minimizing the cost of the company while achieving more efficiency in the availability of material to fulfill planned usage requirements. Consideration should be given to the following control levels:

1. Minimum stock level
2. Maximum stock level
3. Re-order level
4. Re order-quantity

Minimum stock level

This refers to the level below which stocks should not be allowed reach. It is simply a base stock level. If stock falls below this point, there is a danger of stock-out and firms will incur shortage costs. This may also be referred to as safety stock. It is expressed as:

Minimum Stock Level = Reorder level - (Normal consumption x normal reorder period)

Stock out may be caused by various factors such as delay on the part of the supplier, an increase in material usage due to a change in the pattern of production and increase in scrap levels in the production process and delays in placing orders due to scarcity of suppliers.

NB: Reorder period or lead time is the period of time in days, weeks or months that elapse before an order made is received and ready for use.

Maximum stock level

This refers to the upper limit above which stock should not be allowed to exceed. Each material to be kept in store must have a maximum level and stock should not be allowed to go beyond this point or level. If stock level goes beyond this point, then the firm will be overstocking hence incur high holding costs. It is computed as follows:

Maximum Stock level = Reorder level + Reorder Quantity - (Minimum Consumption x Minimum reorder period)

Re-order level

This is a point that lies between minimum and maximum stock levels at which purchase orders must be placed to ensure that goods ordered are received before the minimum stock level is reached. It is the level of stock when approached requires orders made for stock replenishment to cater for the unused stocks. This level is normally higher than the minimum stock level to cover for emergencies such as abnormal usage or unexpected delay in the delivery of new supplies. It expressed as below:

Reorder Level - Maximum Consumption X Maximum Re-order Period

Re-order quantity

This is the quantity or amount of stock ordered once the re-order point is reached. The quantity is such as to minimize stock costs taking into consideration the cost of holding stocks and making an order. The Economic Order Quantity (EOQ) is an example of a re-order quantity. It is important to note that reorder quantity must not always be the EOQ. Given the maximum stock level, the reorder level, minimum usage and the minimum reorder level, re-order quantity may be computed as follows:

ILLUSTRATION

The following information was extracted from the books of Kabele Holdings regarding its stocks:

Determine the following stock levels for Kabele Holdings:

i. Re-order level

ii. Maximum stock level

iii. Minimum stock level

Solution

i. Reorder level = maximum consumption x maximum re - order period
900 units/week x 5 weeks = 4,500 units

ii. Maximum stock level = Reorder level + reorder Quantity - (Minimum Consumption x minimum reorder period) = 4,500 Units + 3,600 Units - (300 units/week x 3 Weeks) = (4,500 + 3,600 - 900) Units = 7,200 units.

iii. Minimum stock level = Reorder level - (Normal consumption x normal reorder period)
Minimum stock level = 4,500 Units - (600 Units/week x 4 weeks) = 2100 units

Example.

The company has provided the following data in respect of its major material

	Units per week
Maximum demand	1,200
Normal demand	900
Minimum demand	600
Re-order period	4 – 6 weeks
Re-order quantity	6,000 units

Calculate;

i. Re-order level
ii. Minimum stock level
iii. Maximum stock level
iv. Average stock

SOLUTION

i. Re-order level

Recorder = max .consumption × max. Reorder period.
= 1,200 ×6= 7,200 Units

ii. Minimum stock level

Min. Stock = re-order Level - (Normal/Average consumption × Normal/Average) lead
= 7,200 – (900 ×5)
= 2,700 units

iii. Maximum stock level

Max. Stock Level = re-order level + order quantity - (Minimum consumption × Min.re-order period)

= 7,200 + 6,000 + (600 × 4) = 10,800 units

iv. Average stock

$$\textbf{Average stock} = \frac{\textbf{maximum stock + minimum stock}}{\textbf{2}}$$

$$\text{Average stock} = \frac{2{,}700 + 10{,}800}{2} = 6{,}750 \text{ units}$$

Costs associated with inventory

- **Purchase cost**

This refers to the price charged by the supplier on an item of inventory. Purchase price will remain irrelevant, where prices are fixed and no discounts are offered or no advantageous purchasing exists. In cases where discounts exist associated with quantity purchased, they remain relevant for decision making.

Purchase cost = Acquisition price per unit(C) x Annual Number of units (D)

- **Holding or carrying cost**

These are costs incurred by firms when they hold or maintain inventories. They normally involve high stock levels and include: opportunity cost of funds tied up in stock, incremental in insurance costs, incremental warehousing and storage costs, incremental material handling costs and cost of obsolescence and theft of stock. The relevant holding cost should include those items which vary with the level of stock. Costs unaffected by changes in the inventory levels are irrelevant in decision making and thus not included in carrying costs, for instance, rent, and depreciation of equipment and salaries for storekeepers

Holding/carrying cost = average stock × holding cost per unit per period (ch)

Where average stock $= \frac{\text{min. stock + max. Stock}}{2}$ or $= \frac{\text{economic order quantity}}{2}$

- **Ordering and procurement costs**

This refers to the cost of acquiring an item into the firm's inventory. It consists of clerical costs of preparing a purchase order, receiving deliveries and paying in-

voices. Ordering costs that are common to all stock decisions are irrelevant, and only incremental ordering costs are used. It is important to note that ordering costs are incurred each time an order is made and are associated with low stock levels

Ordering costs = number of orders made per year x cost per order (Co)

Where number of orders = annual demand (D) / Reorder quantity or Economic order quantity (Q)

- **Stock out costs**

These are costs incurred as a result of an item not being in stock. They include loss of future sales due to disappointed customers, loss of goodwill, lost contributionor profit from lost sales and extra costs of speeding up orders.

Economic Order Quantity Model

The EOQ Model is a simple model that helps the manager to determine the optimum quantity of stock to order so as to keep total costs at a minimum. The main costs of inventory are: Holding or carrying costs, Ordering or set up costs and Shortage costs

Assumptions of the EOQ model

1. The annual demand is certain, constant and continuous over time.
2. Holding costs are known and constant
3. Ordering costs are known and constant
4. The same quantity is ordered every time an order is made since demand as assumed is not to fluctuate significantly.
5. The supply lead time or reorder period is known and constant
6. Price and cost per unit is constant
7. No stock outs are permitted and delivery is instantaneous
8. Customers' orders cannot be held while fresh orders are awaited.

The costs in EOQ model are determined as follows:

Total Cost = Total Ordering cost + Total Holding Cost

Total Ordering Cost = Cost per Order x No. of Orders in a Period

Carrying costs = Holding cost per unit per annum x Average stock

Ordering costs = number of orders made per year x cost per order

$$\text{Number of orders per year} = \frac{\textit{Annual Demand}}{\textit{Number of units ordered each time}}$$

$$\text{Where, No. of orders in a period} = \frac{\textit{Annual Demand}}{\textit{Quantity per order}}$$

Total Holding Cost = Average stock Quantity x Holding cost Per Unit

$$\text{Where, Average stock Quantity} = \frac{\textit{Beginning Inventory}}{2}$$

The cost of the goods procured is not taken into account while determining the EOQ where the price quoted is fixed and no discounts are offered. Mathematically, the EOQ can be determined by the formula as follows:

$EOQ = \frac{2DCo}{Ch}$

Where

D is the annual demand

Co is the cost of making one order

Ch is the holding cost per unit per annum

Example . XYZ Ltd has an aggregate demand of 2.4 million units. Every time they place an order, there is an ordering cost of Shs.1, 000, holding cost is Shs.100 per unit. Determine:

i. Economic order quantity (EOQ)
ii. No. of order to be made based on EOQ
iii. Total cost of stocks based on the EOQ

Solution:

D=2.4 million units, Co =Shs.1, 000, Ch =Shs.100

Economic order quantity (EOQ)= $\sqrt{\frac{2.D.Co}{Ch}}$

$$= \sqrt{\frac{(2\times 2{,}400{,}000\times 1000)}{100}} = 6928 \text{ UNITS}$$

No. of orders to be made based on EOQ = $\frac{\text{Annual demand (D)}}{\text{Quantity ordered (Q)}}$

$= 2{,}400{,}000 \div 6928 = 346$ 0RDERS

iv. Total cost of stocks based on the EOQ =holding cost +ordering cost

$= \left(\frac{6{,}928}{2} \times 100\right) + \left(\frac{2{,}400{,}000}{6928} \times 1000\right) =$ Ksh 692,820

Example.

The annual demand of a certain component is 4,400,000 units. The cost per unit is shs 220 and the cost of placing an order is shs 550. Annual inventory holding is 20% of the purchase cost of inventory.

Calculate;

I. Economic order quantity (EOQ)
II. Annual number of orders
III. Total cost of inventory under the EOQ

SOLUTION

I. Economic order quantity (EOQ)

$$\textbf{EOQ}=Q=\frac{\sqrt{2.D.Co}}{Ch}$$

D= 4,400,000 Units
P= shs 220/unit
Co = shs 550/order
Ch = 20% * 220= 44

$$\textbf{EOQ} = \frac{\sqrt{2} \times (4{,}400{,}000 \times 550)}{44} = \textbf{10, 488 Units}$$

II. Annual number of orders

Number of orders per year= $\frac{\text{Annual demand (D)}}{\text{Quantity ordered (Q)}}$

$= \frac{4{,}400{,}000}{10{,}448} = 420$ Orders

III. Total cost of inventory under the EOQ

Total inventory cost =purchase cost + Holding cost + Ordering cost

$$\textbf{Total cost} = (4{,}400{,}000 \times 220) + \left(\frac{10{,}488}{2} \times 44\right) + \left(\frac{4{,}400{,}000}{10{,}488} \times 550\right)$$

Total cost = 968,000,000 + 230,736 + 230,736 = shs 968,461,472

Example. A company uses 100,000 widgets per annum, which are acquired at

Shs200 each. The ordering and handling costs are Shs250 per order and carrying costs are 15% of the cost of inventory per annum. Required: Calculate the economic order quantity.

Solution:

Annual demand, $D = 100,000$, Cost of ordering $Co - Shs250$

Holding costs per unit per year, $Ch = Ksh(15\% \times 200) = Ksh30$

$$Q = \sqrt{\frac{2DCo}{Ch}} = \sqrt{\frac{2 \times 100,000 \times 250}{30}} = \sqrt{\frac{50,000,000}{30}} = 1,291\ units$$

STOCK VALUATION

In a period stocks are normally purchased at different price and for product costing purposes and profit determination stock have to be appropriately valued. This is because when stocks are transferred to the stores they loss their identity and the issue price may not be accurately determined because they are many in the store.

There are two systems of stock valuation i.e.

a) **Periodic stock take system /physical stock takes:** This involves actual counting, checking and verification of stock available in the stores at the end of the period. The stock will normally be determined after stock take to enhance accuracy, normally close down for the stock take exercise.

b) **Perpetual / Continuous system**: A transaction system where stock records are maintained as per transaction each receipt or issue of stock is recorded and stock records. Therefore readily available and this help address the problem of overstocking/under stocking.

To enhance accuracy each stock item must have its own stock record where the transactions will be recorded. There are several methods which can be used to maintain records for valuation purposes. These methods have been discussed below.

1) First in first out (FIFO) Accounting:

Method of inventory valuation based on the assumption that goods are sold or used in the same chronological order in which they are bought. Hence, the cost of goods purchased first (first-in) is the cost of goods sold first (first-out).

ILLUSTRATION

NyaliMbali Ltd. Is a retailer who sells ceramic tiles. As at 1st June 2019, stock in hand consisted of 4,500 units which were acquired at shs 50 each. The transactions for the month were as follows:

June	purchases	sales
2	5,500 units @ shs 49	
4		6,000 units
7	5,000 units @ shs 52	
10	6,000 units @ shs 54	

12		7,000 unit
14		2,800 Units
18	7,000 Units @ 58	
20	8,500 Units @ 48	
22	6,700 units @ 53	
28		10,000 units
30		2,500 Units

The company uses First in First out (FIFO) method of stock valuation.
Prepare;

i. Stores ledger card
ii. Closing stock valuation

SOLUTION

Nyalimbali ltd.
Stores ledger card
For the month ended 30/06/2019

	Purchases/receipt			Sales / issues			Closing balance		
Dates	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**
1st June							4,500	50	225,000
2nd "	5,500	49	269,500				10,000		494500
4th "				4,500	50	225,000	4000		196,000
				1,500	49	73,500			
				6000		298,500			
7th "	5,000	52	260,000				9,000		456,000
10th "	6,000	54	324,000		49		15,000		780,000
12th "				4,000	52	196,000	8000		428,000
				3,000		156,000			
				7,000		352,000			
14th "					52		5,200		280,800
				2,000	54	104,000			
				800		43,200			
				2,800		147,200			
18th "	7,000	58	406,000				12,200		686,800
20th "	8,500	48	408,000				20,700		1,094,800
22th "	6,700	53	355,100		54		27,400		1,449,900
28th "				5,200	58	280,800	17,400		890,700
				4,800		278,400			
				10,000	58	559,200			
30th "				2,500		145,000	14,900		745700

2) Last in first out (LIFO) Accounting:

Method of inventory valuation is based on the assumption that the goods purchased most recently (the last in) are sold or used first (the first out). The remaining items are assumed to have been purchased at successively-earlier periods. In this method, value of the inventory at the end of an accounting period is based on the value of

items purchased earliest.

ILLUSTRATION

NyaliMbali Ltd. Is a retailer who sells ceramic tiles. As at 1st June 2019, stock in hand consisted of 4,500 units which were acquired at shs 50 each. The transactions for the month were as follows:

June	purchases	sales
2	5,500 units @ shs 49	
4		6,000 units
7	5,000 units @ shs 52	
10	6,000 units @ shs 54	
12		7,000 unit
14		2,800 Units
18	7,000 Units @ 58	
20	8,500 Units @ 48	
22	6,700 units @ 53	
28		10,000 units
30		2,500 Units

The company uses Last in First out (LIFO) method of stock valuation.
Prepare stores ledger card

SOLUTION

Nyalimbali ltd.
Stores ledger card
For the month ended 30/06/2019

	Purchases/receipt			Sales / issues			Closing balance		
Dates	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**
1st June							4,500	50	225,000
2nd "	5,500	49	269,500				10,000		494,500
4th "				5,500	49	269,500	4000		200,000
				500	50	25,000			
				6000		294,500			
7th "	5,000	52	260,000				9,000		460,000
10th "	6,000	54	324,000		54		15,000		784,000
12th "				6,000	52	324,000	8000		408,000
				1,000		52,000			
				7,000	52	376,000			
14th "				2,800		145,600	5,200		262,400
18th "	7,000	58	406,000				12,200		668,400
20th "	8,500	48	408,000				20,700		1,076,400
22th "	6,700	53	355,100		53		27,400		1,431,500
28th "				6,700	48	355,100	17,400		918,000
				3,300		158,400			
				10,000	48	513,500			
30th "				2,500		120,000	14,900		798,000

3) Weighted Average Method:

Under this method the price of material issued is determine by computing the average price of all items held in stock. The quantity for each batch are considered when calculating the average price, the average price is calculated by dividing the total cost of stock items held by the total quantities available.

$$\text{Weighted average price} = \frac{\text{Total cost of all items held in stock}}{\text{Number of stocks items available in store}}$$

NOTE: The weighted average price is determined each and every time a new purchase is made and used consistently to value all material issues until when a new purchase is made from when new price is determined.

ILLUSTRATION

NyaliMbali Ltd. Is a retailer who sells ceramic tiles. As at 1st June 2019, stock in hand consisted of 4,500 units which were acquired at shs 50 each. The transactions for the month were as follows:

June	purchases	sales
2	5,500 units @ shs 49	
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7	5,000 units @ shs 52	
10	6,000 units @ shs 54	
12		5,000 unit
14		2,800 Units
18	7,000 Units @ 58	
20		10,000 units
22	6,700 units @ 53	
30		2,500 Units

The company uses weighted average method of stock valuation.

Prepare stores ledger card

SOLUTION

	Purchases/receipt			**Sales / issues**			**Closing balance**		
Dates	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**
1st **June**							4,500	50	225,000
2nd "	5,500	49	269,500				10,000	49.45	494,500
4th "				6,000	49.45	296,700	4000	49.45	197,800
7th "	5,000	52	260,000				9,000	50.87	457,800
10th "	6,000	54	324,000		52.12		15,000	52.12	781,800
12th "				7,000	52.12	364,840	8000	52.12	416,960
14th "				2,800		145,936	5,200	52.12	271,024
18th "	7,000	58	406,000		55.49		12,200	55.49	677,024
20th "				10,000		554,938	2,200	55.49	122,086
22th "	6,700	53	355,100		53.62		8,900	53.62	477,186
30th "				2,500		134,041	6,400	53.62	343,145

WORKINGS

Weighted average price = $\frac{\text{Total cost of all items held in stock}}{\text{Number of stocks items available in store}}$

P1 = $\frac{225{,}000 + 269{,}500}{4{,}500 + 5{,}500}$ = 49.45

P2 = $\frac{197{,}800 + 260{,}000}{4{,}000 + 5{,}000}$ = 50.87

P3 = $\frac{457{,}800 + 324{,}000}{9{,}000 + 6{,}000}$ = 52.12

P4 = $\frac{271{,}024 + 406{,}000}{5{,}200 + 7{,}000}$ = 55.49

P5 = $\frac{122{,}086 + 355{,}100}{2{,}200 + 6{,}700}$ = 53.62

4) Simple Average cost method

The price of material issued is determined as an average prices existing in stocks. Quantities will not be considered when calculating average price. Issued quantities reduces quantity of earlier purchases receipt once the issued quantity is more than the quantity in the batch, the price of the batch is removed from the existing prices.

Average price = $\frac{\text{Total of Existing Price}}{\text{No of prices}}$

NOTE: The simple average price is determined every time a new issue/sale is to be made.

ILLUSTRATION

NyaliMbali Ltd. Is a retailer who sells ceramic tiles. As at 1st June 2019, stock in hand consisted of 4,500 units which were acquired at shs 50 each. The transactions for the month were as follows:

June	**purchases**	**sales**
2	5,500 units @ shs 49	
4		6,000 units
7	5,000 units @ shs 52	
10	6,000 units @ shs 54	
12		5,000 unit
14		2,800 Units
18	7,000 Units @ 58	
20		10,000 units
22	6,700 units @ 53	
30		2,500 Units

The company uses simple average method of stock valuation.

Prepare stores ledger card

SOLUTION

	Purchases/receipt			Sales / issues			Closing balance		
Dates	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**	**Units**	**Cost**	**Value**
1st **June**							4,500	50	225,000
2nd "	5,500	49	269,500				10,000		494,500
4th "				6,000	49.5	297,000	4000		197,500
7th "	5,000	52	260,000				9,000		457,500
10th "	6,000	54	324,000		51.67		15,000		781,500
12th "				7,000	53	361,667	8000		419,833
14th "				2,800		148,400	5,200		271,433
18th "	7,000	58	406,000		54.67		12,200		677,433
20th "				10,000		546,667	2,200		130,766
22th "	6,700	53	355,100		55.2		8,900		485,866
30th "				2,500		138,750	6,400		347,116

WORKINGS:

Average price = $\frac{\text{Total of Existing Price}}{\text{No of prices}}$

P1 $= \frac{50 + 49}{2} = 49.5$ **P2** $= \frac{49 + 52 + 54}{3} = 51.67$ **P3** $= \frac{52 + 54}{2} = 53$

P4 $= \frac{52 + 54 + 58}{3} = 54.67$ **P5** $= \frac{58 + 53}{2} = 55.5$

Review Questions

EXERCISE 10. Highlight the essential requirements of an effective material control system.

EXERCISE 11. Bonde Ltd manufactures a product which uses material M45 in its production. The following relates to the material:

2016

March 1	balance in stock:	1,500 units at Ksh 7 each
March 4	purchased	2,300 units at Ksh 8 each
March 5	issued	3,000 units
March 12	purchased	4,000 units at Ksh 9 each
March 18	issued	2,800 units
March 25	issued	1,600 units
March 31	purchased	3,500 units at Ksh 7.50 each

The company uses Last In First Out (LIFO) method of valuing material issues. Prepare a stores ledger account for the month of March 2016

EXERCISE 12. Gatex Enterprises issues its product XP using First In First Out (FIFO) method of inventory valuation. The following information relates to the product for the month of September 2019

2019

September 1	Balance b/d 1,000 litres at Ksh 70 each
September 3	received 300 litres at Ksh 68 each
September 8	issued 430 litres
September 15	received 1,500 litres at Ksh 65 each
September 24	received 4,000 litres at Ksh 63 each
September 27	issued 1,700 litres
September 30	issued 2,500 litres

Prepare a store ledger accout for the month of September 2019

EXERCISE 13. Jahala Company is located in Kariokor Light industries area in Nairobi. The company manufactures a product 'Cabbro', which is used in the build- ing industry. The main costs are materials used in the manufacture of 'Cabbro'is material D82000. The following information relates to the material D82000 Annual requirements: 258,000
Ordering costs: Ksh 25,000 per order
Annual holding costs: 25% of the purchase price
Purchase price per unit: Ksh 1, 000
Safety stock requirement: None
Required:

(i) The economic order quantity units
(ii) The number of orders needed per year
(iii) Total costs of ordering and holding material B42000 per year.

EXERCISE 14. The following information relates to the stocks of Kiwanda Limited:

Maximum consumption	4,600 units per week
Normal consumption	4,000 units per week
Minimum consumption	3,400 units per week
Re-order period	4-6 weeks
Re-order quantity	8,000 units

Calculate:

i. Re-order level
ii. Minimum stock level
iii. Maximum stock level

iv. Average stock level

Exercise 16. The following information relates to the material QW38 used by Juma Manufacturers.

Maximum lead time	5 months
Minimum lead time	3 months
Maximum demand	6,000 units per month
Minimum demand	3,000 units per month
Annual demand	40,500 units
Ordering costs	Ksh 5,000 units per order
Price per unit of material	ksh 20

Storage cost is 25% per year of purchase price.

Calculate:

i. Economic Order Quantity (EOQ);

ii. Re-order level

iii. Maximum stock level;

iv. Minimum stock level;

v. Total cost of stock

Exercise 17. Washa processors uses uses material TD 104 in the manufacture of its products. The following information relates to the material for the month of March 2020.

March 1 purchased 1,000 units at Ksh 40 each

March 10 purchased 2,000 units at Ksh 50 each

March 15 issued 2,500 units

March 24 purchased 3,000 units at Ksh 45 each

March 31 issued 2,500 units

i. prepare store ledger account using:

   a) First In First Out (FIFO) method;

   b) Simple average method.

ii. The management intends to report good performance through profit. Based on the results in (i) above, advice the management on the stock valuation method to select

TOPIC 4

LABOUR COSTING

Introduction

The employment of human labour in the production process gives rise to labour cost, that is, the remuneration paid. Labour costs refer to all the costs incurred in compensating the human resources employed to provide a useful service in the production process. They form a large percentage of the total cost of production hence the need to exercise maximum care so that this cost is minimized. Correct determination of labour costs is important for various purposes including correct determination of gross and net pay for each individual employee, for financial accounting and managerial accounting purposes. Labour, therefore, represents cost of services of human resources the most valuable asset of an organization.

Definition of key terms

1. **Labour turnover** is the number of employees leaving or being recruited in a period of time.
2. **Basic wages** is the amount contracted for
3. **Idle time** is non-predictive time paid for
4. **Allowances** are payments in addition to an employee's wage or salary, and are paid as compensation for a particular feature of work, inconvenience or discomfort incurred as part of your position
5. **Overtime premium** is compensation paid to employees in addition to normal wages for hours
6. **Shift premium** is the payment of labour over and above the standard rate when they work on shifts especially during the nights

Methods of Remuneration

These are methods applied in determining labour cost. Determination of labour cost includes the study of different methods of wage computation such as time rates, piece rates and other forms of incentive wage systems. Total wages to be paid to different types of workers are determined by personnel department on the basis of job evaluation.

Job evaluation refers to the scientific methods of determining relative worth of

different pay scales on the bases of qualification, experience, skill, responsibility, efforts, work hazards, and working conditions. The pay scales are established according to current rates prevailing in labour market and wage policy of the firm. The following are the two most common methods of remuneration applied in most industries:

1. Time-based methods of remuneration;
2. Output-based methods of remuneration; and
3. A hybrid of the above two methods.

Time-based methods of remuneration;

These are methods whereby remuneration of the worker is expressed as a function of the amount of time that he has spent in the period in question. The time could be measured in hours, days or months. The periods mostly considered are:

i. Hourly-Based Method

This is a method where the rate of pay of the employee is specified as an amount per hour; and his/her remuneration for the period is calculated by multiplying that rate by the number of hours that he actually worked during that period.

Wages = Number of hours worked x Rate per hour.

ii. Day Rate

This is a method where pay is specified as a rate per day and remuneration is determined by multiplying that rate by the number of days actually worked during the period.

Wages = No. of days worked x Rate per day.

iii. Monthly Rate

This method has a fixed rate per month, or alternatively an amount is fixed per annum but payable monthly. This is more popular in remunerating office, that is, non-production, workers.

iv. Overtime

In most time-based systems, a basic period is usually agreed as the working period. For example, a 40-hour working week may be fixed as the basic working period. Where an employee is made to work in excess of this agreed working period, then

the period in excess of the agreed basic working period is paid at a higher rate than the basic rate. This payment is known as overtime. The higher rate at which the overtime is paid will also depend on whether those hours were worked during the week or a weekend or a public holiday.

Overtime worked during ordinary days may be paid at, say, time and a quarter that is, 12/4 x basic rate per hour. Overtime worked during weekend or public holidays may be paid at time-and-a-half or double. The rate to be applied will always be specified. Overtime premium forms part of indirect wages except when directly related to a particular job being costed, especially when carried out at the specific request of a customer to expedite delivery. Overtime may sometimes be introduced as a way of increasing production output without increasing the number of employees.

Example

Abdi and Betty are employed by Bora manufacturers. During the week ended 1st March 2016, Abdi was issued with materials to make 200 units and Betty was issued with materials to make 180 units of product P22. The time allowed per unit is 15 minutes.

The normal working hours per week is 40 hours. Overtime is paid at a rate of time and a half. A bonus based on time saved is paid at 70% of the basic hourly rate of ksh 50. Abdi completed his work in 45 hours while Betty took 42 hours.

I. For each employee, determine:
   a) Basic pay
   b) Overtime pay
   c) Bonus pay
   d) Gross pay
   e) Labour cost per unit

II. Advise the management on the efficiency of the two workers.

SOLUTION

a. Basic pay = basic hours × basic rate per hour

Abdi = 40 hours/week × 50 = ksh 2,000

Betty = 40hour/week × 50 = ksh 2,000

b. Overtime pay = overtime hours × overtime pay per hour

Where; overtime hours = time taken – basic hours &

Overtime pay rate =50 × 1.5 = ksh 75/hour

Abdi = (45 -40) × 75= ksh 375

Betty = (42 -40) × 75= ksh 150

b) Bonus pay = time saved × bonus pay rate per hour

Where; time saved = time allowed – time taken

Abdi = [(15÷60) ×200] - 45 = 5 hours

Betty = (15÷60) × 180] – 42 = 3 hours

Bonus rate per hour = 70% × 50= ksh 35 per hour

Abdi = 5hours × 35 = ksh 175

Betty = 3 hours × 35 = ksh 105

c) Gross pay = basic pay + overtime pay + bonus pay

Abdi = 2,000 + 375 + 175 = ksh 2,550

Betty = 2,000 + 150 +105 = ksh 2,255

d) Labour cost per unit = $\frac{\text{gross pay}}{\text{Units produced}}$

Abdi = (2,550 ÷ 200) = ksh 12.75 per unit

Betty = (2,255 ÷ 180) = ksh 12.53 per unit

I. Advise; Betty is more efficient than Abdi in cost management. This is because she was able to produce at a lower cost per unit.

Example.

Zebu limited pays a basic wage rate of Ksh 80 per hour. The normal working hours in a week is 40 hours. The overtime hours are paid as follows:

- Weekday at one and half the normal rate
- Weekends at double normal rate

The following are hours worked by three employees in the first week of November 2018:

Day	**Hours worked**		
	John	**Mary**	**Mercy**
Monday	10	8	8
Tuesday	12	8	10
Wednesday	8	8	8
Thursday	8	8	8
Friday	10	10	10
Saturday	1	0	5
Sunday	2	4	0

For each employee, determine the weekly:

a) Basic pay;
b) Overtime pay
c) Gross pay

SOLUTION
Workings;
Weekday overtime rate = 80 × 1.5 = ksh 120
Weekend overtime rate = 80 × 2 = ksh 160

a) **Basic pay = basic weekly hours × basic hourly rate**
John = 40 × 80 = ksh 3,200
Mary = 40 × 80 = Ksh 3,200
Mercy = 40 × 80 = ksh 3,200
b) **Overtime pay= overtime hours × overtime rate**
Weekday overtime hours = (total hours from Monday to Friday) – 40 hours
John = (10 + 12 + 8 + 8 + 10) – 40 = 8 hours
Mary = (8 + 8 + 8 + 8 + 10) – 40 = 2 hours
Mercy = (8 + 10 + 8 + 8 + 10) – 40 = 4 hours
Weekend overtime hours = Saturday hours + Sunday hours
THEREFORE; OVERTIME PAY =
John = (8 × 120) + (3 × 160) = ksh 1,440
Mary = (2 × 120) + (4 × 160) = ksh 880
Mercy = (4 × 120) + (5 × 160) = ksh 1,280
c) **Gross pay = basic pay + overtime pay**
John = 3,200 + 1,440 = ksh 4,640
Mary = 3,200 + 880 = ksh 4,080
Mercy = 3,200 + 1,280 = ksh 4,480

Advantages of Time Rate Method

1. It is a convenient method and wages can be calculated easily and understood by workers, especially illiterate and semi-literate workers;
2. Employees can forecast their income and they are assured to receive this income
3. The method eliminates the need to measure the performance of the workers
4. This is more suitable for such jobs where work cannot be divided into smaller units such as the work of a driver, a typist or any other officeworker
5. Periodic earnings by employees are averagely stable;
6. It helps in the attainment of quality work; and
7. It facilitates planning for labour cost.

Disadvantages of Time Rate Method

- There is no incentive for workers to work efficiently, since all the workers in the same grade are paid at the same rate regardless of their output;
- This method requires close supervision of employees otherwise they do not show interest in their work and this may result to idle time. Workers can be idle and yet get paid since payment is based on time rather than output; and
- Efficient and inefficient workers are paid the same rate within skills (especially where efficient workers are not compensated with bonus).

Output-based methods of remuneration

Output-based methods of remuneration refer to a system where wages paid are computed as a function of the number of units of the product produced irrespective of the amount of time spent to produce them. This is common in certain industries like block making. Output-based method may be categorized as follows:

1. Straight Piece Rate; and
2. Differential Piece Rate.

a) Straight Piece Rate

This method requires that a rate per unit of production is specified. Wages are then calculated at that fixed rate multiplied by the number of units produced.

Wages = Number of good units produced x Rate per piece

b) Differential Piece Rate

This method encourages workers to increase output by offering an increased rate per unit at different levels of production. For example:

Range (Units)	Ksh per unit
1 – 1000	50
1001 – 1500	70
1501 – 2000	100

Thus, if an employee produces 800 units in a period, his pay would be 800 x 50 that is, Ksh 40,000. Where, however, the production is 1,200 units, his pay would be ((1000 x 50) + (200 x 70)), that is, Ksh 64,000.

Example.

Tangazo Limited produces and sells a single product. The company has an option to buy the product from a supplier at Ksh 100 per unit. The material cost of producing one unit is Ksh 50. Wages are calculated using differential piece rate method as follows:

- the first 100 units at ksh 50 per unit;
- the next 100 units at ksh 60 per unit;
- the next 100 units at ksh 70 per unit.

For the month ended 31 august 2018, Otuoma, an employee, produced 280 units of the product.

A. Determine the:

I. Total wages payable to the employee;

II. Total cost for the units produced;

III. Cost per unit.

B. Advise the management on whether to buy or make the product

SOLUTION

I. Total wages payable = units in the bracket × rate per unit

= (100 × 50) + (100 × 60) + (80 × 70) = ksh 16,600

II. Total cost for the units produced = material cost + labour cost

= (50 × 280) + 16,600 = ksh 30,600

III. Cost per unit = total cost ÷ units produced

= 30,600 ÷ 280 = ksh 109

A. Advice:

The management should buy the product from the supplier instead of producing it internally. This is because the cost of internal production (Ksh 109) is higher than cost of external sourcing (Ksh 100)

Advantages of Output-Based Method

- It encourages increased production, sales volume also consequently increasing;
- It discourages idleness of workers at work;
- It is simple for employees to understand and calculate; and
- Due to increased production volume, average fixed cost per unit can be reduced.

Disadvantages of Output-Based Method

- Employees, in a bid to achieve increased output, often overwork the machines;
- Quality of output can suffer due to the desire to just increase output but with less regard for quality;
- In order to avoid defective quality, supervision costs may have to be increased;
- Fixing a rate of pay per piece may become difficult and the standard output may be difficult to fix for the different workers;
- A flat piece rate may be unfair to new entrants (trainees) and naturally slow workers; and
- Finally where idle time occurs due to factors outside the employees' control, such as power failure and machine breakdown, the employees become dissatisfied.

Example. X, Y, and Z are engaged in the production of candies. 2000 candies are expected to be produced in a day of 8 hours and five days in a week. Employees in Section A are paid at the rate of Ksh 50 per hour. Section B employees are paid on a daily basis at the rate of Ksh 350 per day while employees in Section C are paid on the basis of the number of candies produced. The rate in section C is Ksh 4 per candy.

In the month of June 2013, it was ascertained that each worker put in 192 hours producing 1980 candies in a period of 22 days. Calculate the amount of wages earned by each employee assuming that: X works in Section A Y works in Section B Z works in Section C. (Ignore overtime and bonus).

SOLUTION:

Calculation of Wages Earned by Employees

Remuneration Basis

	Hourly rate X	Day Y	Piece rate Z
Candies Produced			1,980
Rate per candy (Ksh)			4
Remuneration (Ksh)			7,920
No of days worked		22	
Rate per day (Ksh)		350	
Remuneration (Ksh)		7,700	
No of hours worked	192		
Rate per hour (Ksh)	50		
Remuneration (Ksh)	9,600		

Other methods of Remuneration

These methods are mainly a combination of time rate and piece rate method. They are;

- **High Time Rate For Over Time**

Under this method, normal working hours are paid at the normal time rate but for overtime worked during week days and at weekends, a higher rate is paid in order to induce to the workers to work for more hours. Usually, normal working hours from Monday to Friday are 8 hours per day and for Saturday 5 hours. It means weekly normal working hours are 45. During week days, for extra time worked, hourly rate is 50% higher than the normal hourly rate for Sundays. It is double than the normal hourly rate.

We assume A. Robert's hourly rate is Ksh 10. During a particular week, he worked for 60 hours including 8 hours on Sundays. His wages for this particular week will be as follows;

At normal hourly rate		=	45 hours
50% above normal hourly rate		=	7 hours
At double hourly rate		=	8 hours
Total hours worked		=	**60 hours**
Wages			Ksh
Normal hours	=	45 x Ksh 10	= 450
Overtime			
Weekdays	=	7 x Ksh 15	= 105
Sundays	=	8 x Ksh 20	= 160
Total wages			715

- **Piece Rate with Guaranteed Time Rate**

A specific amount is paid to the worker on a daily or monthly basis irrespective of units produced by him during that period but if his output exceeds beyond a minimum limit then he is paid according to piece rate method. This method ensures a specific daily or monthly income of the workers.

Lower output in a specific period may result due to some reasons not related to the efficiency of workers such as shortage of materials, power failures, and machinery

breakdowns. In such cases, the guaranteed wage is paid to the workers. For example, the guaranteed wage of F. Kamala is Ksh 6,000 and he is paid Ksh 10 per unit produced. Find out his monthly wage on the assumptions that he produced in a month;

1. 1,000 units
2. 540 units

1,000 units

Total wage for 1,000 units is 1,000 x Ksh10 = Ksh 10,000. This wage is more than guaranteed wage so he will receive Ksh 10,000.

540 units

Total wage for 540 units is 540 x 10 = Ksh 5,400. This wage is less than guaranteed wage, so he will receive Ksh 6,000.

- **Premium Bonus Schemes**

The premium bonus is paid to the workers according to hours saved. The employers assign some jobs to the workers to complete within a specific number of hours.

If the workers complete these jobs in less than time allowed then there are some savings to the employers.
The workers are paid according to hours worked.
The employers save some money because they are not supposed to pay the workers for the hours saved by them. For example, the time allowed for a job is 100 hours and wage rate per hour is Ksh 10. It means the employer is supposed to pay Ksh 1,000 (100 x Ksh 10) wages for this job. If this job is completed by a worker is 80 hours then he will pay wages Ksh 800 (80 x Ksh 10). In this case, the saving to the employer is Ksh 200 which is due to time saved by the worker.
According to premium bonus schemes, the savings accruing to the employers out of time saved by the workers should be shared between the employers and the workers. The premium bonus is paid to a worker on the basis of his individual efforts. There are three common premium bonus schemes namely, Halsey, Halsey Weir and Rowan Schemes. The formula for the worker's total pay is;
Day rate wage + Bonus based on time saved
Time saved = Time allowed – Timetaken
If the time taken exceeds the time allowed then there is no time saved. In this case,

there is no bonus and wage rate is only paid for the time taken. The formulae for the bonus earned under three common schemes are as follows;

a) Rowan

$$\text{Bonus} = \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{wage rate}$$

b) Halsey

$$\text{Bonus} = \tfrac{1}{2}(\text{Time saved} \times \text{wage rate})$$

c) Halsey-Weir

$$\text{Bonus} = \tfrac{1}{3}(\text{Time saved} \times \text{wage rate})$$

Illustration

Monique completed a job in 45 hours for which 60 hours were allowed. His wage rate per hour is Ksh 32. Calculate Monique's total wage according to:

a) Halsey scheme

b) Halsey – Weir scheme

c) Rowan scheme

SOLUTION

Time allowed (T.A.)		=	120 hours
Time taken (T.T.)		=	90 hours
Time saved (T.S.)		=	30 hours
Wage rate per hour		=	Ksh 32
Basic wage =	90 x Ksh 32	=	Ksh 2,880

a) Halsey scheme

Bonus	=	½ x T.S. x wage rate
	=	½ x 30 x Ksh 32
	=	Ksh 480.
Total wage	=	Basic wage + Bonus
	=	Ksh (2,880 + 480)
	=	**Ksh 3,360**

b) Halsey – Weir scheme

Bonus	=	⅓ x T.S. x wage rate
	=	⅓ x 30 x Ksh 32
	=	Ksh 320
Total wage	=	Basic wage + Bonus
	=	Ksh (2,880 + 320)
	=	**Ksh 3,200**

c) Rowan scheme

Bonus	=	$\frac{\text{T.T.}}{\text{T. A.}} \times \text{T.S.} \times \text{wage rate}$
	=	$\frac{90}{120} \times 30 \times \text{Ksh } 32$
	=	Ksh 720
Total wage	=	Basic wage + Bonus
	=	Ksh (2,880 +720)
	=	**Ksh 3,600**

Example.

The following details relate to the labour cost chargeable to job K418. Time allowed is 98 hours; the rate of payment per hour is Ksh 100. Ouma took 80 hours to complete the job.

I. Compute earnings due to him under:

- Halsey
- Rowan

II. Advise Ouma on the scheme to choose given a chance.

SOLUTION

I. Gross Earning = time wages + bonus

Time wages = time taken × time rate

- Under Halsey bonus scheme;

Bonus = 50% × time saved × time rate

Gross earnings = (80 × 100) + (50% × 18 × 100) = ksh 8,900

- Under Rowan scheme;

$$\text{Bonus} = \frac{\text{time taken}}{\text{Time allowed}} \times \text{time saved} \times \text{time rate}$$

Gross earnings = $(80 \times 100) + (\frac{80}{98} \times 18 \times 100)$ = Ksh 9,469

II. Advice: Ouma should choose Rowan bonus scheme since it will earn him more pay.

- **Group Incentive Schemes**

These schemes are introduced by the management of different organizations and their main purpose is to induce workers to participate effectively to increase the production of any organization. In addition to individual bonus incentives, the workers may be given some share of profit and co-ownership. It is explained as;

a) Profit Sharing and Co-ownership

Profit sharing is the payment to employees of a portion of the company's trading profits. Co-ownership relates to a scheme under which employees own shares in the company. These shares may be bought by the workers or given to them without any payment. These two schemes aim to make employees partners in the enterprise but the employees mostly prefer to be paid well instead of becoming partners.

b) Principles of Labour Incentive Schemes

A labour incentive scheme is a scheme that relates remuneration to the performance of labourers. The main principles of labour incentive scheme include the following;

1. These schemes must be fair to employers and employees;
2. They must be stable;
3. The standard of performance must be reasonable;
4. There must be no limits on earnings;

5. There must be proper measurement of employee's efforts.

c) Advantages of Group Incentive Schemes

1. It creates a strong loyalty within the group as all employees work together to ensure that the bonus is earned
2. It often results in reduced absenteeism and increased output as they police one another to avoid time wastages
3. It can be applied to all categories of workers – whether direct or indirect workers.
4. The rate of production is increased
5. These are beneficial for employer and employees
6. These help to reduce labour turnover

d) Disadvantages of Group Incentive Schemes

1. It may not encourage individual initiative as each member of the group is paid the same bonus
2. Efficient and inefficient employees are paid the same amount of bonus
3. The schemes involve extra work
4. There is possibility of exploitation
5. The scheme disputes may become a source of friction

Allocation of Labour

Cost Labour cost is allocated to respective jobs or products. Labour cost being a direct cost can be identified and charged to the products which are produced by a specific worker. The allocation of labour cost to the right jobs or products is required to ascertain the total cost of those jobs or products.

Example . Mwangangi worked 180 hours during the month of June 2012 and he was paid at the rate of Ksh 10 per hour. During the month, he completed three jobs.

Job No.	Number of hours
A	80
B	60
C	40

The following additional information provided;

Required

Calculate the labour cost chargeable to these three jobs on the assumption that these jobs were completed only by Mwangangi.

Solution:

Total wage of Mwangangi = 180 hours x Ksh 10 = Ksh 1,800

Proportion of time for three jobs:-

	A		B		C
	80	:	60	:	40
Or	4	:	3	:	2

The labour cost must be apportioned among these jobs at these proportions. It is shown as follows;

Job A

$\text{Ksh } 1800 \times \frac{4}{9}$ = Ksh 800

Job B

$\text{Ksh } 1800 \times \frac{3}{9}$ = Ksh 600

Job C

$\text{Ksh } 1800 \times \frac{2}{9}$ = Ksh 400

Accounting for Labour

For accounting purposes, wages or labour cost of production workers forms part of prime cost of production while indirect wages are treated as overheads. In other words, only direct wages of production workers and those workers directly engaged in the production process would be regarded as Direct Wages. Remuneration of other workers, even if it refers to the basic remuneration, would be regarded as indirect, that is, it is indirectly related to the production function; the only exception being where the use is related to a specific demand by a customer to expedite completion of a specific job.

For example, in a manufacturing concern, the wages of the factory operatives would be regarded as direct. In a professional accountant's office, the remuneration of the professional staff would be regarded as direct while the remuneration of the administrative staff would be regarded as indirect.

However, within the production function, questions often arise as to the treatment of certain payments. For example:

- Overtime - Overtime premium should be treated as indirect wages, except as noted above where it is done at the specific request of a customer to expedite

delivery

- Bonus – Non-productive bonus, like shift bonus, bonus payments are generally treated as an indirect cost;
- Contribution to Pension Schemes or Housing Fund -This is regarded as indirect wages; and
- Idle Time - Where production workers are idle and the scheme of remuneration allows for wages to be paid during this idle period, the payment during the idle time will be isolated and treated as indirect wages.

Example.

Panda Ltd operates a factory which has 15 direct workers. Employees are paid a basic wage rate of Ksh 350 per hour. The normal working hours per week is 40 hours. During the week ended 5th April 2018, the total time worked by direct workers was 690 hours. Overtime is paid at time rate and third. Overtime is worked to meet general production requirements. Twenty hours of direct workers time were regarded as idle time.

For the week ended 5th April 2018, calculate:

I. Basic wages

II. Overtime wages

III. Gross wages

IV. Direct wages

V. Indirect wages

SOLUTION

I. Basic pay = basic working hours × basic hourly rate

Basic wages = (15worker × 40hours) × 350 = ksh 210,000

II. Overtime wages = overtime hours × overtime hourly rate

Overtime wages = (690 – 600) × (350 × 133%) = Ksh 42,000

III. Gross wages = basic wages + overtime wages

= 210,000 + 42,000 = Ksh 252,000

Direct wages (N.B: as noted above, the overtime premium is treated as indirect labour except for special project. Idle time incurred is also an indirect labour cost)

IV. Direct wages = gross wages – idle labour – overtime premium

Direct wages = 252,000 – (20hours × 350) – (33% × 350 × 90hours)

= 252,000 – 7,000 -10,500 =Ksh 234,500

V. Indirect wages = idle labour + overtime premium

= 7,000 + 10,500 = Ksh 17,500

Review Questions

EXERCISE 18. The following information relates to three employees of Lamboka Limited for the last week of August 2017.

	Waitii	Braoni	Grini
Actual hours worked	40	39	50
Pay per hour (Ksh)	400	380	350
Output (litres)			
Product A	200	205	210
Product B	300	294	288

The standard time for product A is 6 minutes while for product B is 5 minutes.
The company pays a bonus at half the normal late. The remuneration is time based.
For each employee, determine:

i. Basic pay;
ii. Bonus pay;
iii. Gross pay. (12 marks)

EXERCISE 19. Explain five benefits that may accrue to a firm that implements a time based remuneration system. (10 marks)

EXERCISE 20. Explain four factors that should be considered before choosing a suitable method for labour remuneration. (8 marks)

EXERCISE 21. Gemee Limited manufactures ornaments for export. The company allocates jobs for ornaments to its three operators; Mwelu, Kimaru and Charo. In a period of one week, the units produced and standard time allowed were are follows

	Units produced	std time allowed (hrs)	time taken (hrs)
Mwelu	108	30	46
Kimaru	144	25	49

Charo	177	20	55

The basic wage rate is Ksh 240 for the employees. Hours worked in excess of basic week hours are paid for at the basic wage rate plus two thirds of basic wage rate. A bonus is paid at 30% of the basic wage rate for time saved. A working week has 40 hours.

I. For each employee, calculate:
   a) The amount of bonus payable
   b) The gross wages payable

II. A customer has offered Ksh 120 for the ornament produced by Mwelu. Advise the management of Gemee Limited on whether to accept the offer or not. (12 marks)

Exercise 22. The total output for Kamwangi for one week was 960 units. He was allowed 16 minutes per unit. He completed these units in 208 hours. His wage rate per hour is Ksh 36. Calculate Kamwangi's total wage according to:

a) Halsey scheme

b) Rowan scheme (10 marks)

EXERCISE 23. Makalu produced 1,200 units in a week but 80 units were rejected. Time allowed per unit is 12 minutes. No payment is made beyond the time allowed but the bonus is paid on accepted units only. No penalty is imposed on the rejected units. Makalu produced the units in 192 hours only. His wage rate per unit is Ksh 30. Calculate his total wage on the basis of Halsey Bonus scheme. (8 marks)

EXERCISE 24. Soila Enterprises has employed three workers. The firm remunerates its employees under Rowan scheme.

The following information relates to the employees for the month of june, 2018.

	Otieno	Kamau	Juma
Time allowed per unit (hours)	1.25	1.50	1.75
Units produced	450	525	600
Time taken (hours)	500	700	950

The basic hourly rate of pay is Ksh 250.

Calculate the gross earnings for each worker for June 2018. (9 marks)

EXERCISE 25. Pantex manufacturers have five employees who are paid on piece rate system basis. The following information relates to five employees for the month of April 2018.

Payroll number	Name	units produced
P40M01	James Karanja	2,600
P40M02	Ouma Okero	2.800
P40M03	Nelima Kerubo	2,750
P40M04	Joel Mutua	2,650
P40M05	Mohammad Abdul	2,300

Additional information

i. The standard rate of pay is Ksh 24 per unit
ii. The standard production per month is 2,300 units;
iii. Any production beyond the standard output is paid for at 35% above the standard rate;
iv. Each employee is paid a house allowance of Ksh 15,000 per month
v. PAYE is deducted at 10% of gross pay;
vi. NHIF is Ksh 850 per month;
vii. NSSF contribution is Ksh 1080 per month;
viii. Commuter allowance is Ksh 7,500 per month

Prepare a payroll for the month of june 2017. (12 marks)

TOPIC 5

OVERHEAD COSTS

Introduction

This lesson will feature the nature of expenses normally regarded as overheads including apportionment of service department costs. It will also cover the absorption of overheads into product costs, various overhead recovery rates and choice of appropriate rates, and the effect of activity based costing on overhead allotment.

Definition of Key Terms

1. Overhead costs

These are costs incurred in the course of manufacturing a product, providing a service or running a department which cannot be traced directly to the product, service or department. By overheads, is meant, the aggregate of indirect materials, indirect labour and indirect expenses.

2. Indirect Expenses

These refer to those expenses that are not directly traceable to a particular cost object, such as, production salaries, rent and rates and electricity.

3. Direct Expenses

These refer to those expenses that are directly traceable to a particular cost object, for example, direct materials, direct wages, and royalty.

4. Service cost center

This is a department that provides services to the production department.

5. Overhead allocation

This is the process by which the whole cost items are charged directly to a cost unit or as a cost center.

6. Overhead apportionment

This is a process that occurs when the total value of an overhead item is shared between two or more cost centers that use the overheads

7. Production Overheads

This refers to the aggregate of indirect costs associated with manufacturing activities. Manufacturing activities are the sequence of operations, which begin with supplying materials to work stations and end with the primary packing of the product. Examples of these would include depreciation of plant and machinery, and production salaries.

8. Administrative Overheads

Administrative overheads encompass the costs of formulating policy, directing the organization, and controlling the operations of an undertaking which is not related to production, selling, distribution, research or development activity or function. Examples of these include office rent, office electricity, office salaries, printing and stationery, audit and professional fees.

9. Selling Overheads

These refer to those indirect costs, which are associated with marketing and selling (excluding distribution) activities. Examples of these will include salaries of sales staff, advertisement, and sales commissions.

10. Distribution Overheads

These represent the aggregate of indirect costs associated with the distribution of finished products. Examples of these would include haulage costs to customers, and warehouse rents.

Reasons for Absorption of Overheads

The following are a list of situations where analysis of overheads will be useful in evaluation of the relevant cost data. These situations include:

a. The control of overhead expenditures

There must be a link between overhead costs and the manager responsible for its control. This is best achieved by having the planned level of overhead costs for each cost center compared to the actual cost incurred in order that any differences may be investigated and corrective measures taken.

b. Charging of overheads to cost units

Overheads relating to a specific job must be charged to that product, job or process in order to come up with the correct cost of the cost object or unit. Each product or job should share a part of indirect costs of the business.

c. Valuation of work in progress

Work in progress is partly completed goods in manufacturing industries. Such work in progress must be valued at the end of an accounting period to enable calculate profit and derive a balance sheet. For manufacturing firms, work in progress (work in process) forms part of the inventory. Therefore, it becomes necessary to determine with accuracy the value of the work in process which comprises prime cost and manufacturing overheads.

d. Valuation of abnormal losses

Abnormal losses arise when the actual output given the budgeted input yields less than the expected output. (Abnormal loss = Expected output – actual output). That is, the actual loss incurred exceeds the expected or normal loss. (Abnormal loss = Actual loss – Normal loss). They arise due to unanticipated inefficiencies in production. Such losses need to be charged to the departments that incur them for efficiency analysis purposes.

e. Profit measurement

The valuation of work in progress and finished goods stock will affect the profit reported. The basis on which production overhead has been absorbed by cost units will, therefore, have a direct influence on the level of profit reported during the period.

f. Decision making

Relevant costs are the only ones that trigger decision making process. Production overhead costs may be allocated to a department (cost center) or apportioned to it using some arbitrary apportionment basis. In other cases, overhead cost may be a fixed or variable behavior pattern as activity changes. The total costs associated with cost center and the organization as a whole affect the kind of decisions made by the management. But such relevant costs need to be incremental and future costs (not sunk costs) that are controllable by management.

Allocation and Apportionment of Overhead Costs

Allocation of overheads

This is the charging of overheads to the cost center which results from the existence of that cost center. For example, all indirect materials used by department "A" must be charged to that department. The overheads are allocated when the following two conditions are fulfilled:

1. The cost center must have caused the overheads to be incurred, and
2. The exact amount of the overhead must be known.

Apportionment of overheads

This is to charge a cost center the fair share of an overhead. The overheads which are incurred for the organization as a whole must be charged to various cost centers of that organization. For example, sharing of rent to four departments of an organisation which is paid as a whole for all the departments.

Absorption of overheads

This is the charging of overheads to cost units. The overheads of a particular cost center are absorbed into cost units produced during a particular period.

Bases of Apportionment

The following is a list of various bases applied in apportionment of overheads to various cost centers:

	Basis of apportionment	Overheads to which basis applies
1	Area	Rent, rates, heat and light, depreciation of buildings, maintenance of buildings, and insurance of premises.
2	Book value	Depreciation of plant and machinery, insurance of plant, repairs and maintenance etc.
3	Number of employees	Expenses of personnel office canteen, welfare of staff, safety measures, supervision etc.
4	Weight of materials or cost of materials used	Material handling expenses, storekeeping, packages cost etc.
5	Technical estimates	Power consumption, water usage, steel consumption etc.
6	Sales revenue	Advertisement, selling and distribution expenses etc.
7	Direct wages	Staff training, provident contribution etc.
8	Machine hours or labour or labour hours	General overheads items
9	Number of radiators	Heating

Note: The choice of an appropriate basis of apportionment is a matter of judgment. A company may decide any basis of apportionment of overheads according to its own circumstances.

Overhead analysis sheet

This is prepared to show how the various overheads have been allocated and apportioned among different cost centers/departments. This sheet will have the following columns:

- The first column shows the name of Overhead to be apportioned.
- The second column shows the basis of apportionment.
- The third column shows the total amount of the overhead which is to be apportioned.
- The fourth column shows the total number of units in respect of a specific overhead e.g. area, book value etc.
- The fifth column shows rate of overhead per unit. This is obtained by dividing total overhead amount by total number of units. That is, divide column (3) by column (4) to arrive at column (5)
- More columns are drawn depending on the number of cost centers or departments in the organisation in addition to the first five columns above. For example, if there are four departments, then four more columns are used. Each of these columns shows the share of overhead for a specific department.

ILLUSTRATION I

The following information was extracted from the books of Andama traders and relates to four departments:

Overhead	**Ksh**
Rent	80,000
Repairs to plant	50,000
Depreciation of plant	40,000
Light and heating	20,000
Supervision	60,000
Repairs to buildings	30,000

The following additional information in respect of the four departments is also provided:

	Dept. A	**Dept. B**	**Dept. C**	**Dept. D**
Area in square metres	1,500	1,200	800	500
Number of employees	35	25	25	15
	Ksh	Ksh	Ksh	
Value of plant	500,000	300,000	200,000	

Required: Prepare an overhead analysis sheet showing clearly the bases of apportionment.

OVERHEAD ANALYSIS SHEET

Overhead	Basis	Amt. (Ksh)	Units	Rate per unit	Dept. A (Ksh)	Dept. B (Ksh)	Dept. C (Ksh)	Dept. D (Ksh)
Rent	Area	80,000	4,000m²	Ksh 20 m²	30,000	24,000	16,000	10,000
Repairs to plant	Value of plant	50,000	Ksh 1,000,000	Ksh 0.05 per Ksh	25,000	15,000	10,000	
Depreciation of plant	Value of plant	40,000	Ksh 1,000,000	Ksh 0.04 per Ksh	20,000	12,000	8,000	
Light and heating	Area	20,000	4,000m²	Ksh 5 per m²	7,500	6,000	4,000	2,500
Supervision	No. of employees	60,000	100 employees	Ksh 600 per employee	21,000	15,000	15,000	9,000
Repairs to buildings	Area	30,000	4,000m²	Ksh 7.5 per m²	11,250	9,000	6,000	3,750
		280,000			114,750	81,000	59,000	25,250

1. Total area = 1,500 + 1,200 + 800 + 500 = Ksh 4,000m²
2. Total number of employees = 35 + 25 + 25 15 = 100
3. Total value of plant = Ksh (500,000 + 300,000 + 200,000) = Ksh 1,000,000.
4. Rent per square metre = Ksh (80,000 ÷ 4,000) = Ksh 20
5. Depreciation of plant per Ksh = Ksh (40,000 ÷ 1,000,000) = Ksh 0.04
6. Repairs to plant = Ksh (50,000 ÷ 1,000,000) = Ksh 0.05
7. Light and heat per square metre = Ksh (20,000 ÷ 4,000) = Ksh 5
8. Supervision per employee = Ksh (60,000 ÷ 100) = Ksh 600
9. Repairs to buildings per square metre = Ksh (30,000 ÷ 4,000) = Ksh 7.5
10. Apportionment of rent

		Ksh
Dept. A	= 1,500 × Ksh 20	=30,000
Dept. B	= 1,200 × Ksh 20	= 24,000
Dept. C	= 800 × Ksh 20	= 16,000
Dept. D	= 500 × Ksh 20	= 10,000
	TOTAL	80,000

11. Apportionment of repairs to plant

		Ksh
Dept. A	= 500,000 × Ksh 0.05	=25,000
Dept. B	= 300,000 × Ksh 0.05	= 15,000
Dept. C	= 200,000 × Ksh 0.05	= 10,000
	TOTAL	50,000

12. Apportionment of depreciation of plant

		Ksh
Dept. A	= 500,000 × Ksh 0.04	=25,000
Dept. B	= 300,000 × Ksh 0.04	= 15,000
Dept. C	= 200,000 × Ksh 0.04	= 10,000
	TOTAL	50,000

13. Apportionment of light and heat

		Ksh
Dept. A	= 1,500 × Ksh 5	=7,500
Dept. B	= 1,200 × Ksh 5	= 6,000
Dept. C	= 800 × Ksh 5	= 4,000
Dept. D	= 500 × Ksh 5	= 2,500
	TOTAL	20,000

14. Apportionment of supervision

		Ksh
Dept. A	= 1,500 × Ksh 7.5	=11,250
Dept. B	= 1,200 × Ksh 7.5	= 9,000
Dept. C	= 800 × Ksh 7.5	= 6,000
Dept. D	= 500 × Ksh7.5	= 3,750
	TOTAL	30,000

16. Total overheads = Ksh (114,750 + 81,000 + 59,000 + 25,000) = Ksh 280,000.

		Ksh
Dept. A	= 35 × Ksh 600	= 21,000
Dept. B	= 25 × Ksh 600	= 15,000
Dept. C	= 25 × Ksh 600	= 15,000
Dept. D	= 15 × Ksh600	= 9,000
	TOTAL	60,000

ILLUSTRATION II

Overheads	Amount shs
Consumables;	
Department P1	250,000
" P2	150,000
" S1	100,000
" S2	50,000
Depreciation of factory building	1,000,000
Supervision	1,500,000
Depreciation of equipment	800,000
Canteen	900,000
Heat & Air Conditioning	500,000
Insurance of Equipment	200,000

The information relating to department is as follows:-

Department	Area occupied	No. of employees	Book value of equipment
P1	**1,200**	**30**	**3,000,000**
P2	**1,600**	**30**	**2,500,000**
S1	**800**	**15**	**1,000,000**
S2	**400**	**15**	**500,000**

Required:

Prepare overhead analysis sheet to show the amount that will be distributed to each department.

SOLUTION

OVERHEAD ANALYSIS SHEET							
Overhead item	**Basis of apportionment**	**Ratio**	**Total**	**Dpt. P1**	**Dpt. P2**	**Dpt. S1**	**Dpt. S2**
Consumables	**Allocated**	**-**	**550,000**	**250,000**	**150,000**	**100,000**	**50,000**
Depreciation of factory building	**Area occupied**	**3:4:2:1**	**1,000,000**	**400,000**	**400,000**	**200,000**	**100,000**
Supervision of employees	**No. of Employees**	**2:2:1:1**	**1,500,000**	**500,000**	**500,000**	**250,000**	**250,000**
Depreciation. of equipment	**Book value of Equipment**	**6:5:2:1**	**800,000**	**243,857**	**285,714**	**114,265**	**37142**
Canteen	**Number of Employees.**	**2:2:2:1**	**900,000**	**300,000**	**300,000**	**130,000**	**150,000**
Heating	**Area. occupied**	**3:4:2:1**	**500,000**	**150,000**	**200,000**	**100,000**	**50,000**
Insurance	**Book. Value of. equipment**	**6:5:2:1**	**200,000**	**85,714**	**71429**	**28571**	**14286**
Total			**3,950,000**	**1,928,571**	**1,907,143**	**942,856**	**671,428**

Overhead of Service Departments

The overheads charged to service departments must be further charged to production departments. Service departments are those departments that provide services to the production departments such as stores and repairs departments. In order to apportion the overheads of service departments among the production departments, some information is provided. If service departments provide services to production departments only, then there is no difficulty in transferring service department overheads to production departments.

Example . XYZ Company operates a factory whose overheads for the year ending 31st December, 20x3 are as follows:

15. Apportionment of repairs to buildings

	Ksh	Ksh
Indirect material		
Shop 1	40,000	
Shop 2	60,000	
Shop 3	20,000	
Tool room	12,000	
Stores	16,000	
Clerical services	6,000	**154,000**
Indirect wages		
Shop 1	42,000	
Shop 2	58,000	
Shop 3	54,000	
Tool room	37,000	
Stores	15,000	
Clerical services	22,000	**228,000**
Rent and rates	100,000	
Insurance	20,000	
Depreciation	300,000	
Power	90,000	
Light and heat	40,000	**550,000**
		932,000

The following information is provided:

Departments	Area (m^2)	Book value of machinery	Technical estimate
Production		Ksh	
Shop 1	1,000	500,000	50
Shop 2	750	900,000	40
Shop 3	1,500	200,000	
Service			
Tool room	500	300,000	10
Stores	750	50,000	-
Clerical services	500	50,000	-
	5,000	**2,000,000**	**190**

Service departments provide their services to production departments as follows:

	Service departments		
Service departments	Tool room	Stores	Clerical services
Shop 1	30%	50%	30%
Shop 2	50%	30%	40%
Shop 3	20%	20%	30%

Required:

Prepare an overhead an overhead analysis sheet for the departments of XYZ

Company for the factory for the year ending 31st December, 20x3 showing clearly the bases of apportionment.

Solution:

Overhead	Basis	Amount (Ksh)	Units	Rate per unit (Ksh)	Shop 1 (Ksh)	Shop 2 (Ksh)	Shop 3 (Ksh)	Tool room (Ksh)	Stores (Ksh)	Clerical services (Ksh)
Indirect material	Allocation	154,000	-	-	40,000	60,000	20,000	12,000	16,000	6,000
Indirect wages	Allocation	228,000	-	-	42,000	58,000	54,000	37,000	15,000	22,000
Rent and rates	Area	100,000	5,000m²	20	20,000	15,000	30,000	10,000	15,000	10,000
Insurance	Book value	20,000	2,000,000	0.01	5,000	9,000	2,000	3,000	500	500
Depreciation		300,000	2,000,000	0.15	75,000	135,000	30,000	45,000	7,500	7,500
Power	Book value	90,000	90	900	45,000	36,000	-	9,000	-	-
Light and heat	Technical estimate	40,000	5,000m²	8	8,000	6,000	12,000	4,000	6,000	4,000
Service department overheads Apportioned Over Production Departments			Ratios		235,000	319,000	148,000	120,000	60,000	50,000
Tool room	Technical estimate		30:50:20		36,000	60,000	24,000	(120,000)		
Stores	Technical estimate		50:30:20		30,000	18,000	12,000		(60,000)	
Clerical services	Technical estimate		30:40:30		15,000	20,000	15,000			(50,000)
		932,000			316,000	417,000	199,000	-	-	-

Service departments providing services to fellow service departments

When some service departments provide services to production departments as well as to other service department, then a part of the overhead cost of one service department should be charged to another service department. An assumption is made that the maintenance departments provides some services to the stores department and similarly, the stores department provides some services to the maintenance department. In this case, the overhead cost of the maintenance department should be charged partly to stores department and the overhead cost of stores department should be charged partly to the maintenance department. Ultimately, the overheads of these service departments should be charged to the production departments only. The following methods are applied in respect of service departments providing ser- vices to fellow service departments:

1. **Repeated distribution**
2. **Simultaneous equation method**
3. **Direct method**
4. **Step-closing/step by step method**

1. Repeated distribution

This is a method whereby service department costs are continuously allocated to the recipient departments until the service department cost are zero or almost zero.

Example. Menno production Company has three production departments and two service departments. The overhead of these departments for year 20x3 are as follows:

Production departments	Ksh
A	150,000
B	270,000
C	190,000
Service departments	
X	30,000
Y	50,000
	690,000

A technical assessment for the apportionment of the costs of the service departments reveals that:

	Departments				
	A	B	C	X	Y
X	40%	20%	30%	-	10%
Y	50%	20%	20%	10%	-

Required:

Prepare Menno's overhead analysis sheet using repeated distribution method.

Solution:

	Departments				
	A	B	C	X	Y
	Ksh	Ksh	Ksh	Ksh	Ksh
Overhead (OH)	150,000	270,000	190,000	30,000	50,000
OH of "X" apportioned	12,000	6,000	9,000	(30,000)	3,000
OH of "Y" apportioned	26,500	10,600	10,600	5,300	(53,000)
OH of "X" apportioned	2,120	1,060	1,590	(5,300)	530
OH of "Y" apportioned	265	106	106	53	(530)
OH of "X" apportioned	21	11	16	(53)	5
OH of "Y" apportioned	3	1	1	-	(5)
	190,909	287,778	211,313	0	0

The principle of repeated distribution involves the appropriating a portion of the overhead of one service department which is charged to the other service department. For example, 10% of the overhead of X department is charged to Y department. The process continues until all the amounts are transferred to production departments. These amounts are rounded off to the nearest Ksh. The final overheads of production departments are equal to the total overheads of all departments, that is,

Ksh (190,909 + 287,778 + 211,313) = Ksh 690,000.

Criticisms of repeated distribution

This method is tedious and time consuming to use as compared to other methods such as simultaneous equations method.

2. Simultaneous equation method

This method recognizes the reciprocal nature of the service departments and expresses it as an equation.

Example.

A company has three production and two service departments. The overhead analysis sheets provide the following totals analysed into production and services:

		Ksh
Production Dept.	X	48, 000
	Y	42, 000
	Z	30, 000
Service Dept.	P	14, 040
	Q	18, 000

The service departments' costs are apportioned as follows:

	Production Depts.			Service Depts.	
	X	Y	Z	P	Q
	%	%	%	%	%
Service Dept. p	20	40	30	-	10
Service Dept. q	40	20	20	20	-

Using simultaneous equation method, calculate the total overheads charged to the production departments.

Solution:

Let P represent total overhead of department P
And Q total overhead of department Q
P received 20% of Q's services
Thus, P = 14,040 + 0.2 Q
Likewise, Q = 18,000 + 0.1P
Using substitution method of simultaneous equations
P = 14,040 + 0.2 (18,000 + 0.1P)
P = 14,040 + 3,600 + 0.02P
P – 0.02P = 17,640
0.98P = 17,640
P = Ksh 18,000
Q = Ksh 18,000 + (0.1 x 18,000)
Q = Ksh 19,800

Overhead charged to Production

	X (Ksh)	Y (Ksh)	Z (Ksh)
Allocated Overheads	48,000	42,000	30,000
Share of P's service (Ksh18,000 X % served)	3,600	7,200	5,400
Share of Q's service (Ksh18,000 X % served)	7,920	3,960	3,960
	59,520	**53,160**	**39,360**

Q

3. Direct method

This is a method where costs of each service department are only charged to production centers. Administration; selling and distribution centers are not

charged with the cost of the service departments as they are not production centers. This method is simple to operate though it is very inaccurate. It only applies where reciprocals are very negligible

4. Step-closing/sequential method

This is a method whereby a service department with the highest amount of overhead cost is identified first and all its overheads distributed to other departments, that is, production and service departments. This is because the largest department is assumed to have rendered services to all other departments making it accumulate the highest amount of overheads. The smallest or last department will only share its department overheads to production department, once cost is re-appropriated from service department. The department is eliminated from receiving costs from the other other service departments. This method recognizes reciprocal effects partially.

Absorption of Overheads Overhead

Absorption is the allotment of overhead cost to cost units by means of predetermined rates separately calculated for each cost center. It simply refers to the charging of overheads to cost units. The overheads as determined to various costcenters are distributed to all cost units produced by the cost center. A cost unit is defined as a unit of quantity of produce, service or time in relation to which costs may be ascertained or expressed. Examples of cost units include a metre of cloth, a litre of milk or a kilogram of sugar. For example, if total overheads of department 'Z' are Ksh 200,000 and 50,000 units are produced in the department during a particular period, then overhead per unit of product can be calculated as follows:

$$\text{Overhead per cost unit} = \frac{\text{Total overheads}}{\text{Units produced}} = \text{Ksh } (200{,}000 \div 50{,}000) = \text{Ksh } 4.$$

Overhead Absorption Rates (OAR)

These are rates calculated in order to charge overheads to cost units. They simply refer to the rates at which overheads are charged to each cost unit. The first stage in absorption is to establish the absorption rate. The following is the general procedure followed in calculating the absorption rate;

- Estimation of the overheads likely to be incurred during the period
- Estimation of the various levels of activities on which overhead absorption

rates are to be calculated

- Calculation of the overheads absorption rate using the formula:

$$\textbf{Overhead Absorption Rate (OAR)} = \frac{\text{Budgeted overhead}}{\text{Budgeted Absorption Rates}}$$

Overhead absorption methods

These are also known as bases of absorption of overheads. The following is a list of the commonly used methods:

	Method	Formula to calculate OAR
a.	Percentage of direct material cost	$=\frac{\text{Overhead cost x 100}}{\text{Direct Material cost}}$
b.	Percentage of direct labour cost	$=\frac{\text{Overhead cost x 100}}{\text{Direct Labour Cost}}$
c.	Percentage of prime cost	$=\frac{\text{Overhead cost x 100}}{\text{Prime cost}}$
d.	Rate per direct labour hour	$=\frac{\text{Overhead cost}}{\text{Labour hours}}$
e.	Rate per machine hour	$=\frac{\text{Overhead cost}}{\text{Machine hours}}$
f.	Units of output	$=\frac{\text{Overhead cost}}{\text{Units of Output}}$

Choice of an appropriate absorption method

The choice of an absorption method is not specific but based on a matter of judgment or common sense. An appropriate absorption method is selected according to the circumstances. The most commonly used factors in absorption include:

a. Output units

This is where absorption is based on the units produced and this applies when the units can are clearly identified with the overhead cost incurred during the period.

$$\textbf{OAR} = \frac{\text{Budgeted Overhead cost}}{\text{Units of Output}} = \text{Ksh/unit}$$

b. Machine hours

This method is applied where the company's operations are automated or where it is possible to identify or determine machine hours per unit.

$$\textbf{OAR} = \frac{\text{Budgeted Overhead cost}}{\text{Budgeted machine hours}} = \text{Ksh/ machine hour}$$

c. Direct labour hours

This method is applied where a company's operations are done manually. It is also used where there is a strong relationship between the hours worked and the overhead costs incurred.

$$\text{OAR} = \frac{\text{Budgeted Overhead cost}}{\text{Budgeted labour hours}} = \text{Ksh/labor hour}$$

d. Direct material costs

This is normally used where there is a strong relationship between material cost incurred and the overhead cost

$$\text{OAR} = \frac{\text{Budgeted Overhead cost x 100}}{\text{Budgeted direct material cost}} = \% \text{ of materials}$$

e. Direct labour cost

It is used where most of the work done is manual in nature and the direct labour cost forms the largest portion of the production cost.

$$\text{Prime cost} = \frac{\text{Budgeted overheads x 100}}{\text{Budgeted prime cost}} = \% \text{ of prime cost}$$

f. Prime cost

This is applied where overheads can be clearly defined and identified with all the direct cost in the company.

Example .

The overheads Kemuma manufacturing Company were Ksh 250,000 for the year 20x4. Total output for the same period was 50,000 units. Kemuma provides you with the following information:

	Ksh
Material cost	500,000
Number of labour hours	25,000
Labour cost	125,000
Number of machine hours	20,000

Required: Calculate Kemuma's overhead absorption rates using different absorption methods.

Solution:

Method	Formula	Overhead absorption
Units of output	**OAR**= Budgeted Overhead cost / Units of Output	Ksh (250,000 ÷50,000) = Ksh 5 per unit
Direct labour hours	**OAR**= Budgeted Overhead cost / Direct labour hours	Ksh (250,000 ÷25,000) = Ksh 10 per labour hour
Direct machine hours	**OAR**= Budgeted Overhead cost / Direct machine hours	Ksh (250,000 ÷20,000) = Ksh 12.50 per machine hour
Percentage of material cost	**OAR**=Budgeted Overhead cost x 100 / Material cost	Ksh (250,000 ÷500,000 x 100) = 50% of material cost
Percentage of labour cost	**OAR**= Budgeted Overhead cost x 100 / Labour cost	Ksh (250,000 ÷125,000 x 100) = 200% of labour cost

Application of Absorption Rates

The overhead absorption rates are applied in computation of total cost of any particular job or cost unit. The overhead absorption method is indicated in order to find the total cost of a cost unit.

Review Questions

EXERCISE 24. Explain four bases used in absorbing overheads. (8 marks)

EXERCISE 25. Upepo Enterprises has three production departments; A, B and C; and two service departments D and E. The following are the overheads of each department:

	Production departments			**service departments**	
	A	**B**	**C**	**D**	**E**
	Ksh 850,000	Ksh 740,000	Ksh 480,000	Ksh 300,000	Ksh 368,000

Overheads of service departments D and E are apportioned to the departments as follows:

	A	B	C	D	E
D	60%	20%	10%	-	10%
E	40%	30%	25%	5%	-

Determine the total overheads for each service department using simultaneous equation methods;

Reapportion the service departments' overheads to production. (12 marks)

EXERCISE 26. Sungura Ltd has three departments; S, R and T. the following are the budgeted overheads for the year 2019.

			Ksh
Insurance	-	Machinery	15,000,000
	-	Stock	1,500,000
Rent for factory			3,210,000
Transport services for employees			450,000
Depreciation for Machinery			950,000

Additional information

	Departments		
	S	R	T
Area (Square metres)	1,500	900	600
Number of employees	150	120	90
Value of machines (Ksh)	6,000,000	4,000,000	2,000,000
Value of stock (Ksh)	1,200,000	1,800,000	2,000,000

Prepare an overheads analysis sheet for the year 2019. (12 marks)

EXERCISE 27. The following information relates to a factory which has four departments; A, B, C and D.

Overheads incurred in June 2016:

	Ksh
Insurance to plant	75,000
Depreciation	60,000
Lighting and heating	30,000
Supervision	90,000
Maintenance	45,000
Canteen services	50,000
Factory rent	100,000

Information in respect of four departments are as follows:

	A	B	C	D
Area occupied (m2)	2,250	1,800	1,200	750
Number of employees	35	25	25	15
Value of plant (Ksh)	750,000	450,000	300,000	300,000

Prepare an overheads analysis sheet showing the total overheads in each department. (12 marks)

EXERCISE 28. Explain four reasons why overheads are absorbed. (8 marks)

EXERCISE 29. Muma clothing factory has four departments three of which are production departments and the fourth is a service department. W,X and Y are the production department while Z is a service department. The actual costs for the financial year ended 31st 20x3 were as follows:

	Ksh
Rent	20,000
Repairs of plant	12,000
Depreciation of plant	9,000
Light and power	2,000
Supervision	30,000
Repairs to building	8,000

The following additional information about the departments is available and is used as a basis for distribution of costs:

	DEPARTMENTS			
	W	**X**	**Y**	**Z**
Area (m^2)	1,500	1,100	900	500
Number of employees	20	15	10	5
	Ksh	**Ksh**	**Ksh**	**Ksh**
Wages paid	120,000	80,000	60,000	40,000
Value of plant	300,000	180,000	120,000	

Required: Apportion the above costs to the four departments and indicate the basis of apportionment in each case. (8 marks)

EXERCISE 30. XYZ manufacturing company has three production departments and two service departments. Overhead allocated for each department for a period is as follows

Production department		**Ksh**	**Ksh**
	A	120,000	
	B	195,000	
	C	260,000	**575,000**
Service departments			
	X	68,000	
	Y	27,000	**95,000**
			670,000

A technical assessment for the apportionment of the costs of the service department shows

Department	A (%)	B (%)	C (%)	X (%)	Y (%)
X	25	38	32	-	5
Y	40	27	18	15	-

REQUIRED: Apportion the service department using the two methods:

i. Continued allotment distribution

ii. Simultaneous equations (12 marks)

TOPIC 6

COSTING METHODS

Introduction

Costing is concerned primarily with ascertaining in financial terms the cost of producing a product or rendering a service. Such information is usually useful to management to effectively carry out their functions of planning, controlling and decision making. Costing methods therefore, refer to the systems of cost finding and ascertainment. They are devised to suit the methods by which goods are manufactured or services are provided.

Definition of Key Terms

1. Progress payments

   These are interim payments made by the client to the contractor throughout the course of the work.

2. Architects certificate

   This is a certificate that provides confirmations that work done up to a certain value have been completed.

3. Retention money

   This is a proportion of value of work certified withheld by the customer for a specified period during which the customer must make good all contractual defects.

4. Cost of Work certified

   This includes the portion of all total costs that relate to the work certified.

5. The Notional Profit

   This is the difference between the value of work certified to date and cost of work certified to date less a provision for any anticipated unforeseen eventualities.

6. Profit not taken

   This refers to the part of the notional profit that is not recognized in the current period.

7. A batch

   This is a cost unit consisting of a group of identical items in particular characteristics

8. Equivalent units

   This is a notional quantity of completed goods in the production process

9. Scrap

   Material held after a productive process, which are irrecoverable or have no recoverable value.

10. Joint products

    Two or more products of relatively high value emerge simultaneously from a single process, each of which has significant value relative to the others up to the point of separation

11. By products

    This is an incidental or secondary product from a process, which has an in-significant value compared to the main product.

Costing Methods

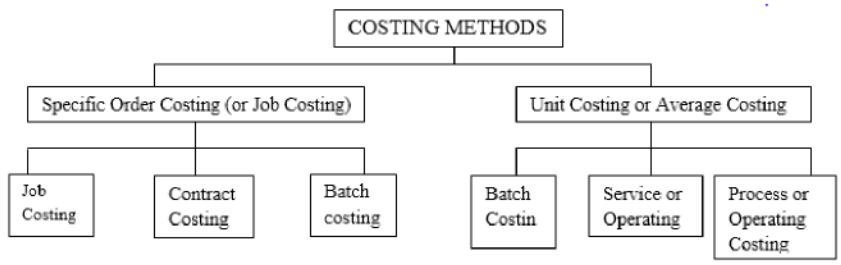
Costing methods are categorized into two broad classifications as follows:

1. Specific Order Costing

This is where expenses are linked to the cost object, for example, Job, Contract or a Batch. Hence, Job Costing, Contract Costing and Batch Costing fall under specific order costing method.

2. Unit Costing (Average Costing)

This is a method where expenses cannot be linked directly with the cost object and are, therefore, charged to the department or process. The total costs are then averaged over the total units produced. Examples of these are batch costing (where the cost of a unit within the batch is desired), Service or Operating Costing, and Process or Operation Costing. The following is a diagrammatic representation of the costing methods:



Job Costing

Job Costing is that form of costing which applies where jobs are carried out to customer's specific requirements. For example, printing, construction, furniture and general engineering. The job becomes the cost unit. In job costing, production is not for stock but in accordance with the special requirements of a customer. Some of the noticeable features of industries where Job Costing will be applicable are:

1. The specific request of a customer is received.
2. A Technical Personnel meets the customer and agrees with him the precise details of his requirement.
3. An estimate of cost is prepared by the estimating department or a designated officer, which forms the basis of a quotation that is then submitted to the customer.
4. If the quotation is acceptable to the customer, he signifies his acceptance, and he is asked to make a deposit payment.
5. A distinct Job number is then assigned and a Job Card is opened. The job number will be quoted on all Material Requisition Notes, Job, etc. for proper cost accumulation.

Example.

Bidii Ltd manufactures products on order. The company has two departments, machining and assembly. Overheads are absorbed using machine hours for machining department and labour hours for assembly department.

The following estimates were made for the year to 31st December 2015:

		Ksh
Factory overheads:		
Machine department		600,000
Assembly department		300,000
Factory time:		
Machining department	8,000 machine hours	
Assembly department	12,000 labour hours	

During the month of February 2015, job No. JB77, was undertaken. The following information relates to the job:

Department	**Machining**	**Assembly**
Direct materials	ksh 19,000	ksh 6,500
Direct labour	ksh 3,000	ksh 25,000
Time:	hours	hours
Machine hours	240	22
Labour hours	50	1,700

Prepare a job cost statement for Job No. JB77.

SOLUTION

Determine the OAR first;

OAR for Machining department = $\frac{\text{Budgeted overheads}}{\text{Budgeted machine hours}}$

= (600,000 ÷ 8,000) = Ksh 75 per machine hour

OAR for Assembly department = $\frac{\text{Budgeted overheads}}{\text{Budgeted labour hours}}$

= (300,000 ÷ 12,000) = Ksh 25 per labour hour

Bidii Ltd
Job No. JB77 Cost Statement
For the year ended 31/12/2015

		Ksh	Ksh
Direct material:	- Machining dpt	19,000	
	- Assembly dpt	6,500	25,500
Direct labour:	- machining dpt	3,000	
	-Assembly dpt	25,000	28,000
Overheads: - Machine dpt (75 × 240)		18,000	
- Assembly dpt (25 × 1,700)		42,500	60,500
			114,000

Example.

Ruakwa limited uses job cost system. The following information relates to Job No 2 and 3 during the month of December 2013

		Job No. 2 Ksh
• Opening balance of job in hand on 1 December 2013		
Direct materials		42,000
Direct labour		45,000
Factory overheads absorbed		40,000
		127,000
• Direct material requisition during the month of December 2013		
Job number 2		28,000
Job number 3		22,500
• Direct labour distribution	**hours**	**ksh**
Job number 2	200	45,000
Job number 3	300	67,500

- Factory overheads are absorbed to the job using a direct labour hour rate of kdh 200

- Job number 2 and 3 were completed during the month of December 2013. Selling and administration expenses were 20% of factory cost and profit was 10% of the selling price.
    i. Prepare the job cost sheet for job number 2 and 3
    ii. Determine the billing price for each job
    iii. Comment on the profitability of the jobs

SOLUTION

Ruakwa Ltd
Job cost sheet
For the month of December 2013

	Job No. 2	**Job No. 3**
Opening balance;		
Direct materials	42,000	-
Direct labour	45,000	-
Factory overheads	40,000	-
Cost incurred in the month;		
Direct materials	28,000	22,500
Direct labour	45,000	67,500
Factory overheads (200 × 200) ; (300 × 200)	40,000	60,000
Factory costs	240,000	150,000
Selling and admin. expense (20% × 240,000); (20%× 150,000)	48,000	30,000
Total cost	288,000	180,000
Profit	32,000	20,000
Selling price	320,000	200,000

Workings:
Determination of profit;
Let X= Selling price
Recall; **selling price = total cost + profit**

Job No. 2; X = 288,000 + 0.1X
X – 0.1X = 288,000
0.9X = 288,000
X = (288,000 ÷ 0.9) =**320,000**
THEREFORE: Profit = 320,000 – 288,000 =**32,000**
Job No. 3; X = 180,000 + 0.1X
X= (180,000 ÷ 0.1) = **200,000**
THEREFORE: Profit = 200,000 – 180,000 = **20,000**

Example:
The following information relates to job No. M20 which passes through three departments in a factory.
Direct materials Ksh 14,400
Direct labour:

Department	**number of hours**	**cost per hour (Ksh)**

Machining	12	216
Assembly	6	108
Finishing	3	54

Factory overheads are absorbed as follows:

Department	**Rate per labour hour**
Machining	ksh 54
Assembly	ksh 27
Finishing	ksh 45

Selling and distribution overheads are absorbed at 20% of the factory cost.

I. Prepare a job cost sheet for job No, M20 showing the following;
   a) Prime cost;
   b) Factory cost
   c) Total cost for the job

II. A firm has offered to perform the job on behalf of the company at a price of Ksh 20,000. Based on the results in (I) above, advice the management on whether to engage the firm or not.

SOLUTION

Job No. M20 Cost Sheet

	Ksh	**Ksh**
Direct materials		14,400
Direct labour:		
Machining dpt (12 × 216)	2,592	
Assembly dpt (6 × 108)	648	
Finishing dpt (3 × 54)	162	3,402
Prime cost		17,802
Production overheads		
Factory overheads;		
Machining dpt (12 × 54)	648	
Assembly dpt (6 × 27)	162	
Finishing dpt (3 × 45)	135	945
Total factor cost		18,747
Selling and distribution overheads (20% × 18,747)		3749
Total cost for the job		22,496

Advice: management should engage the firm and save cost of Ksh 2,496 (22,496 – 20,000).

Batch Costing

Batch Costing arises where a customer orders a quantity of identical products at the same time. The job consists of a number of units of similar products covered by a single job number; for example, a batch of 1000 books printed by a printer. The batch cost must be divided by the total quantity to give a cost per item. The following procedure is followed in determining cost per item:

1. Allocation of batch number
2. Production order is made
3. Creation of batch costs account
4. Completion of the work and closure of the batch cost account
5. Allocation of costs to individual units in the batch
6. Determination of selling price/batch and unit.

Example .

Kebwaro Press Limited was asked to quote for supplying 5,000 and 25,000 booklets. The company normally expects a profit of 10% on sales.

Costs were reckoned to be:

	Ksh
Paper and other materials,(per 1,000 copies)	30
Wages (per 1,000 copies)	20
Layout cost	500
Fixed overhead	200
Variable overhead; 12 % of wages	

Required:

i. Compute the cost per batch and cost per unit.

ii. Draft a cost computation showing minimum selling prices that might be quoted per 1,000 copies for each of the suppliers.

***Solution*:**

i. Calculation of batch cost simply involves the accumulation of all expenses incurred in producing batches of similar products, for instance the booklets in this case.

	1,000 copies Ksh	5,000 copies Ksh	25,000 copies Ksh
Set-up cost			
Layout cost	500	500	500
Material			
Paper	30	(30 x5) = 150	(30 x25) = 750
Labour			
Wages	20	(20 x 5) = 100	(20 x 25) = 500
Overhead			
Fixed overhead	200	200	200
Variable overhead	(12/100 x 20) = 2.4	(12/100 x 100) = 12	(12/100 x 500) = 60
Total cost	752.40	962	2,310
Profit margin (10%)	83.60	107	223
Selling price	836	1,069	2,533

It should be noted that Total cost was obtained by simply aggregating the expenses, set-up cost, and material, labour and overhead. If cost per unit is desired, it will be obtained by simply averaging the total cost per batch over the units that made up the batch size. At 5000 units, total cost was Ksh 962; cost per unit, therefore, will be Ksh (962/5000), i.e. Ksh 19.24 per unit. At 25000 copies, total cost was Ksh 2,310; cost per copy therefore is Ksh 8.04. This proves a common saying, that cost decreases as the batch size increases, meaning that cost per unit decreases as the batch size increases.

Example.

Shozi ltd manufactures its products in batches. The following information relates to Batch No. B17 of 1,000 units:

Direct Materials 12,000 kg at Ksh 50 per kg

Direct Labour:

- Department A 4,000 hours at Ksh 50 per hour
- Department B 5,000 hours at Ksh 60 per hour

Additional information:

- Production overheads are absorbed using the direct labour rate as follows:
  - Department A – Ksh 70 per hour;
  - Department B – Ksh 80 per hour
- Administration overheads are absorbed at 10% of prime cost.
- Selling and distribution overheads are absorbed at 7.5% of prime cost.
- Selling price is set at factory cost plus 25%

Prepare a quotation showing:

i. Total cost of the batch;
ii. Selling price per unit.

SOLUTION

Shozi ltd

Batch cost statement

	Ksh	**Ksh**
Direct materials (12,000 × 50)	600,000	
Direct labour:		
- Dpt A (4,000×50)		200,000
- Dpt B (5,000 × 60)	300,000	
Prime cost		1,100,000

Factory overheads

Production overheads:

	-Dpt A (4,000 × 70)	280,000
	- Dpt B (5,000 × 80)	400,000
	Total Factory cost	1,780,000
Administration overheads (10% × 1,100,000)		110,000
Selling and distribution overheads (7.5% × 1,100,000)		82,500
	Total cost	1,972,500
Profit (25% × 1,972,500)		493,125
Batch selling price		2,465,625

$$\text{Selling price per unit} = \frac{2,465,625}{1,000} = \text{Ksh } 2,465.625$$

Example.

Batch No. X47 in production process incurred in the following costs:

Labour costs:

- Department X 600 labour hours @ Ksh 35
- Department Y 760 labour hours @Ksh 30

Factory overheads absorbed on labour hours

- Department X Rate per hour Ksh 80
- Department Y Rate per hour Ksh 50

Direct material costs Ksh 32,800

The firm marks up its cost at 40%. Administrative overheads are absorbed at 10% of production cost. The production for Batch No. X47 was 1,000 units.

Calculate the:

i. Selling price per unit produced and sold

ii. Total amount of administrative overheads recovered by Batch No. X47.

Solution

Batch cost statement

		Ksh	**Ksh**
Direct material costs			32,800
Labour cost:			
-	Dpt X (600×35)	21,000	
-	Dpt Y (760 × 30)	22,800	43,800
	PRIME COST		76,600

Factory Overheads:			
	- Dpt X (600 × 80)	48,000	
	- Dpt Y (760 × 50)	38,000	86,000
	Total factory/production cost		162,600
Administrative cost (10%× 162,600)			16,260
	Total cost		178,860
	Profit (178,860 × 40%)		71,544
	Batch selling price		250,404

CONTRACT COSTING

This is a form of specific order costing that is applied to relatively large cost units, which normally take a considerable length of time to complete such as building or construction works. Contract jobs are undertaken in accordance with specific requirements of contractee/customer. Contracts may be distinguished from job orders by the following features:

1. The jobs are usually of long term duration, often more than one accounting period.
2. A contract consumes significantly larger amount of resources than a job order.
3. The contracts are often carried out in the contractee's premises, that is, site-based.
4. There may be sub-contractors where there are some special jobs to be done such as plumbing, and electrical installation.
5. There is often an architect engaged by the contractee who supervises the work and issues a valuation certificate upon which payment would be made to the contractor. This is otherwise known as work certified or architects valuation.
6. For a contract, special progress reports are usually made while in job costing, reports are made after the completion of the job.

Accounting for Contracts

The progress of contract works requires that a special account known as a contract account is maintained. The following are principles that are applied in profit recognition for contract accounts:

1. If the contract is in its early stages, no profits should be taken until when the outcome can be measured with reasonable certainty

2. Where a loss has occurred, it must be recognized in the period it has occurred regardless of the stage of maturity of the project or the timing.

3. When substantial costs have been incurred on the contract but the contract is not near completion, the notional profit is apportioned using the formula in order to determine the notional profit taken.

CONTRACT ACCOUNTS

This is a separate account that is opened and maintained for each contract undertaken for the purpose of accumulating costs. Each contract is given a number and all costs relating to that particular contract are recorded in this account. A typical contract account is as shown below:

Contract No. XYZ Account

Materials bal b/d	xx	Material returned to store	xx
Raw material purchased	xx	Materials bal c/d	xx
Direct wages	xx	Machinery bal c/d	xx
Indirect wages	xx		
Subcontractors fees	xx		
Cost of special plant	xx	Cost of work done (balancing figure)	xx
Machinery/plant bal b/d	xx		
	xxx		xxx
Cost of work done bal b/d	xx	Value of work certified	xx
Notional profit(balancing figure)	xx	Value of work not certified	xx
	xxx		xxx

Contractee Account

This is a customer/clients account used to record the amount of contract paid to the contractor with regard to value of work satisfactory certified by architect. It is prepared as follows:

Contractee account

Cost of work certified	xxx	Cash received	xx
		Bal c/d	xx
	xxx		xxx

Valuation of work in progress

	Ksh
Cost of work certified	xxx
Add: profit taken	xx
	Xxx
Less: cash received	(xx)

Value of work-in-progress xxx

Contract costing terminologies:

1. **Notional profit** is divided into two components namely:

a) **Profit taken** = Notional profit × 2/3 × cash received/work certified

This formula of calculating the part of notional profit taken in the year is used when substantial costs have been incurred on the contract but the contract is not near completion. But when the contract is near completion the profit taken is calculated as:

$$\text{Profit taken} = \text{Estimated profit} \times \frac{\text{cash received}}{\text{Contract price}}$$

Where estimated profit = Contract price – estimated total cost

Estimated total cost = Costs incurred to date and estimated future costs.

b) **Profit not taken**: this refers to the part of notional profit that is not recognized in the current period. It is profit carried forward to be recognized in the years that follow.

2. **Retention money:**

This is a portion of the value of work certified that is retained by the contractor to protect himself from faulty work that might be evident at the time of progress payment or at the completion of the contract. This amount is released after satisfactory performance under the contract.

Example . Mawe construction company Ltd is undertaking a contract of constructing a multi-story building at a cost Ksh 200,000,000. The data relating to the contract for the year ended 31st 20x2 were as follows:

	Ksh '000'
Materials issued to the site	80,000
Materials purchased locally	15,700
Direct wages	
Paid	5,800
Accrued	350
Plant purchased and installed	48,800
Direct expenditure	
Paid	1,780
Accrued	70
Establishment charges	180
Materials returned to store	850
Work certified	150,000
Cost of work not certified	3,800
Materials on site on 31/12/20x2	5,330
Value of plant on 31/12/20x2	41,500

The company had received from the client, payments amounting to Ksh 126,000,000.

REQUIRED: Prepare

i. Mawe's contract account

ii. The contractee account

iii. Show how the various items will appear in the Balance Sheet as at 31st December, 20x2.

Solution:

i. Contract Account

	Ksh (000)		Ksh (000)
Direct materials		Materials returned to store	850
Issued from store	80,000		
Purchased locally	15,700		
Plant installed	48,800		
Direct wages (Ksh 000)			
Paid	5,800		

ii. Contractee's Account

	Ksh (000)		Ksh (000)
		Bank A/c	126,000
Work certified	150,000	Balance c/d	24,000
	150,000		150,000
Balance b/d	24,000		

iii. Balance sheet (extract)

	Ksh (000)		Ksh (000)
Accrued wages	350	Plant on site	41,500
Accrued direct expenses	70	Stock on site	5,330
		Work in progress (Wk. 2)	6,328

WORKINGS

Wk.1 profit computations

Profit formula is;

Amount of profit taken = notional profit x 2/3 x $\frac{\text{cash received}}{\text{Work certified}}$

Wk.2 Work-In-Progress (WIP)

Work-In-Progress to be shown in the Balance Sheet is computed as follows:

	Ksh (000)
Cost to date	105,000
Add: profit taken	27,328
	132,328
Less: cash received	126,000
WIP	6,328

Profit taken = Notional profit x 2/3 x $\frac{\text{cash received}}{\text{Work certified}}$

iv. When the contract is near completion, the profit taken is calculated as:

Profit taken = Estimated profit x $\frac{\text{cash received}}{\text{Contract price}}$

Where; Estimated profit = Contract price – Estimated total cost; and
Estimated total cost = Costs incurred to date + estimated future costs.

Example.

Bora contractors limited was awarded a contract by Mashinani University to construct lecture halls at a contract price of Ksh 500,000,000, starting 1 April 2019. The following information relates to the contract.

	Kshs
Machinery sent to site	100,000,000
Materials sent to site	70,000,000
Direct Labour cost	48,000,000
Materials returned from site	10,000,000
Indirect labour cost	3,500,000
Overheads charged (allocated)	80,000,000
Work certified by architect	270,000,000
Cash received	240,000,000
Value of work not yet certified	90,000,000
Material on hand (31.3.2019)	5,000,000
Wages accrued (31.3.2019)	500,000

Value of machinery (31.3.2019) 50,000,000

Prepare:

i. Contract account.

ii. Contractee account

Bora contractors Ltd

Contract account

For the year ended 31.3.2019

Machinery sent to site	100,000,000	Materials returned from site	10,000,000
Material sent to site	70,000,000	Materials on hand(31.3.2019)	5,000,000
Direct labour cost	48,000,000	Machinery (31.3.2019)	50,000,000
Overheads charged	80,000,000		
Indirect labour cost	3,500,000	Cost to date(balancing figure)	241,500,000
Wages accrued	5,000,000		
	306,500,000		306,500,000
Cost to date bal b/d	241,500,000	Value of work certified	270,000,000
Notional profit	118,500,000	Value of work not certified	90,000,000
	360,000,000		**360,000,000**

Bora contractors Ltd

Contractee account

For the year ended 31.3.2019

Work certified	**270,000,000**	**Cash received**	**240,000,000**
		Balance carried down	**30,000,000**
	270,000,000		**270,000,000**

SERVICE COSTING

This is a form of operation costing which applies where standardized services are provided by an undertaking or by a service cost centre within an undertaking. It is normally applied by organizations which provide service rather than products such as road, rail, and air transport and hospitals. Each organization has to decide what cost unit is most appropriate for its own purposes. Cost per unit is computed using the following formula:

$$\text{Cost per unit of service} = \frac{\text{Total costs per period}}{\text{Number of services units}}$$

The following are common cost units applied in service costing:

	Service	**Cost units applied**
i.	Transport	Tonne-kilometre, passenger-seat, passenger-kilometre, kilometres travelled
ii.	Hospitals	Patient-beds, patient-days, number of operations.
iii.	Electricity	Kilowatt-hours
iv.	Hotels	Occupied-bed nights
v.	Restaurants	Meals served

The manner in which costs are classified would vary from one industry to the other. The main costs involved costs involved in transport service industry are: Fuel consumption, vehicle depreciation, vehicle repairs and maintenance, wages of drivers and conductors, insurance of vehicles, road licences etc. The main costs involved in respect of a restaurant or canteen include: i. Cost of provision such as meat, fish and poultry, vegetables, flour, cakes, tea, sugar, milk etc. ii. Wages and salaries of supervisors, cooks, waitresses, kitchen assistants etc. iii. Miscellaneous costs such as rent, gas, electricity, crockery, maintenance etc.

Example: A vehicle carries 8 tonnes on a trip and delivers 3 tonnes after 20 km, 2 tonnes after 10 km and the remaining 5 tonnes after 30 km. it then makes a return journey while empty. The following information in respect of cost is provided:

	Ksh
Fuel and lubricants	400
Wages: Driver	150
Co-Driver	80

Share of annual costs such as insurance, maintenance administration, Depreciation charged to this trip amount to Ksh 320.

REQUIRED:

i. Compute cost per tonne-kilometre

ii. Compute cost per kilometre

Solution:

Operation cost statement

	Ksh	**Ksh**
Fuel and lubricants		400
Wages of Driver	150	
Wages of Co-Driver	80	230
Share of annual costs		320
		950

Total tonne-kilometres are:

3 x 20 + 2 x 20 + 5 x 30 + 0 x 60 = 60 + 20 + 150 + 0 = 230

Total kilometres travelled are = 20 + 10 + 60 = 120 km.

i. Cost per tonne-kilometre = Ksh (950 ÷ 230) = **Ksh 4.13**

ii. Cost per kilometre = Ksh (950 ÷ 120) = **Ksh 7.92**

Review Questions

EXERCISE 31. state the costing unit applicable in each of the following business services:

i. Transport

ii. Hospital

iii. Colleges

iv. Hotels (4 marks)

EXERCISE 32. A tailor plans to undertake either Job A or Job B. The direct material cost

is Ksh 1,440 and Ksh 976 for Jobs A and B respectively. The job will be expected to pass through three departments and expected direct labour cost in each of the departments is Ksh 18 per hour. The direct labour hours for each of the jobs is as follows:

	Direct labour hours	
Department	Job A	Job B
Preparation	12	18
Machining	6	9
Finishing	3	2

The production overheads are absorbed at the rate of Ksh 54, Ksh 27 and Ksh 45 per direct labour hours in the preparation, machining and finishing departments respectively.

The selling and distribution overheads are absorbed at 25% of production costs. Profit margin is 12.5% of selling price.

a) For each of the jobs, calculate the:

   I. Expected total costs;

   II. Expected profit.

b) Based on the results in II above, advice the tailor on the job to undertake. (12 marks)

EXERCISE 33. Xungish contractors was awarded a contract to construct a road at a contract price of ksh 520,000,000 in the year 2015. The following information relates to the contract for the year ended 31 December 2018.

	Ksh
Direct material purchased	275,000,000
Materials issued form stores	30,000,000
Direct labour paid	83,000,000
Direct expenses paid	15,000,000
Value of work certified	415,000,000
Cost of work not yet certified	110,000,000
Indirect expenses	6,000,000
Plant and machinery (1 January 2018)	100,000,000

Plant and machinery (31 December 2018)	13,000,000
Materials on site (31 December 2018)	4,000,000

Additional information

i. As at 31 December 2018:

- Accrued direct labour ksh 7,000,000
- Accrued expenses ksh 2,000,000

ii. It is the policy of the company to transfer 25% of the notinal profit to the income statement.

Prepare a contract account as at December 2018 (8 marks)

EXERCISE 34. Umojah limited manufactures product JK in batches. The following information relates to batch x20:

Direct Labour

Department A 420 hours at ksh 35 each

Department B 686 hours at ksh 30 each

Direct materials ksh 32,800

Additional informations

- Factory overheads are absorbed on labour hours at the rate of ksh 45 for department A and ksh 35 department B.
- The gross profit is 25% of the total production cost.
- Administrative overheads are absorbed at 10% of the factory cost.
- Batch x20 had 1,000 units produced.

Determine the:

i. Selling price per unit;

ii. Notional net profit. (12 marks)

EXERCISE 35. The following information has been provided by a contractor R.J. construction Company Ltd for the year ended 31st December 2007.

	Ksh
Materials delivered to site direct	384,200
Materials delivered to store	84,500
Materials sold, surplus to needs (cost Ksh 1,200)	1,500
Wages paid to 31/12/2007	210,000
Direct expenses 31/12/2007	39,500
Sub-contractor's cost	28,000
Plant delivered to site	222,400
Overhead apportionment to 31/12/2007	37,000
Materials on site at 31/12/2007	55,000
Plant valuation 31/12/2007	80,000

The contract started on 1/1/2007 and expected completion date was February 19th 2008.
Contract price was Ksh 1,250,000.
Cash received by R.J. Construction Company to 31/12/2007 amounts to Ksh 900,000.
Retention money is 10% of certified Values

REQUIRED:

i. Prepare the contact account in the ledgers of R.J. construction Company Ltd.

ii. Show the computation of net profit to be taken into account at December 31st 2007.

EXERCISE 36. Makita Transport Company makes deliveries by lorry. The return journey has no deliveries. The following information relate to the month of July 2012.

Days operated	25
Total kilometres covered	1,200
Total trips made	50
Total tonnage carried	800
Opening costs for July were:	Ksh
Fuel and lubricants	3,000
Wages of Driver	2,500
Wages of Co-Driver	1,500

Estimated costs for the whole year (300 operating days) were:

	Ksh
Maintenance	8,000
Administration	6,000
Depreciation	10,000

REQUIRED:

Assuming an equitable share of the annual costs, prepare a cost service statement for the month of July showing:

a) Cost per tonne-kilometre

b) Cost per kilometre

c) Cost per day operated

EXERCISE 37. The following data relates to job number 006 that passes through three departments; A,B and C.

Raw Materials	**ksh**
Materials issued from store	85,000
Materials purchases	27,000

Direct labour:

Department: A 50 labour hours at ksh 12 per hour.
B 200 labour hours at ksh 20 per hour
C 150 labour hours at ksh 10 per hour

Additional information:

- The factory overheads are absorbed based on direct labour hours. The rate of absorption for departments A, B and C are ksh 3, ksh 7 and ksh 6 respectively.
- Administration and selling overheads are absorbed at 10% of the factory cost.
- Profit is charged at 25% of the cost.

i. Prepare a job cost sheet showing
   I. Prime cost;
   II. Factory cost;
   III. Total cost.

ii. Determine the price to be quoted for the job. (10 marks)

EXERCISE 38.Smart clothing limited operates three departments. The following are the budgeted overheads and the units of absorption for each department.

Departments	**Amount of overhead (ksh)**	**Overhead Absorption Base**
Preparation	150,000	15,000 labour hours
Machinery	200,000	25,000 machine hours
Finishing	300,000	30,000 labour laws

The following costs relate to batch No.x220 produced and sold during the year 2018:

- Raw materials ksh 100,000
- Labour:
  Preparation 150 hours at ksh 12 per hour

Machining	100 hours at ksh 30 per hour
Finishing	100 hours at ksh 10 per hour

Additional information:

- Selling and administration overheads are absorbed at 10% of production costs
- Profit is 20% of the total costs.

Calculate the:

i. Overhead absorption rate of each department;
ii. Total cost of the batch;
iii. Selling price of the batch. (8 marks)

EXERCISE 39. Mjengo construction company was awarded a contract to construct a building in the year 2010. The contract is nearing completion. The following data relates to the contract for the year ended 31 August 2018:

	Ksh
Materials on site: 1 September 2017	1,260,000
Materials purchased	5,300,000
Direct expenses:	
- Paid	2,400,000
- Accrued	20,000
Establishment charges	320,000
Materials returned to stores	190,000
Value of work certified	16,500,000
Cost of work not yet certified	2,500,000
Materials on site: 31 August 2018	520,000
Value of plant: 31 August 2018	30,000
Cash received from client	13,000,000

i. Prepare a:
   I. Contract account;
   II. Contractee account.
ii. Calculate the amount of profit to be taken. (12 marks)

EXERCISE 40. Dos ltd has been outsourcing meals for its employees at ksh 45 per plate. The company intends to operate a canteen where employees will be offered lunch at a fee equivalent to the cost of the meal.

The following is the estimated cost of preparing 10,000 plates of the meal:

	Ksh
<u>Inputs and other provisions:</u>	
Maize flour	100,000
Meat	80,000
Vegetables	70,000

Cooking fats	60,000
Soft drinks	28,000
Labour cost:	
Cooks	25,000
Supervisor	10,000
Waiters	12,000
Miscellaneous overheads:	
Depreciation of utensils	2,700
Insurance	3,000
Electricity	4,000
Cooking oil	5,000

i. Prepare a canteen cost statement;

ii. Calculate the cost per plate;

iii. Advise the management on whether to operate the canteen or continue outsourcing for meals. (9 marks)

EXERCISE 41: explain four benefits that may accrue to a firm using job order costing (12 marks)

LESSON 8

PROCESS COSTING

Introduction

Process costing is a method used in a situation where production follows a series of sequential processes. An inherent feature of process costing is that the output of one process becomes the input of the other process. In case of process costing all the cost direct and indirect are charged to the specific process. Process costing is normally used by industries which manufacture identical products such as chemicals, soaps, spirits paper, paint or oil products, biscuits textiles etc.

Characteristics of Process Costing

The following are the distinct features in most process costing systems:

1. Clearly defined process cost centres will normally be set up for each operational stage, which can be identified. Expenditure for each cost centre is collected and, at the end of the accounting period, the cost of the completed units are then transferred into a stock account or to a further process cost centre. Accurate records are, therefore, required of units produced and part- produced units and the total cost incurred by the cost centres.

2. The cost unit chosen should be relevant to the organisation.

3. The cost of the output of one process is the raw material input cost of the following process. The cost incurred in a process cost centre could include, therefore, costs transferred from a previous process plus the raw materials, labour and overhead costs relevant to the cost centre.

4. Wastage due to scrap, chemical reaction or evaporation is unavoidable. The operation or manufacturing should, however, be in such a way that wastage can be reduced to the nearest minimum.

5. Either the main product or by-product of the production process may require further processing before reaching a marketable state.

Elements of process costing

1. Raw materials Materials are divided into:

- Input materials
- Materials added

Input materials are those materials introduced into the first process and materials added are those added into subsequent processes. The cost of all materials, input and added is debited in the process account.

2. Labour cost

Labour cost of each process in debited in the process account. Labour cost is usually low in process costing due to automation.

3. Direct cost

These are expenses incurred in respect of any particular process and they are debited into the process account. For example the direct expense of packaging.

4. Production overheads

In case of production overheads each and every process is debited with a fair share of the production overheads.

Example. Manufacture of product Ghee goes through three distinct processes, that is, 1-3. After process 3, the completed is passed to finished goods stock. The following information was provided by the cost accountant in respect of product Ghee for the month of July 20x3. 6,000 units of raw material at Ksh 50 were passed to process 1 and the costs incurred are as shown below:

Element of cost	Process 1 Ksh	Process 2 Ksh	Process 3 Ksh	Total Ksh
Direct material	10,000	24,000	36,000	70,000
Direct labour	60,000	40,000	20,000	120,000
Direct expenses	5,600	10,400	4,000	20,000
Production overheads	-	-	-	180,000

Production overheads are absorbed by each process at 150% of direct labour. There was no stock of raw materials or work-in-process either at the beginning or at the end of the production period.

REQUIRED:

Prepare the process accounts.

***Solution*:**

Process 2 Account

Dr. (Ksh)							Cr.(Ksh)
	Units	Cost per unit (Ksh)	Amt. (Ksh)		Units	Cost per unit (Ksh)	Amt. (Ksh)
Process 1	6,000	77.6	465,600	Process 3- output transferred	6,000	100	600,000
Direct material			24,000				
Direct labour			40,000				
Direct expenses			10,400				
Production overhead			60,000				
	6,000		600,000		6,000		600,000

Process 1 Account

Dr. (Ksh)							Cr.(Ksh)
	Units	Cost per unit (Ksh)	Amt. (Ksh)		Units	Cost per unit (Ksh)	Amt. (Ksh)
Units introduced	6,000	50	300,000	process 2 - Output transferred	6,000	77.6	465,600
Direct material			10,000				
Direct labour			60,000				
Direct expenses			5,600				
Production overhead			90,000				
	6,000		465,600		6,000		465,600

Process 3 Account

Dr. (Ksh)							Cr.(Ksh)
	Units	Cost per unit (Ksh)	Amt. (Ksh)		Units	Cost per unit (Ksh)	Amt. (Ksh)
Process 2	6,000	100	600,000	Finished goods stock -output transferred	6,000	115	690,000
Direct material			36,000				
Direct labour			20,000				
Direct expenses			4,000				
Production overhead			30,000				
	6,000		690,000		6,000		690,000

Finished Goods Stock Account

Dr. (Ksh)							Cr.(Ksh)
	Units	Cost per unit (Ksh)	Amt. (Ksh)		Units	Cost per unit (Ksh)	Amt. (Ksh)
Process 3- output transferred	6,000	115	690,000				

Process loss, scrap and waste

In process costing the weight or quantity of output of a process is less than input of that process. This loss of weight arises in the course of manufacturing. The main cause of loss is due to distillation or disintegration by heat or chemical action which leads to evaporation, residuals, ash and spoilage.

Process loss

This is the loss of weight or volume of material during a process. It is divided into

two:

i. Normal process loss

This represents loss which is expected under normal conditions. It is loss which is unavoidable in view of nature of the production processes such as loss due to evaporation and it is calculated in advance on the basis of past experience. The cost of normal loss is absorbed in the cost of production for goods production. Proceeds of defective units that are sold in respect to normal loss at a reduced value are normally subtracted from total cost of good products.

A fundamental feature of process costing is the determination of cost per unit of transfer from one process to the next. This cost per unit is influenced by the value of normal loss, that is, whether normal loss has value or not. Obtaining cost per unit of transfer:

1. Where normal loss has no scrap value

$$\text{Cost per unit} = \frac{\text{Total process cost}}{\text{Expected units after normal loss}}$$

2. Where normal loss has a scrap value

$$\text{Cost per unit} = \frac{\text{Total process cost} - \text{scrap value of normal loss}}{\text{Expected units after normal loss}}$$

Note: If normal loss has no sales proceeds or the sales proceeds are less than the cost the amount of cost not recovered becomes part of the cost of the goods units.

Abnormal process loss

It represents a loss which occurs under abnormal conditions. It is loss which cannot be foreseen such as loss due plant break down, power failure, industrial accident, and inefficiency of workers or use of defective low materials.

Abnormal process loss is therefore defined as a loss that occurs when actual loss is more than the normal process loss. The following are the accounting entries for abnormal process loss:

		Dr.	Cr.
1.	When abnormal process loss arise	Abnormal loss account	Process account
2.	Sales of abnormal loss item	Bank/cash account	Abnormal loss account
3.	Loss - the difference between abnormal loss and sales	P&L account	Abnormal loss

Abnormal gain

The difference between actual loss and normal loss is known as abnormal gain and it normally arises when the process loss is less than expected. The value of abnormal

is calculated on the basis of goods produced. The following are the accounting entries for its treatment:

The value of abnormal gain

Dr. Process account

Cr. Abnormal gain account

Normal loss is reduced due to abnormal gain such that:

Dr. Abnormal gain account

Cr. Scrap debtors account

Waste

This refers to material arising in production process but has no value attached to it. If waste is part of the normal loss, then its cost is absorbed by the goods produced and in case of abnormal loss, then it is transferred to abnormal loss account.

Scrap

This refers to material which can no longer be used for its original purpose. It can be sold at a much lower price than the cost price. Income as a result of scrap is considered and process loss is reduced by that amount.

Example. Moyongo Company Ltd manufactures a chemical that passes through three production processes 1-3. During the month of December 20x3; 6,000 litres of raw material at a price of Ksh 240,000 was introduced into process 1. The following are the additional costs that were incurred during the production process:

Element of cost	**Total** (Ksh)	**Process**		
		1(Ksh)	2 (Ksh)	3 (Ksh)
Direct material (added)	87,500	30,000	40,000	17,500
Direct labour	110,000	40,000	50,00	20,000
Direct expenses	16,900	6,000	1,600	9,300

Normal loss per process is estimated to be 10%, 5% and 8% for processes 1, 2 and 3 respectively. The outputs for each process were 5,300, 5,000 and 4,700 for processes 1, 2 and 3 respectively. The loss in each process represented scrap which could be sold at for the following values:

Process 1 - Ksh 20 per unit
Process 2 - Ksh 44 per unit
Process 3 - Ksh 55 per unit

There were no stocks of materials or work-in-progress at the beginning or end of the month. The output of each process passes directly to the next process and finally to finished stock. Production overhead is absorbed by each process on a basis of 50% of the cost of direct labour.

Required: a.

Prepare separate process accounts for each of the three processes b. Prepare the abnormal loss and abnormal gain accounts

Solution:

Process 1 Account

Element of cost	Units	Cost per Unit	Amount	Element of cost	Units	Cost per unit	Amount
		Ksh	**Ksh**			**Ksh**	**Ksh**
Direct Material	6000	40	240,000	Normal loss	600	20	12,000
(Basic)			30,000	Abnormal loss	100	60	6,000
Direct Material II			40,000	Process 2 -			
Direct Labour			6,000	Output	5,300	60	318,000
Direct expenses			20,000	Transferred			
Production Overhead	**6000**		**336,000**		**6000**		**336,000**

Process 2 Account

	Units	Cost per Unit	Amount		Units	Cost per unit	Amount
		Ksh	**Ksh**			**Ksh**	**Ksh**
Process 1	5300	60	318,000	Normal loss	265	44	11,660
Direct Material			40,000	Abnormal loss	35	84	2,940
Direct Labour			50,000	Process 3			
Direct expenses			1,600	Output Transferred	5,000	84	420,600
Production Overhead			25,000				
	5300		**434,600**		**5300**		**434,600**

Process 3 Account

	Units	Cost per Unit	Amount		Units	Cost per unit	Amount
		Ksh	**Ksh**			**Ksh**	**Ksh**
Process 1	5000	84	420,000	Normal loss	400	65	26,000
Direct Material			17,500	Finished Goods stock			
Direct Labour			20,000	- Output Transferred	4,700	98	460,000
Direct expenses			9,300				
Production Overhead			10,000				
Abnormal	100	98	9,800				
	5100		**486,600**		**5100**		**486,000**

Abnormal Loss Account

	Units	Cost per Unit	Amount		Units	Cost per unit	Amount
		Ksh	Ksh			Ksh	Ksh
Process 1	100	60	6,000	Scrap Debtors	100	20	2,000
Process 2	35	84	2,940	A/C -	35	44	1,540
				Process 1			
				Process 2			
				P&L A/C			
	135		**8,940**		**135**		**8,940**

Abnormal Gain Account

	Units	Cost per Unit	Amount		Units	Cost per unit	Amount
		Ksh	Ksh			Ksh	Ksh
Scrap Sales A/C				Process 3	100	98	9,800
Process 3 Profit & Loss A/C	100	65	6,500				
	100		**9,800**		**100**		**9,800**

Scrap Debtors Account

	Ksh		Ksh
Process 1		Process 3	
Normal Loss	12,000	Abnormal gain	6,500
Abnormal loss	2,000	Balance c/d	46,700
Process 2			
Normal Loss	11,660		
Abnormal loss	1,540		
Process 3			
Normal Loss	26,000		
Balance b/d	**53,200**		
	46,700		**53,200**

Finished Goods Stock Account

	Units	Cost per Unit	Amount
		Ksh	Ksh
Process 3 - Output Transferred	4,700	98	460,000

Workings

Process 1

Normal Loss = 10% of 6000 units = 600 units
Expected production = 6000 − 600 units = 5400 units
Actual production = 5300 units
Abnormal loss = 5400 − 5300 = 100 units
Scrap value of normal loss = 600 x Ksh 20 = Ksh 12,000

$$\text{Cost per unit} = \frac{\text{Ksh } 336{,}000 - \text{Ksh } 12{,}000}{5400 \text{ units}}$$

$$= \frac{\text{Ksh } 324{,}000}{5400} = \text{Ksh } 60$$

Process 2

Normal loss = 5% of 5300 − 265 = 5035 units
Expected production = 5300 − 265 = 5035 units
Actual production = 5000 units
Abnormal loss = 5035 − 5000 = 35 units
Scarp value of normal loss = 265 x Ksh 44
= Ksh 11,660

$$\text{Cost per unit} = \text{Ksh } \frac{(434{,}600 - 11{,}660)}{5{,}035 \text{ units}}$$

$$= \frac{\text{Ksh } 422{,}940}{5035 \text{ units}} = \text{Ksh } 84$$

Process 3

Normal loss = 8% of 5300 − 265 = 5035 units
Expected production = 5000 − 400 = 4600 units
Actual production = 4700units
Abnormal gain = 4700 − 4600 = 100 units
Scarp value of normal loss = 400 x Ksh 65
= Ksh 26,000

$$\text{Cost per unit} = \frac{\text{Ksh } (476{,}800 - 26{,}000)}{4600 \text{ units}}$$

$$= \frac{\text{Ksh } 450{,}800}{4600 \text{ units}}$$

$$= \text{Ksh } 98$$

Review Questions

EXERCISE 41. Kampala bottlers produce schweppes after three distinct pro- cesses. The following information is obtained from the account for a period.

		Processes		
Items	Total	I (Ksh)	II (Ksh)	III (Ksh)
Direct material	2,200	1,800	300	100
Direct wages	400	100	200	100
Direct expenses	500	300	-	200

Production overhead incurred is Shs.800 and recovered on 200% of direct wages. Production during the period was 100kg. There were no opening stocks or closing stocks. REQUIRED:

a) Prepare process cost accounts.

b) Define process costing and explain the main elements of process costs.

What is meant by abnormal gain? How is treated in product cost?

EXERCISE 42. Differentiate the following terms as used in process costing:

i. Abnormal loss and abnormal gain;

ii. Joint product and by-product. (8 marks)

EXERCISE 43. Explain the meaning of each of the following terms used in process costing:

i. Normal loss;

ii. Abnormal loss;

iii. Waste;

iv. Scrap. (8 marks)

EXERCISE 44. Chemo ltd manufactures a product which passes through two processes, I and II to completion. The following information relates to the year ended 31st December 2015.

Process	**I**	**II**
	Ksh	**Ksh**
Raw materials (5,000 kg)	280,000	-
Direct wages	150,000	250,000
Direct expenses	45,000	18,000
Production overheads	312,000	416,000
Outputs (units)	4,200	3,900
Normal loss (% of input)	12	5
Scrap value of losses (ksh/kg)	65	200

Prepare:

i. Process I account.

ii. Process II account.

iii. Normal loss account.

iv. Abnormal loss account. (12 marks)

EXERCISE 45. Kaka ltd manufactures a product which goes through a single process. The following information relates to the process for the month of January 2016.

Process costs:	**Ksh**
Materials (3,200 units)	128,000
Labour	72,960
Overheads	59,200

During the year, 2,800 units were transferred to finished goods, while 400 units remained as work-in-progress with the following percentages of completion.

Materials	10%
Labour	60%
Overheads	40%

Prepare a production cost statement showing:

i. Equivalent production
ii. Cost per equivalent
iii. Cost of finished goods
iv. Value of work-in-progress (12 marks)

EXERCISE 46. Mrefu limited manufactures a product that passes through two processes; Refining and finishing. During the month of May 2014,100,000 litres of raw materials were introduced into the refining process at ksh 50 per litre. The following information relates to the two processes for the month of May 2014:

	Refining process	**Finishing process**
Materials (ksh)	2,600,000	108,000
Direct labour (ksh)	4,000,000	600,000
Normal loss (percentage of input)	10%	5%
Output (litres)	88,000	85,000
Scrap value per litre (ksh)	40	50

The production overheads are absorbed at 80% of direct labour in each process.

Prepare:

i. Refining process account;
ii. Finishing process account. (12 marks)