

# PRINCIPLES OF COST ACCOUNTING AND PROCUREMENT

STUDY TEXT

# T06

Accounting  
Technician  
Level II

THE NATIONAL BOARD OF  
ACCOUNTANTS AND AUDITORS  
TANZANIA (NBAA)



T06 PRINCIPLES OF COST ACCOUNTING AND PROCUREMENT

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**NBAA**



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## **FOREWORD.**

The National Board of Accountants and Auditors is a professional body in Tanzania, established under the Auditors and Accountancy Registration Act No 33 of 1972 (CAP 286 R.E.2002). The Board has been charged with among other things, the responsibility to promote, develop and regulate the accountancy profession in the country.

In fulfilling its statutory obligations, NBAA prepares National Accountancy Examination Scheme for students aspiring to sit for Accounting Technician and Professional Examinations. Further, for effective implementation of the examination scheme and improve examination results, the Board provides Study Guides for all subjects to assist both examination candidates and trainers in the course of learning and teaching.

The Study Guides have been prepared in the form of text books with examples and questions to enable the user to have comprehensive understanding of the topics. The Study Guides cover a wide range of topics in the NBAA syllabi and adequately cover the most comprehensive and complete knowledge base that is required by a learner to pass the respective examination levels.

Furthermore, the Study Guides have been prepared to match with the Competency Based Syllabi to enable the learners to be exposed to practical understanding of issues rather than memorisation of concepts. In this case, the Study Guides are characterized by the following features:-

1. Focus on outcomes – The outcomes shown in every topic provides clear understanding on what to be learnt.
2. Greater workplace relevance – the guides emphasize on the importance of applying knowledge and skills necessary for effectively performance in a work place. This is different from the traditional training where much concern has been expressed in theoretical perspectives.
3. Assessments as judgments of competence – The assessment questions embedded in the Study Guides are adequate measures of understanding of the subject matter.

Study Guides are also useful to trainers specifically those who are teaching in the review classes preparing learners to sit for the professional examinations. They will make use of these Study Guides together with their additional learning materials from other sources in ensuring that the learners are getting sufficient knowledge and skills not only to enable them pass examinations but also make them competent enough to perform effectively in their respectively workplace.

NBAA believes that these standard Study Guides are about assisting candidates to acquire necessary skills and knowledge that will enable them to perform as professionals. The outcomes to be achieved are clearly stated so that learners may know exactly the skills and knowledge they are supposed to acquire in a particular topic.

NBAA wishes all the best to NBAA Examination candidates, trainers in their review classes, lecturers in the higher learning institutions and all other beneficiaries of these learning materials in making good use of the Study Guides towards promoting the accountancy profession in Tanzania.

CPA. Pius A. Maneno  
**EXECUTIVE DIRECTOR**  
**JUNE, 2019**

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## Features of the book

The book covers the entire syllabus split into various chapters (referred to as Study Guides in the book). Each chapter discusses the various Learning Outcomes as mentioned in the syllabus.

### Contents of each Study Guide

- ❑ **'Get Through Intro'**: explains **why** the particular Study Guide is important through real life examples.
- ❑ **'Learning Outcomes'**: on completion of a Study Guide, students will be able to understand all the learning outcomes which are listed under this icon in the Study Guide.

The Learning Outcomes include:

- ✓ **'Definition'**: explains the meaning of important terminologies discussed in the learning Outcome.
- ✓ **'Example'**: makes easy complex concepts.
- ✓ **'Tip'**: helps to understand how to deal with complicated portions.
- ✓ **'Important'**: highlights important concepts, formats, Acts, sections, standards, etc.
- ✓ **'Summary'**: highlights the key points of the Learning Outcomes.
- ✓ **'Diagram'**: facilitates memory retention.
- ✓ **'Test Yourself'**: contains questions on the Learning Outcome. It enables students to check whether they have assimilated a particular Learning Outcome.
- ❑ **Self Examination Questions'**: exam standard questions relating to the learning outcomes given at the end of each Study Guide.

## EXAMINATION STRUCTURE

The syllabus is assessed by a three-hour paper based examination.

The examination will consist of

Three conventional question of 20 marks	60 marks
Twenty objective questions of 2 marks	40 marks
	<b>100 marks</b>



## STUDY GUIDE A1: NATURE, MEANING, IMPORTANCE AND SCOPE OF COST ACCOUNTING

### Get Through Intro

Ted overslept on the morning of his first interview. The alarm didn't ring as the clock had stopped working. The boiler wasn't working either, so he had to take a cold shower. Instead of the bus Ted now had to take a taxi to reach his interview on time. The interview went nicely, and Ted got the job.

However, the messed-up morning made him think about the panic it had caused him. He had failed to plan the day. Planning forms an inevitable part of life. If Ted had checked the clock and boiler the night before, he would have been able to have a relaxed start to his day. Similarly, management needs to plan its activities for a specified period, in order to maximise the use of its resources. Information is the main ingredient of planning. For the information to be of optimum use to the company it has to have certain attributes.

An accountant, being an important part of the overall management system, also needs to create information from the available data and formulate plans based on it. He is responsible for the financial accounts, budgets, and management accounts and as such needs to be actively involved in the overall planning, decision making and control functions.

This Study Guide will elaborate on the aspects of data, information and the managerial processes of planning, decision making and control. This Study Guide helps us to identify accurate data for the purpose of producing information to plan our activities smoothly.

### Learning Outcomes

- a) Define cost, cost accounting costing, cost unit / object.
- b) Explain the framework of Cost Accounting.
- c) Describe the nature and objectives of Cost Accounting.
- d) Differentiate between Financial Accounting, Cost Accounting and Management Accounting.
- e) State the functions of a cost accounting system.
- f) State the elements involved in decision making, planning and control.
- g) Describe different users of cost accounting information.
- h) Discuss value of cost information (Financial and non-financial) in management decision making process.
- i) Explain the impact of information technology on the generation, evaluation and promotion of cost information.



## 2: Cost Accounting, Cost Classification and Coding

### 1. Define cost, cost accounting costing, cost unit / object

[Learning Outcome, a]

#### 1.1 Cost



#### Definition

Cost of a product or cost of service refers to the cost of the various components which make the final product or to deliver the service.

#### 1.2 Cost accounting



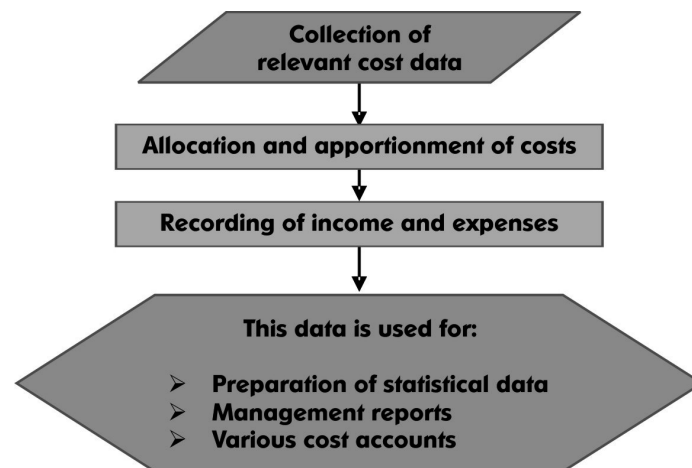
#### Definition

**Cost accounting** is “the establishment of budgets, standard costs (benchmark for comparison with actual) and actual costs of operations, processes, activities or products; and the analysis of variances, profitability or the social use of funds”.

CIMA Official Terminology, 2005

**Cost accounting** is the process of accounting or recording all attributable and allocable costs for a product or service, beginning with recording of income and expenditure relating to the product and ending with preparation of statistical data. Costing is essentially an activity of assigning the appropriate costs to a product and creating a data for future references as regards the cost relating to it.

#### Diagram 1: Cost accounting process



Its main objective is the creation of an underlying data for use in management accounting. This should include recording of:

- Cost of goods produced or services rendered
- Cost of combinations of activities grouped as a cost centre
- Accumulation of revenues
- Profitability at any level
- Optimum selling prices, ensuring all costs are covered
- Value of inventory
- Future costs
- Actual cost versus budgeted cost for budgetary control

Cost accounting systems can be found in all type of organisations but are highly developed and extensively used in the manufacturing sector. This is because industry is sensitive to costs, and the production costs need to be monitored and controlled effectively for the profit margins to be at a desired level. Cost accounting can be, and is generally, applied to all areas of the organisation. It is not department specific.

 **Example**

Product A consists of the following cost components at budgeted (standard or planned) costs.

**Statement showing budgeted cost**

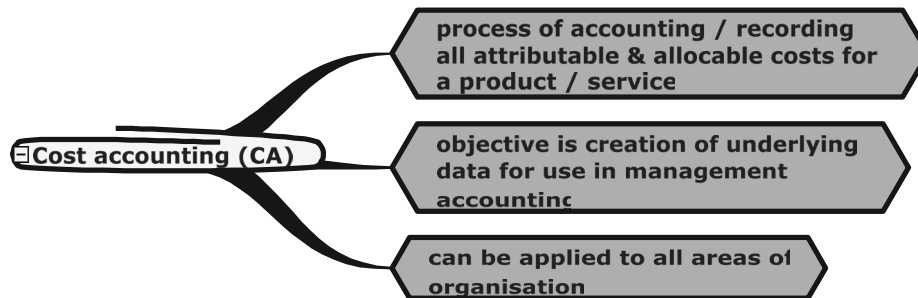
	Tshs'000
Direct materials	7
Direct labour	5
Direct attributable costs (such as packing and transportation)	3
Manufacturing overheads	3
Administration overheads	2
Selling and distribution overheads	2
<b>Total</b>	<b>22</b>

**Statement showing actual costs incurred**

	Tshs'000
Direct materials	9
Direct labour	5
Directly attributable costs (such as packing and transportation)	3
Manufacturing overheads	4
Administration overheads	2
Selling and distribution overheads	2
<b>Total</b>	<b>25</b>

By comparing the two sets, we can identify that there is a difference between budgeted costs and the actual costs thus revealing that the actual total costs are more than the budgeted by Tshs3,000.

**SUMMARY**



**1.3 Cost object**

 **Definition**

A product, service, item of equipment or geographical location for which a **separate cost determination** is required is known as a **cost object**.

A cost object is an activity, a unit of product or service, a customer, or a segment of an organisation for which management needs a **separate measurement and accumulation of costs**.

Costs assigned to a cost object are either **direct or indirect**. A cost that can be traced conveniently and assigned to a cost object in a cost-effective manner is a direct cost.

Indirect costs cannot be so easily traced to the products. Without a direct relationship to the cost object, an indirect cost needs to be assigned to the products or cost objects using a **basis of allocation**.

 **Example**

**Manufacturing organisation**

In a clothes factory, the cost object would be a unit of clothing produced.

**Non-manufacturing organisation**

A financial ERP package developed by a software firm will be the cost object for that firm.

## 4: Cost Accounting, Cost Classification and Coding

### 1.4 Cost unit



#### Definition

A unit of product or service in relation to which costs are determined is known as a **cost unit**.

CIMA Official Terminology, 2005

A cost unit is a quantity, which may be one or more of products that has a relationship with costs and which can be easily expressed in money. Cost unit is the smallest unit for which cost is accumulated.



#### Example

Various industries and their cost unit bases:

Industry	Cost unit bases
Automobile	Number of cars
Bricks	Per 1,000 bricks
Chemicals	Litre, Gallon, Kilogram, Tonne
Bicycle	Number of bicycles
Cement	Tonne
Furniture	Each article
Nursing Home	Per bed or per day
Bridge Construction	Each contract
Sugar	Tonne
Steel	Tonne
Power	Kilowatt hour
Transport	Tonne-kilometre or Passenger-kilometre
Fertilizer	Tonne
Gas	Cubic foot or cubic metre
Interior Decoration	Each job
Advertising	Each job

### 1.5 Cost centre



#### Definition

Production or service department, function, activity, person or item of equipment for which costs are accumulated is known as a **cost centre**.



#### Test Yourself 1

Cost accounting is:

- A The production or service department, function, activity, person or item of equipment for which costs are accumulated.
- B The establishment of budgets, standard costs (benchmark for comparison with actual) and actual costs of operations, processes, activities or products; and the analysis of variances, profitability or the social use of funds".
- C A product, service, item of equipment or geographical location for which a **separate cost determination** is required.
- D The cost of the various components which make the final product or to deliver the service.

**2. Describe the nature and objectives of cost accounting.** [Learning Outcome c]

**2.1 Nature of cost accounting**

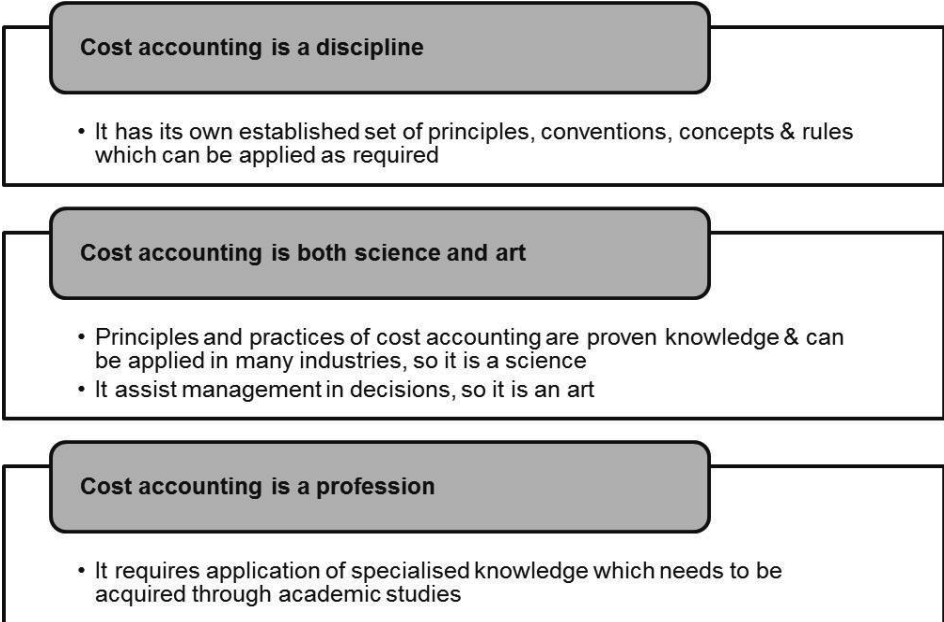
The nature of cost accounting can be discussed as follows:

- 1. **Cost accounting is a discipline:** cost accounting, as a body of knowledge, as its own established set of principles, conventions, concepts and rules which can be applied to business situations as required. Thus, cost accounting is considered to be an organised discipline.
- 2. **Cost accounting is both science and art:** cost accounting is an organised body of knowledge, encompassing various disciplines like financial accounting, inventory and production management, law, data processing, etc. Cost accountants must possess inter disciplinary knowledge to carry on their tasks of determining cost of production, selling price, assisting management to take important policy decisions, etc. The principles and practices of cost accounting are established and proven knowledge and can be applied in many industries. Thus, **cost accounting is a science.**

Although the principles, concepts and conventions of cost accounting are organised and systematic in nature, the cost accountants need to use their personal skills and competence to apply these principles and conventions while using the cost accounting techniques to aid in managerial decision making. Cost accountants assist management in decisions like, establishing selling prices of products / services, deciding whether to outsource an activity, deciding whether to continue particular operations or not , etc. Thus, **cost accounting is an art.**

- 3. **Cost accounting is a profession:** a profession refers to an activity requiring application of specialised knowledge which needs to be acquired through academic studies and the application and conduct of which is regulated through a representative body. Cost accounting is a profession since it satisfies the following basic premise of a profession:
  - (a) **Specialised body of knowledge:** it has already been established earlier that cost accounting is a specialised discipline, the knowledge of which can be acquired by undergoing formal academic training.
  - (b) **Representative associations:** all over the world there are representative bodies of cost accountants, like the Chartered Institute of Cost and Management Accountants (CICMA) of Nigeria, the Institute of Cost and Works Accountants of India (ICWAI), Institute of Certified Cost and Management Accountants (ICCA) of United States, etc.
  - (c) **Codes of conduct:** the professional qualifications, activities and behaviours of cost accountants are regulated by the representative bodies to which they belong to, through codes of conduct developed and implemented by those bodies. These bodies also spell out ethical codes to be practices by the cost accountants.

**Diagram 2: Nature of cost accounting**



## 6: Cost Accounting, Cost Classification and Coding

### 2.2 Objectives of cost accounting

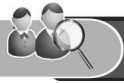
The primary objectives of cost accounting is to ascertain costs, determine selling price and record, analyse, summarise and present to the management cost accounting data which would enable them to take informed decisions and control costs. These objectives are pursued with an intention to frame and implement appropriate ways to record, classify and allocate expenditures on material, labour and overheads so that cost of production, selling prices and profits can be accurately determined.

The main objectives of cost accounting are discussed below:

- 1. Ascertaining cost:** this is the most important objective as the success of the entire cost accounting system lies on the efficiency with which the cost of the product or service in question is determined. The cost of production is usually ascertained in terms of 'per unit', for example, cost per ton, cost kilogram, cost per meter, etc.

Ascertainment of cost involves:

- (a) The allocation of costs



#### Example

The total costs incurred, Tshs10,000,000, will be allocated to the various departments in which these are incurred for example, Tshs5,000,000 allocated to the production department, Tshs3,000,000 allocated to distribution department and Tshs2,000,000 allocated to the marketing department.

- (b) The collation of such costs into meaningful groups: the costs thus allocated are split into groups such as production overheads, selling overheads and so on.
- (c) The application of these costs to inventory, products and services: the costs thus grouped are ultimately charged to the units produced using suitable bases for absorption. For example, the production overheads are absorbed on the basis of labour hours required per unit.

#### Specimen of a cost sheet

	Tshs'000	Tshs'000
Direct material	X	
Direct labour or direct wages	X	
Direct expenses	X	
Prime cost		X
Production overheads		X
Production or factory or manufacturing cost		X
Administration cost		X
Selling and distribution cost		X
<b>Cost of sales / Total cost</b>		<b>X</b>

The above will be discussed later in this Study Text.

- 2. Determination of selling price:** maximising profit is the primary aim of every business. In order to fulfil this aim, it is very important that sufficient revenue is generated by selling the product / service at the most appropriate price. Cost ascertained form the basis of determination of the selling price (selling price equals to cost of production plus a profit margin). Cost accounting provides accurate cost information related with the various stages of production, thus, enabling the management to determine the selling price.



#### Example

The cost of manufacturing product Alpha is Tshs10,000 per unit. It is a practice of the company to add a profit margin of 20% to the cost of production while determining the selling price. Thus, the selling price of each unit of Alpha would be set at Tshs12,000.

- 3. Controlling and reducing cost:** cost accounting aims at controlling and reducing the costs incurred by an organisation in the various stages of manufacturing a product (like, material procurement, hiring and deploying staff, production process, etc.) or rendering a service. Techniques like inventory control, budgetary control, standard costing, etc. are used for controlling and reducing costs. The steps involved in cost control include:

establishing pre-determined cost standards  
 measuring actual costs during the production process  
 comparing the actual costs against the pre-determined standards and identifying variances (if any)  
 investigating into the causes of such variances and taking corrective measures where ever required.

 **Example**

The actual cost of production of 100 ovens is compared with the planned costs.

If the planned costs are Tshs25, 000,000 and the actual costs total to Tshs27,000,000 then there needs to be an investigation as to the reasons for the extra costs incurred.

- 4. Ascertaining costing profit:** cost accounting aims at ascertaining activity-wise and product-wise profits. For this, the revenue / savings generated by each activity / product is matched against the cost involved in performing the activity or manufacturing the product. Profit statements can be generated at various stages and periods of time as required by the management for decision making. Such reporting of profits enables appropriate business analysis and improves efficiency of operations.
- 5. Facilitating preparation of financial and other statements:** financial statements (like, the Statement of Comprehensive Income and the Statement of Financial Position) are prepared either annually or semi-annually. Cost accounting system records all costs and revenues in shorter periods efficiently. Such data can be used in preparing consolidated financial statements at the year end.
- 6. Improving operational efficiency:** cost accounting, through various activities associated with ascertaining and controlling costs, enables an organisation to reduce wastages, identify loopholes in various processes, identify sources of economies associated with various resources, etc., thereby aiming at improving its overall efficiency.
- 7. Helping management in decision making:** decision making forms one of the prime responsibilities of the management of an organisation. Good decisions need to be backed by relevant, accurate and timely information, especially information relating to cost. Cost accounting aims at presenting relevant information in a systematic manner to the management so that informed and good quality decisions can be taken.

 **Example**

Information regarding the survey carried out by a kitchen appliances selling company, on the number of people who use modern kitchen gadgets in the locality. This will enable management to estimate which products can be further manufactured and sold in the area.

Managers depend upon cost information to formulate the operative policies, some of which have been listed below:

**Table 1**

No.	Type of decision	Meaning	Information required to take these decisions
(a)	Product mix decision	which products are profitable and should continue to be offered	demand for the products offered availability of resources feedback from customers political or technological impact on the product
(b)	Make or buy decisions	determining whether an organisation would be better off making a product or buying it.	availability of resources to produce the product is the product readily available? cost incurred if product is purchased

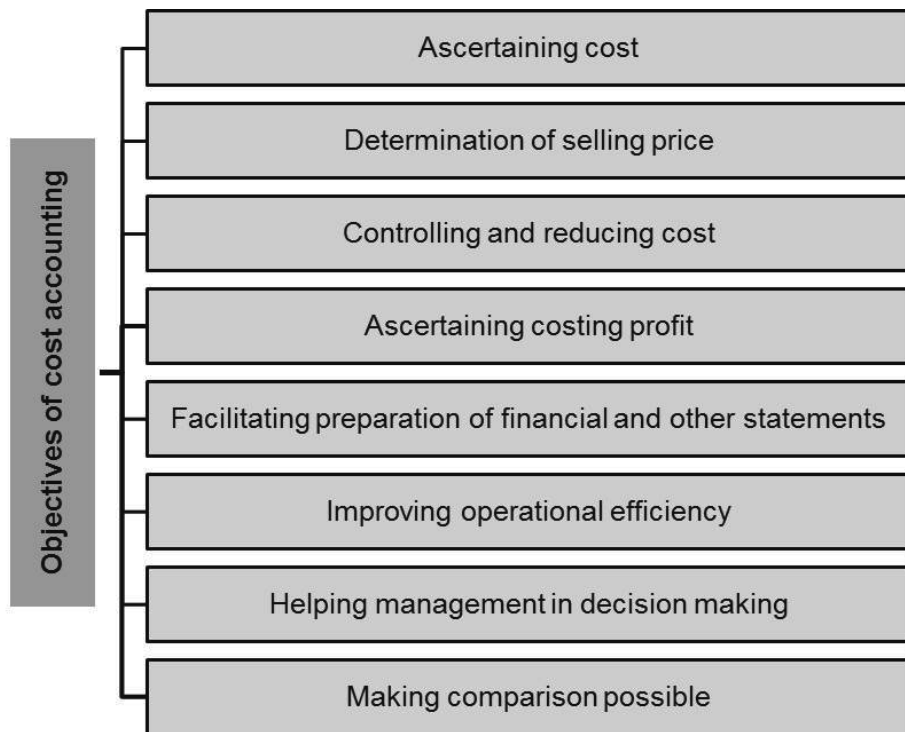
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## 8: Cost Accounting, Cost Classification and Coding

(c)	Discontinuation decisions	determining whether an operation or division should be closed down	cost of closing down any operation or division alternative uses of the assets of discontinued operations
(d)	Pricing decisions	determining if an organisation should increase or decrease the price of its goods or services	competitors' pricing policies customers' price expectations impact of price on the demand for the product impact of government policies (e.g. taxes and duties) on pricing

**8. Making comparison possible:** cost accounting aims to help management compare the holistic performance of an organisation over various time periods and across departments and business units. Such comparative data help management to take various policy decisions.

**Diagram 3: Objectives of cost accounting**



### Test Yourself 2

Which of the following statements relating to the objectives of cost accounting is **incorrect**?

- A** Cost accounting aims to report the profit / loss made by a company in an accounting year.
- B** Cost accounting aims to report product wise profitability of an organisation.
- C** Cost accounting aims to help in managerial decision making.
- D** Cost accounting aims to control and reduce manufacturing costs.

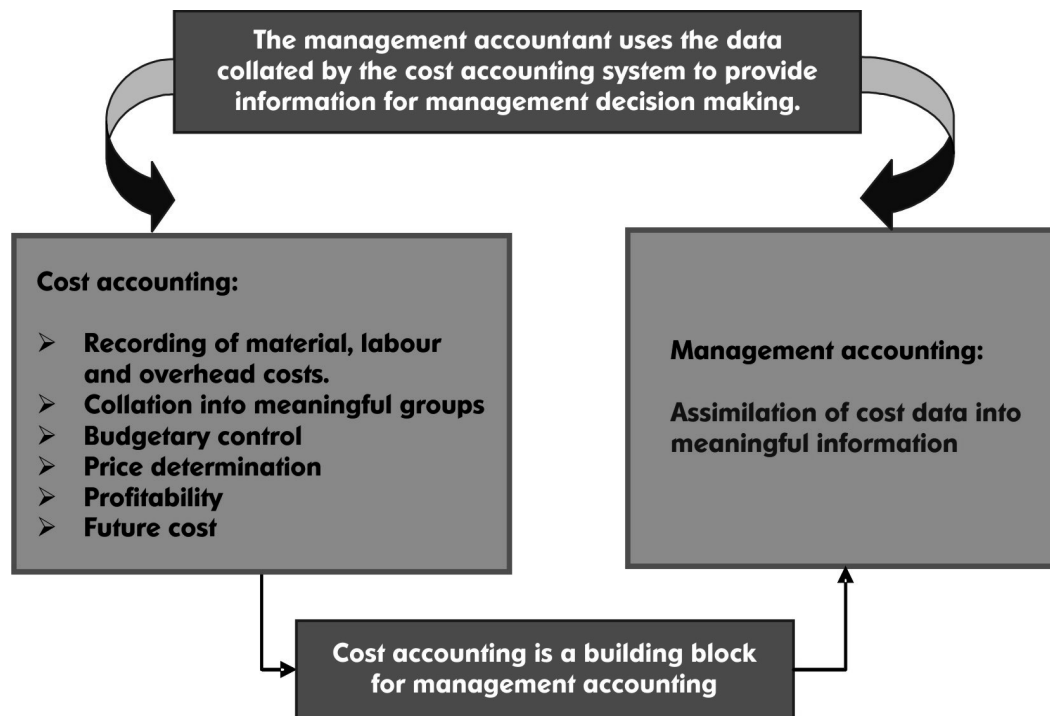
**3. Differentiate between financial accounting, cost accounting and management accounting. [Learning Outcome d]**



**Definition**

**Management accounting** is “an integral part of management concerned with identifying, presenting and interpreting information”

**Diagram 4: Importance of cost and management accounting**



At the moment we have a brief idea of what cost accounting and management accounting are, their nature and scope, the type of information generated by them and how one builds on the other to provide useful information for management decision making. It is a process of preparation of financial information that can be used by the **internal management** of the organisation.



**Definition**

**Financial accounting** is collecting, classifying, recording and summarising the financial transactions for the purpose of presenting the financial results of an organisation for the given period.

**Financial accounting** is the preparation of financial statements for use mainly by persons or organisations **external to the organisation**. These may include:

- Customers
- Suppliers
- Inland revenue
- Shareholders
- Financial institutions

The underlying data used in both cost and management accounting and financial accounting is the same, but the information created from these two sets of accounts differs. This is because the method of analysing the data is different under these two accounting systems.



## 10: Cost Accounting, Cost Classification and Coding

	Financial accounts	Cost and management accounts
<b>Time span</b>	Defined period – SOCI (income statement) - usually 1 year Specific date - statement of financial position as on last day of the above period	Period appropriate for purpose For e.g., the sales data pertaining to the two quarters
<b>Statutory</b>	Legal requirement	Management choice but cost records are recommended at times.
<b>Format</b>	Declared by law and Financial Reporting Standards.	According to management choice and purpose of information. For e.g., the quantitative data pertaining to the production in the past three weeks for analysing whether the targets were met.
<b>Focus</b>	All numbers are in aggregate and for the organisation as a whole. Financial accounts are consolidated for the entire organisation.	Numbers are broken up into meaningful chunks to aid decision-making, for e.g., cost per product or service. Management accounts focus on specific areas of an organisation's activities.
<b>Type of information</b>	Mainly contains monetary value	Incorporates non-monetary measures also such as machine hours, tonnes, and man-hours. Cost records will however contain mainly monetary values
<b>Use</b>	Ensures all business assets and liabilities are accounted for. Helps comparison with other organisations. Financial accounts are historical, specifying the transactions which happened in the past.	Aids decision-making. Internal measure of <b>achievement and control, hence orientation is</b> - Historic - Present - Future



### Example

Harold Plc has traded profitably for the last year. Both the financial accountant and the management accountant draw up statements to reflect this performance.

#### Statement of profit or loss for year ended 31 March 20X6.

	Tshs million	Tshs million
<b>Sales</b>		<b>1,000</b>
Raw materials Direct	(300)	
labour Manufacturing	(150)	
overheads <b>Gross profit</b>	(150)	(600)
Administration overheads		<b>400</b>
Selling and distribution overheads	(120)	
	(80)	(200)
<b>Profit</b>		<b>200</b>

Continued on the next page

The same statement can be presented for management information purposes as follows:

**Management information statement**

Product	A	B	C	Total
	Tshs million	Tshs million	Tshs million	Tshs million
Direct materials	150	100	50	300
Direct labour	50	70	30	150
<b>Prime cost</b>	<b>200</b>	<b>170</b>	<b>80</b>	<b>450</b>
Manufacturing overheads	50	70	30	150
<b>Factory cost</b>	<b>250</b>	<b>240</b>	<b>110</b>	<b>600</b>
Administration overheads	40	50	30	120
<b>Cost of finished goods</b>	<b>290</b>	<b>290</b>	<b>140</b>	<b>720</b>
Selling and distribution overheads	40	25	15	80
Cost of sales (a)	330	315	155	800
Sales (b)	400	500	100	1000
<b>Profit / (loss) = (b) – (a)</b>	<b>70</b>	<b>185</b>	<b>(55)</b>	<b>200</b>

The advantages of cost and management accounting over financial accounting for the organisation's management can be seen as below.

The SOPL submitted by the financial accountant depicts the overall profitability position, which is Tshs200 million in this case. It is quite obvious that the year's profit is 20% of total sales ( $200(\text{profit})/1,000(\text{total sales}) \times 100 = 20\%$ ). However, the statement of comprehensive income does not provide sufficient information for managerial decision making, as **product performance** has not been shown.

On the other hand, the cost and management accountant's analysis is more useful for management. It highlights the percentage profits per product in addition to overall profits:

Product	% profits / loss	Calculation
A	17.50%	$(70/400 \times 100 = 17.5\%)$
B	37%	$(185/500 \times 100 = 37\%)$
C (loss)	55%	$(55/100 \times 100 = 55\%)$

Financial statements do not reveal facts that are helpful for product-wise analysis. Therefore this short analysis pinpoints the area for concern. It is up to management to improve C's profitability position.

The choices are:

- (i) Increase the selling price
- (ii) Reduce the costs



**Test Yourself 3**

The format for financial accounting statements is decided by management:

- A True
- B False

**4. State the functions of a cost accounting system.**

**[Learning Outcome e]**

All the points discussed under 'Objectives of cost accounting' (ascertainment of cost, selling price and profit, controlling and reducing cost, helping management in decision making and preparation of other financial statements), are a part of the functions of a cost accounting system as well. Apart from those already detailed in the above section, following are some of the important functions of a cost accounting system:

**4.1 Material management:** material can be in form of raw material, work in progress and in finished goods based on the stage that they are in the production process:

1. Raw material: purchased goods that form the basis of the final product.
2. Work-in-progress: an intermediate stage between raw materials and finished product. These are raw materials for which a portion of work is performed but not completed. These are no longer a part of raw materials and not yet a part of finished goods.
3. Finished product: goods which are ready for sale.



**Example**

Cotton Moods Inc is a garment manufacturing company. Their raw materials would be cloth, threads; work-in-progress would be inventory at any stage between the raw cotton and the finished product i.e. semi-finished cloth that yet to be polished and finished goods inventory will be garments ready for dispatch.

In addition to this, material is classified as direct material and indirect material based on the role that they play in the production process:

**Direct material:** direct material is that part of material that can be specifically attributed to a unit of production or a specific job or service provided.

**Indirect material:** cannot be directly attributed to a specific unit of production.

Managing materials by maintaining proper sets of accounts for it is a part of the cost accounting system.

Accounting for material costs includes the whole procedure that ranges from the purchase of raw materials to their issue for production. Material costs are normally direct costs. They are part of the cost per unit. However, indirect materials form a part of indirect costs. These are termed as overheads.

**4.2 Budgeting and budgetary control:** a budget helps an organisation to plan its objectives for the future and the methodology to achieve these objectives. Budgeting is an important function of cost accounting.



**Definition**

A budget is a quantitative statement for a defined period of time, which may include planned revenues, expenses, assets, liabilities and cash flows. A budget provides a focus for an organisation aids the co-ordination of activities and facilitates control. Planning is achieved by means of a fixed master budget, whereas control is generally exercised through the comparison of actual costs with a flexible budget.



**Example**

A manufacturing company is required to plan the future production in order to estimate the labour and raw material requirements. This information can be obtained from the sales budget.

The territory-wise sales budgets for the year 20X9 based on the estimates of the sales division managers were as follows:

South zone	Sales of 20,000 units at a price of Tshs10,000
North zone	Sales of 12,500 units at a price of Tshs9,000
East zone	Sales of 10,000 units at a price of Tshs9,000
West zone	Sales of 8,000 units at a price of Tshs9,000

Total budgeted sales were 50,500 units for the whole organisation. Hence, the sales budget will look as follows:

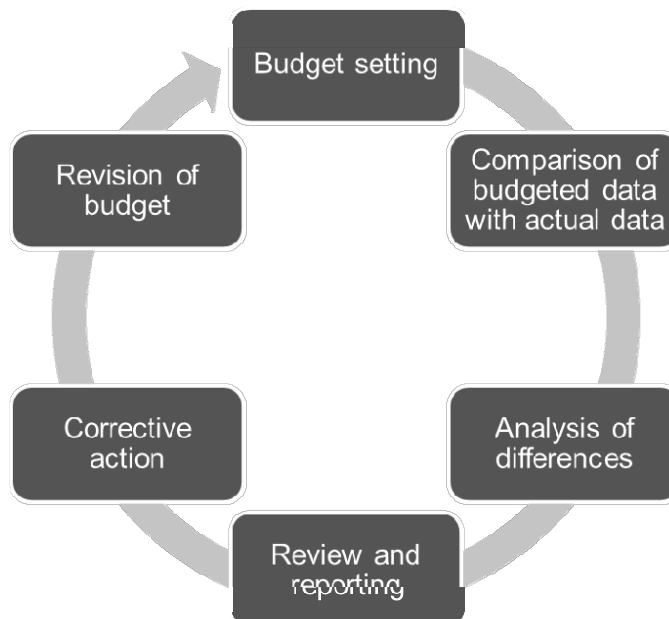
	South zone	North zone	East zone	West zone	Total
Budgeted units	20,000	12,500	10,000	8,000	50,500
Budgeted selling price	Tshs10,000	Tshs9,000	Tshs9,000	Tshs9,000	
Total sales (Tshs)	200,000,000	112,500,000	90,000,000	72,000,000	474,500,000

With the help of this sales budget, the production department can prepare its budget for material and labour requirements.

**A budgetary control system** (a part of the cost accounting system) is a means of monitoring revenue and costs and thereby exercising control in an entity by developing budgets and comparing budgeted figures with actual results. This system highlights any discrepancies (variances) and allows corrective action to be taken.

The procedure of budget monitoring can be seen as a periodic cycle, which is also termed as budgetary control cycle. It is illustrated in the below diagram:

**Diagram 5: Budgetary control cycle**



Budgetary control helps management to take timely corrective action in cases where actual performance is not in line with the budget.

## 14: Cost Accounting, Cost Classification and Coding



### Example

Skytel Ltd is a manufacturing company. Skytel's budget period is one year. However, in order to achieve better control, the company splits its budget period into twelve monthly budgets and at the end of each month actual figures are compared with the corresponding budgeted figures.

In the months of January and February, management observed that the actual cost of raw materials exceeded the standard cost. This comparison of budget and actual figures is budgetary control. With further detailed study, management discovered that the poorly managed inventory system had led to emergency purchases at short notice and this had resulted in an increase in the cost of raw materials.

Accordingly, as a corrective action, a perpetual inventory control system was introduced to ensure the timely purchase of the right quality and quantity of raw materials at the right price. Thus, the examination of the variance helped the company to take timely corrective action.

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**4.3 Cost audit:** cost audit is a system of checking cost accounts and records of an organisation and establishing whether cost accounting principles have been adhered to.

Thus, cost audit involves:

1. Examination of cost records to establish accuracy of cost data (relating to material, labour and overheads), costing techniques, cost reports generated for management use, statements of cost, etc.
2. Verifying whether the above have been prepared in accordance with the rules, procedures, principles and practices of cost accounting.

The objective of cost audit is to ensure that there are no un-accounted or undue losses before or during the production process, costs are reported appropriately and reports are generated to help management decision making. Cost audit is compulsory in case of certain categories of industries in the manufacturing sector.

**4.4 Cost coding:** allocating codes to various items produced, costs incurred by an organisation and categories of its customers is an important function included in a cost accounting system.



### Definition

A code is a system of symbols designed to be applied to a classified set of items to give a brief accurate reference, facilitating entry, collation and analysis.

**CIMA Official Terminology, 2005**

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Coding is the method of assigning codes to a unique set of items / a unique item in order to distinguish it from another unique class of items. Through coding, the costs can be identified and collected in a combination of alphabets and numbers or both for further analysis. Once costs are classified, a coding system can be applied to make it easier to manage the cost data, both in manual and in computerised systems. Intelligent coding of input costs items is one of the most important activities to ensure the proper control.



### Example

Gorgeous Plc deals in cosmetics. It has adopted a coding system for various kinds of perfumes and foundations. The codes are designed to provide information about the type of perfume, pack type and pack size.

Under this system, the large pack of the men's fragrance, Musk would be coded as M (for men), MU (for Musk), and L (for Large pack). Similarly, the small pack of the women's fragrance Citrus would be coded as W (for Women), CI (for Citrus) and S (for small pack).

As a result, all the products can be classified according to their characteristics. This helps to identify the products, even if the same perfume is available in several pack types and sizes.

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Coded items can be easily classified into relevant groups for the purposes of recording and processing data. A general ledger will consist of a large number of coded accounts. A business will decide its own codes for its general accounts. Each customer is allocated an account which is identified by a unique code number.

**4.5 Generating reports:** a report is **formal document** containing detailed discussion on a topic. The scope of a report determines the contents of the report. The report may contain general information, details of an investigation or provide recommendations about a topic.

A cost accounting system generates the following three types of reports:

1. **Non financial** report, written in an essay form, e.g. reports on expansion plans on where the company should expand and the advantages and profits it can achieve if it does so.
2. **Numerical** report with information giving the number details, for example a comparison of budgeted sales and actual sales where the major information provided is in the form of numbers.
3. **Mix** of the two reports, reports showing comparison of budgeted sales and actual sales with an explanation of the differences in the budgeted and the actual sales.

The above reports help management in decision making, as discussed earlier in this Study Guide.



#### Test Yourself 4

Which of the following functions of cost accounting helps in uniquely distinguishing one item of cost from the other?

- A Budgeting
- B Budgetary control
- C Coding
- D Report generation



#### Test Yourself 5

Why is budgetary control important?

### 5. Explain the framework of cost accounting.

[Learning Outcome b]

The framework of cost accounting system of an organisation is built upon the following areas of application of the discipline:

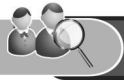
1. **Ascertaining costs of products and services:** this has been discussed under the heading of, 'Objectives of cost accounting'.
2. **Planning, control and evaluation of performance:** the technique of budgeting (discussed earlier in this Study Guide) is used for planning activities and resources. A budget, apart from serving as a tool of planning, also serves as a benchmark. Managers can use the figures depicted in the budget to compare the actual costs and revenues. In case the budgeted and actual figures do not match with each other, variances are calculated and investigated into in order to improve future performance. Thus, in this way, costs and activities can be controlled and performance of various units of an organisation can be appraised.
3. **Identifying relevant cost for making decisions:** one of the objectives of cost accounting is to help in decision making in organisations. Management decision of any sort ultimately boils down to a 'cost-benefit analysis' which involves weighing up the different alternatives. In order to arrive at the best possible solution, the decision-maker needs to know which costs are really relevant to a decision and therefore merit consideration.

**Relevant costs** are the costs pertinent to the making of a specific managerial decision. These are essentially the future costs and should differ amongst the possible alternative courses of action.

Following are the features of relevant costs:

- Relevant costs are incremental and futuristic in nature
- Relevant costs are cash flows and opportunity costs
- Committed costs and sunk cost are not relevant.

## 16: Cost Accounting, Cost Classification and Coding



### Example

Lindsey owned two houses. She lived in one and the other was empty. Even though the other house was empty, she needed to pay property taxes of Tshs100, 000 every year for the house.

In the year 20X9, Lindsey decided to rent out the other house at Tshs1, 200,000 per annum. The payment of Tshs100, 000 as property taxes is unaffected by the decision to rent out the house. These taxes are incurred irrespective of whether or not the house is rented out. Therefore these costs are irrelevant to the decision-making. However, the net gain of Tshs1, 200,000 (from rent) is a relevant cost for decision-making.



### Example

Adventurous Plc is planning to launch a new product in the market. They have hired a consultancy firm for conducting a market survey in order to determine the popularity that the new product may gain. Adventurous Plc has paid Tshs100, 000 towards consultancy charges.

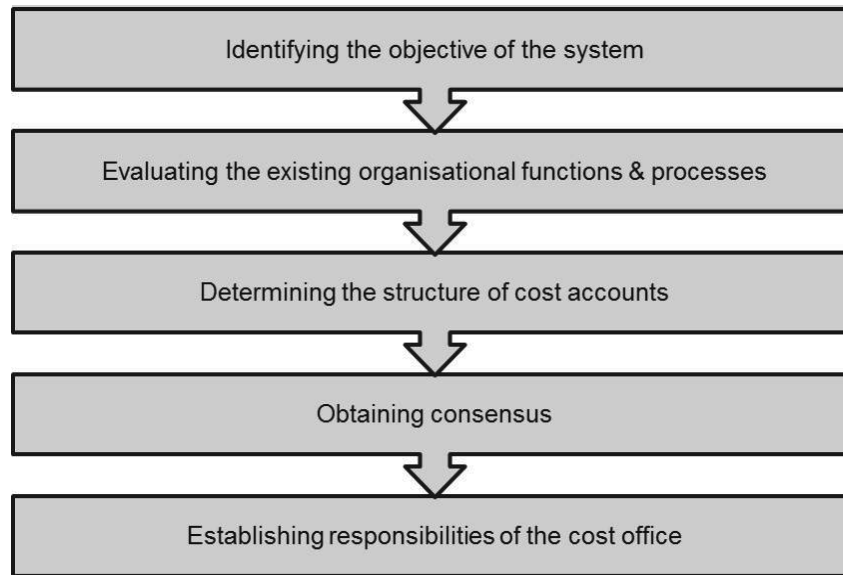
The consultancy firm submits its report to Adventurous Plc within 2 months. Adventurous Plc is now analysing the report in order to come to a decision. The consultancy charges paid by Adventurous Plc would, however, have no bearing on the decision as it is a sunk cost, and thus, not relevant for decision making.

A cost accounting system needs to be designed, developed and implemented in order to execute the framework of cost accounting. A cost accounting system is developed for helping an organisation to plan and control various elements of cost at various stages of the production process. The system's ultimate goal is to help managers in taking decisions.

Steps involved in installation of a cost accounting system:

- 1. Identifying the objective of the system:** in case the objective of the cost accounting system is just cost and selling price determination, then the framework of the entire system needs to be basic in nature, and provision for entering only basic data should be made. But, in case the objective goes beyond the basic requirement, for example if the aim is to help management in decision making, then, a more sophisticated system capable of generating various reports needs to be provided for. Thus, identification of the objective of the system forms the first step.
- 2. Evaluating the existing organisational functions and processes:** this would include studying the nature of the products / services being produced, the structure (including the roles and responsibilities of different positions) of the organisation, layout of factory, procedure of time keeping and computation of wages and salaries, controls involved in material handling and avoiding wastages, technique of splitting costs into fixed, variable, semi variable categories, etc. Appraising such existing factors is essential for deciding upon the cost accounting structure.
- 3. Determining the structure of cost accounts:** a thorough study of the nature and sequence of the various processes involved in the production of the product(s) (including ancillary services) must be done while determining the structure of the cost accounts. This will enable an organisation to gradually build up cost as the product(s) passes from one phase of production to the other, ultimately reaching the stage of finished output. This will also help in identifying and classifying costs according to their nature, behaviour, time, etc. (discussed later in this Study Text).
- 4. Obtaining consensus:** introducing a full-fledged system of cost accounting in an organisation for the first time invite resistance from different groups of staff members. Thus, the advantages of such a system must be explained to staff and they should be made a part of the process of developing the entire framework of the system. A part of the system can be introduced initially in one area so that staff members are able to appreciate it. For example, the system can be first introduced in inventory management by installing systems of receiving and issuing inventory, methods of determining re-order levels and danger levels, etc.
- 5. Establishing responsibilities of the cost office:** a cost office should be created, which would be responsible for maintain cost records as per the principles and practices of cost accounting. The following can be the broad areas in which the cost office would function:
  - inventory control
  - accounting for labour
  - accounting for overheads
  - budgeting and variance analysis
  - generating reports to aid in managerial decision making

**Diagram 6: Steps involved in installation of a cost accounting system**



**Test Yourself 6**

Which of the following options represents the **correct** order of the steps involved in installation of a cost accounting system?

- A Evaluating the existing organisational functions, identifying the objective of the system, determining the structure of cost accounts, obtaining consensus and establishing responsibilities of the cost office.
- B Identifying the objective of the system, evaluating the existing organisational functions, determining the structure of cost accounts, establishing responsibilities of the cost office and obtaining consensus.
- C Evaluating the existing organisational functions, identifying the objective of the system, determining the structure of cost accounts, establishing responsibilities of the cost office and obtaining consensus.
- D Identifying the objective of the system, evaluating the existing organisational functions, determining the structure of cost accounts, obtaining consensus and establishing responsibilities of the cost office

**6. State the elements involved in decision making, planning and control.**

**[Learning Outcome f]**

Planning, decision making and control are the prime responsibilities of any manager. Unless you plan, you cannot make the decisions necessary to achieve the objective or goal. Decisions should be implemented and the results monitored for control purposes.



**Example**

Let us have a look at a simple case where you have been given the responsibility of arranging a weekend outing for your office. All the functions of planning, decision making and control will come into play during this process.

**Planning**

You will assess the number of people who are likely to come, the possible places to visit and the estimated cost. You will plan these things by evaluation of the alternatives available.

**Decision making**

A decision will be made by evaluating the options. Decision making will be done on the basis of the various options available for the venue of the picnic, the costs involved, the entertainment facilities provided by the various resorts, their capacity for accommodation etc.

**Control**

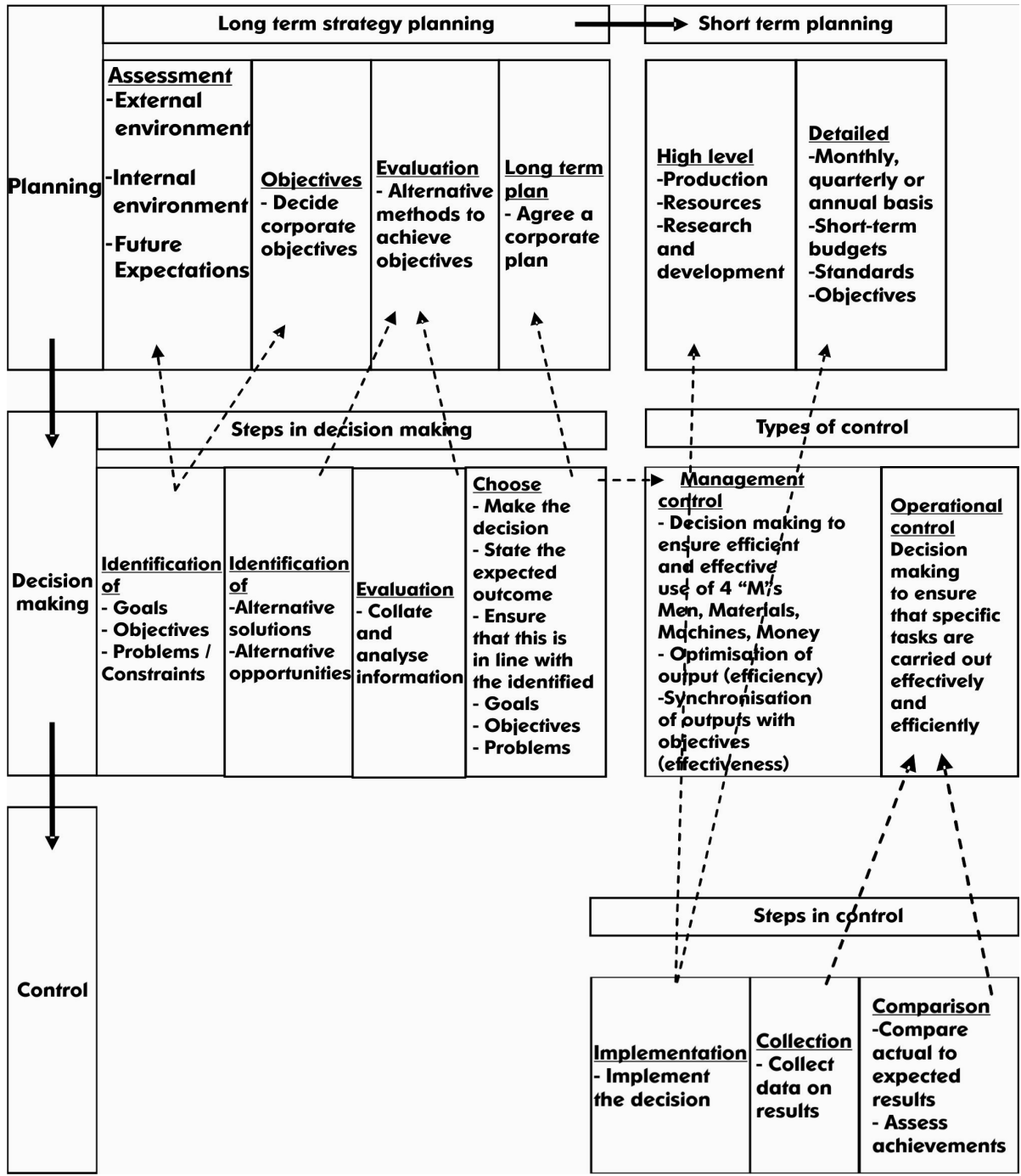
Control will come into play on the day of the picnic. Monitoring will have to be done to keep a check on whether the resort where the picnic is planned is ready with food and entertainment arrangements, whether the vehicles arranged for commuting are ready at the departure time. Even during the outing a constant check is required to ensure whether the fun events are taking place according to plan, and whether everyone is comfortable.



**18: Cost Accounting, Cost Classification and Coding**

Planning, decision making and control are divided by a very thin line of difference. They intersect each other at many stages and are interlinked throughout the process of achievement of the ultimate goals. The following diagram shows how all three managerial responsibilities are inextricably linked. R N Anthony, a leading writer on organisational control, suggests that since all managers make planning and control decisions these activities cannot be separated. Certainly it can be seen from the diagram that there are many steps in common in the three activities, and that none of them can be successfully discharged without reference to the others.

**Diagram 7: The managerial processes of planning, decision making and control**



**6.1 Planning**



**Definition**

**Planning** is a management function, concerned with defining goals for future organisational performance and deciding on the tasks and resources to be used in order to attain these goals.

## 1. Steps involved in the planning process

### (a) Assessment

Planning makes an assessment of:

- (i) **The external environment** - the factors external to the organisation that are likely to affect operations e.g. market trends, prices prevalent and customer preferences.
- (ii) **The organisation** - the structure, hierarchy, division of tasks, duties and responsibilities of personnel according to functions e.g. how will the responsibilities be divided and handled by the personnel if the organisation plans to set up four new branches in the town.
- (iii) **The future** - where the organisation wants to be in the mid to long term (2 to 10 years) e.g. the organisation aims at earning double the profits it earns today along with diversifying the range of products it produces.
- (iv) **The expectations** of those who are associated with planning as well as those who are likely to be affected by the organisation's activities e.g. customers and users of the organisations products or services, the stakeholders etc.



### Example

A group of people form an investment company. They are offered the choice of two projects:

1. The formation of a power generating company or,
2. The formation of a travel company.

The power company could attract a government subsidy of 20% if built in a recognised EU development zone, and a return of 20% per annum can be expected on their investment. The travel company should provide a return of 17.5%.

While assessing the alternatives for financial, social, environmental aspects and so on, they should take into consideration the following:

- (a) **Assessment of external factors** - Change in government policies should be monitored because in the case of the first project, it will need to avail the government subsidies and a change in the government policy for subsidies may affect the business.
- (b) **Deciding the responsibilities of the members of the group**, assessment of the requirement of the staff members and the division of work amongst the members of the group etc. This is said to be assessment of an organisation.
- (c) **The assessment of the future profits to be earned**; either 20% or 17.5% from each of the business alternatives is the assessment of future. What is the prospect of the both the businesses after say 5 years, should be assessed.
- (d) **Estimating the possible effects of the decision taken** on the staff and the customers is the assessment of the expectations that the staff and the customers have from the organisation.

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### (b) Objectives

Based on the above assessment, you should be in a position to decide your objective or goal. Objectives should be drafted **carefully, clearly and specifically**.



### Example

Continuing with the example of the investment company above, we will now consider the objective of the group, which is to maximise profit whilst minimising the risk. Keeping this objective in mind we will choose the option of either forming a power generating company or a travel company.

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## 20: Cost Accounting, Cost Classification and Coding

### (c) Evaluation

Once you decide your goals, you should consider how to achieve them. There could be a number of feasible alternatives. The alternative that yields the **maximum benefit with minimum possible risk and cost** needs to be selected. The alternatives need to be evaluated to assess what resources would be required, how much, and at what cost.



#### Example

In the above example, the travel company will require less capital, no building and will make profit in the first year.

After extensive research it appears that the power company requires a heavy investment; 2 years building plans and will only make a profit in year 4. In addition, the government controls the price at which the power may be sold. This might affect the profits.

When these additional facts are taken into consideration, the travel company looks like a better option.

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### (d) Long term planning

The evaluation of the alternatives helps us arrive at an **overall or master plan**, known as a **corporate plan**. The corporate plan provides answers to vital questions such as:

What is the existing environment in which the organisation is operating?

What is the environment that will exist in the organisation in the future based on the future action plans?

Where does the organisation really want to go?

What best way should the organisation adopt to reach the desired goal?

This would give you overall **guidelines regarding the direction in which to proceed**. This kind of planning is used by top level management.



#### Example

Suppose the investment group's corporate plan has the objective of setting up a travel company. The corporate plan would outline the type of 'holiday packages' the company would offer. This could be 'budget holidays' (low price, high volume) or the 'high class holidays' for the upper end of the market (high price, low volume). It would also state the required return and any deeply held beliefs by which they would like the company to be run, e.g. the company will employ a certain percentage of people from the physically challenged groups etc.

---

### (e) Short term planning

Long term planning gives us the ultimate goals. To convert these into achievable tasks we need to define short term plans. There are two types of short term planning: tactical planning and operational planning.

(i) **Tactical planning** is typically used by middle management. They consider the production, and the resource requirements, to produce a plan that will ensure the **efficient and effective use of the 4 "M"s** (money, men, materials and machines) whilst **optimising output** and staying within the organisational objectives. It is the implementation of the corporate plan.



#### Example

If the corporate plan outlines that the company has to achieve a market share of 25%, the tactical plan will decide the geographical location where the sales can be increased or the product whose sale can help the company to achieve the desired market share.

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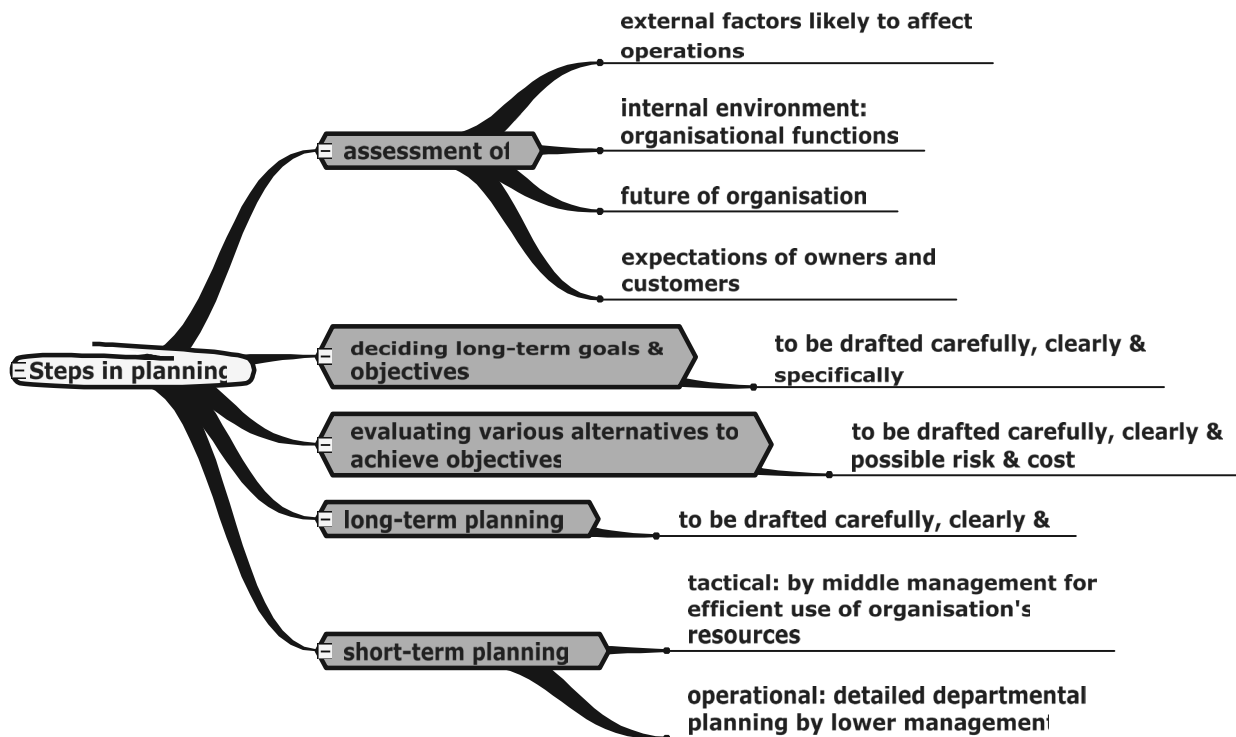
- (ii) **Operational planning** is detailed departmental planning often performed by supervisors. The plans may be of any length less than one year, and in the case of production planning, made on a daily basis. There are clear standards and objectives to be met and data is collected to ensure that there is both **measurability and accountability for the use of resources**. It is at this level of planning that the control is tightest and the decision making most frequent.



**Example**

Continuing the example above, once the tactical plan relating to the geographical location or the product to be sold is finalised, the operational plan will decide the action plan (to implement the tactical plan). This includes day to day requirement of resources such as materials, labour hours etc.

**SUMMARY**



**2. Essentials values of a good plan**

- (a) **Adherence to objectives:** The plan should be based on **clearly defined objectives**.
- (b) **Easy to understand:** The plan should be **simple and easily understandable** by people at all levels who are to implement and follow it.
- (c) **Flexible:** The plan should be **flexible or adaptable to changing conditions** (capable of incorporating suitable adjustments or amendments).
- (d) **Balanced:** The plan should be **balanced in all respects** and should be reasonably **comprehensive** (equal importance given to all areas covered; not leaving anything to doubt).
- (e) **Provide standards:** The plan should provide standards for the evaluation of performance.
- (f) **Economical:** The plan should be economical to permit **optimum use of available resources** before creating new authorities and new resources.
- (g) **Practicable:** The plan should be **feasible and action-oriented**, e.g. if the estimated skilled labour hours available are 40,000 then the plan should be for the number of units that can be produced within the available hours.

## 22: Cost Accounting, Cost Classification and Coding

- (h) **Unanimous:** The plan should be prepared in consultation with all the concerned persons (those responsible for planning and decision making). While devising a plan, opinions of the top managers along with the opinions of the representatives of the lower level supervisors should be considered.
- (i) **Integrity and harmony:** The plan should be properly integrated and harmonised with other plans, e.g. a production plan should be consistent with the marketing one. If the production plan is to produce 10,000 units in a month then the sales plan should also be to sell 10,000 units and not to sell 20,000 units.

### 6.2 Decision making

Planning shows us the ways of achieving goals. The implementation of plans requires us to **assess the various ways** to best attain the given objective. Here, decision making comes into play.



#### Definition

**Decision-making** is an exercise of choosing a particular course of action out of several alternative courses to achieve the given objective.

Decision-making involves committing the organisation and its resources to specific courses of actions. A decision is the outcome of judgement and represents a commitment.

#### Steps involved in decision making

##### 1. Identification of goals

The first step is to identify the goals, or objectives. It involves:

Identification of goals that can be achieved

Plans to be formulated in order to achieve these goals

Recognition of any problems or constraints likely to hinder or restrict the organisation to achieve the goal

This step is similar to the assessment and objectives steps in planning.



#### Example

Stag Plc (Stag) wants to start a business of trading in electronics goods.

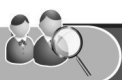
The identification of goals – setting up a retail store for electronic goods.

The plan – to make arrangements for showroom space, finance options for customers, tie-ups with banks for finance assistance, determining the electronic product range to be displayed for sale etc.

Recognising constraints – identifying the legal regulations governing shops, competitors' showrooms in the area, type of population in the vicinity of the outlet, etc.

##### 2. Recognising alternatives

The second step is to identify various alternatives to achieve the goals. Alternatives can be solutions or opportunities. This step is similar to the evaluation step in planning.



#### Example

Continuing the above example, Stag will have to list the various alternatives of electronic goods in which it may deal, etc. Recognising various brands of electronic goods in which Stag wants to deal also amounts to identification of alternatives to reach the desired goals.

### 3. Evaluation

Evaluation of the identified alternatives leads to the optimum solution. Evaluation requires:

Collation and review of documents listing various alternatives, the resources required under each alternative and the costs involved.

An analysis based on this assessment facilitates taking a decision on the best alternative course of action. This is the alternative that involves **minimum costs and maximum benefits**. In other words, the chosen alternative course of action must be the optimal under the prevailing conditions.

This step is similar to the evaluation step in planning.



#### Example

In the assessment of the various electronic goods and the brands that Stag may offer, the company should carefully consider various factors. Some of the factors include discounts offered by the suppliers, the terms of payment (such as credit periods offered), after sales services provided by the supplier company, feedback from the customers etc. Based on the above factors, Stag can decide to sell, for example, televisions of brands that give the maximum benefits (e.g. maximum credit period, heavy discounts etc.).

### 4. Choice of the best action

Make the decision, ensuring that the:

**Best suited plan** (alternative) is chosen to fulfil corporate strategy (long term),

**The requirements emanating from the decision are clear** - such as the resources, manpower, money, statutory permissions and any other legal approvals that will be required as a result of the decision taken, and

**Decision and its expected outcome** are in line with goals.

This step is similar to the evaluation step in planning.



#### Example

After evaluating the various electronic goods and brands, Stag decides to concentrate on selling televisions that offer the highest margins. To this end, the organisation identifies high end "brand" televisions such as Sony, Sanyo and Sharp that it will retail to its customers.

The above decision clearly identifies that Stag will require a big showroom at a posh locality and seasoned sales professionals.

The decision to sell these brands will meet its long term goals of maximising profits.

### 6.3 Control



#### Definition

**Control** is a function aimed at promoting efficiency or assuring the implementation of a policy or safeguarding against possible deviations from the set procedures.

It is:

- The power to influence people's behaviour or the course of events
- Restricting or permitting certain activities only
- A means of limiting something
- The ability to direct an individual or an event

## 24: Cost Accounting, Cost Classification and Coding

The process of control has three stages: **Implementation, collection** and **comparison**.

**Implementation:** The decisions made are acted upon.

**Collection:** Data is collected that is relevant to the decision made.

**Comparison:** The data collected in the step above is evaluated and compared with the expected results.

Management then assesses the achievements and considers if any corrective action is required.

When applied to high level planning, control is referred to as **management control**. Detailed or operational planning is controlled by **operational control**.

### 1. Management control



#### Definition

**Management control** means monitoring the efficient and effective use of the resources employed by an organisation to achieve the desired goals.

#### Important features of management control:

##### Sets the performance benchmark

Standards, goals, guidelines and objectives serve as performance benchmarks. Performance has to be assessed in the light of all these.



#### Example

The management of the company sets a benchmark that it should attain a 20% return on investment made during the year.

##### Efficient use of resources

Control should ensure the efficient use of “**4Ms**”: **M**en, **M**aterials, **M**achines and **M**oney.



#### Example

The labour productivity has to be a minimum of 10 units of products per day. If any worker produces less than this, his employment may be terminated or he may be given extra training to improve.

##### Review

The **actual results should be compared to the expected results** to ensure that the plans are being met.



#### Example

Analyse whether the desired level of output and profit was achieved during the year. If not, then the organisation should investigate the reasons for this and either come up with better ways to manufacture or employ more skilled labourers so that the output increases.

### Corrective action

If the results are not **in line with the expectations**, management will need to decide on corrective action.



#### Example

If each employee does not produce 10 units per day, management has decided to run a training program for the employees. Once the training is over the employees will be given another two weeks to improve. If they do not improve in this period they will be either dismissed or demoted.

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## 2. Operational control



#### Definition

**Operational control** is to monitor the individual detailed tasks to ensure the attainment of the short term goals.

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#### Important features of operational control

**Detailed plans at the lowest level** ensuring that individuals are given practicable tasks that they are able to achieve and that are in line with both strategic plans and management control parameters.



#### Example

The desired annual output for an organisation may be fixed at 12,000 units and to achieve this, labour is divided into 10 teams and each team is given the task of producing 1,200 units per annum.

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Plans that are **task specific** and relate to the **immediate period**.



#### Example

The long term goal of producing 1,200 units of output per annum for each team is converted into a short term goal of producing 100 units per month.

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Plans are **updated frequently**.



#### Example

Suppose the pre-determined target of 100 units per month does not seem feasible and is compromising quality, a revised target of producing 80 units is set with minimum damage to quality.

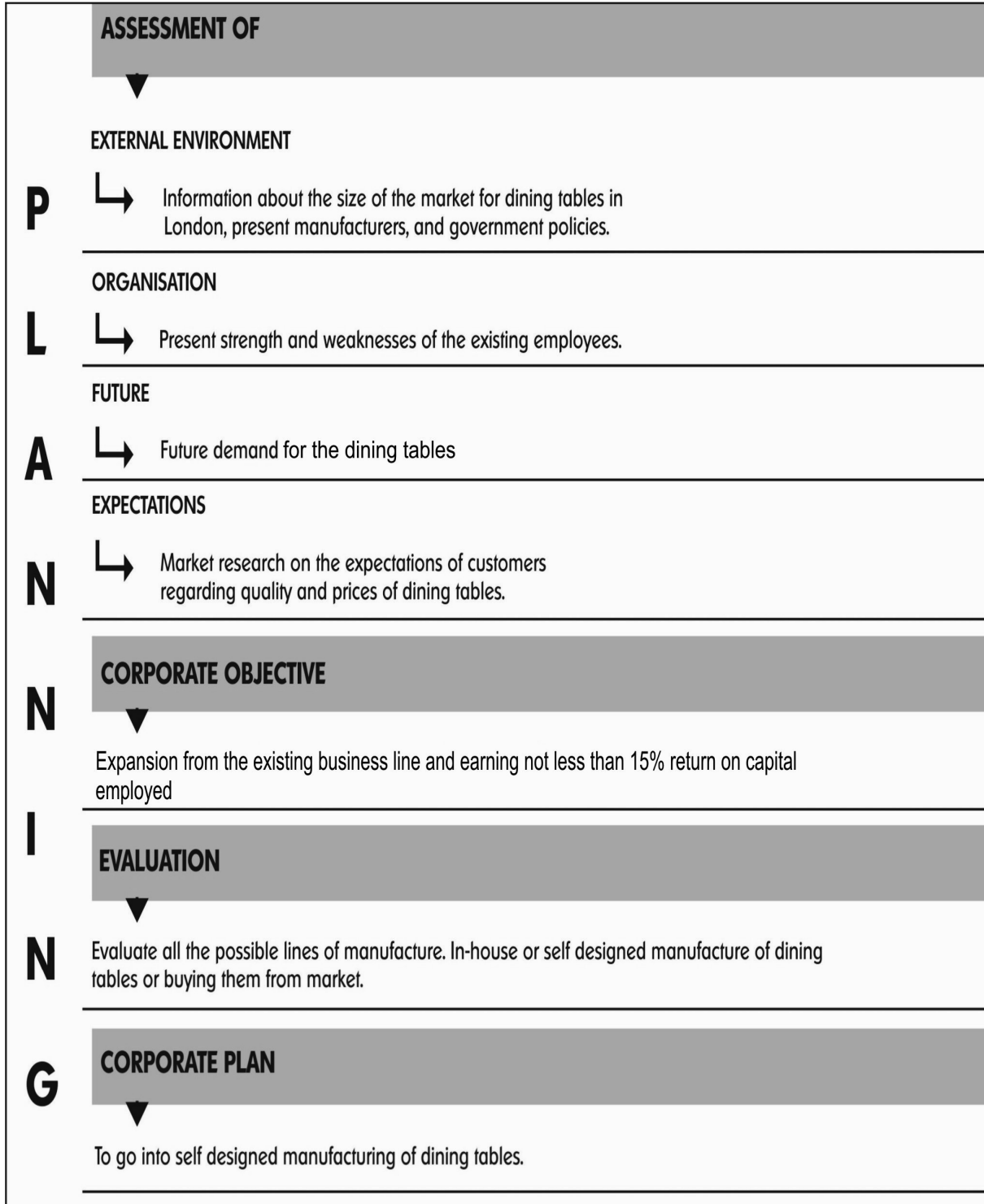
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**Example**

In the example below we apply the processes of planning, decision making and control to the story of the company as it unfolds. Tangent Plc, successfully operating in the business of mattresses, wants to venture into the dining table industry. How the various processes of planning, decision making and control come into play while implementing the decision, is explained below.

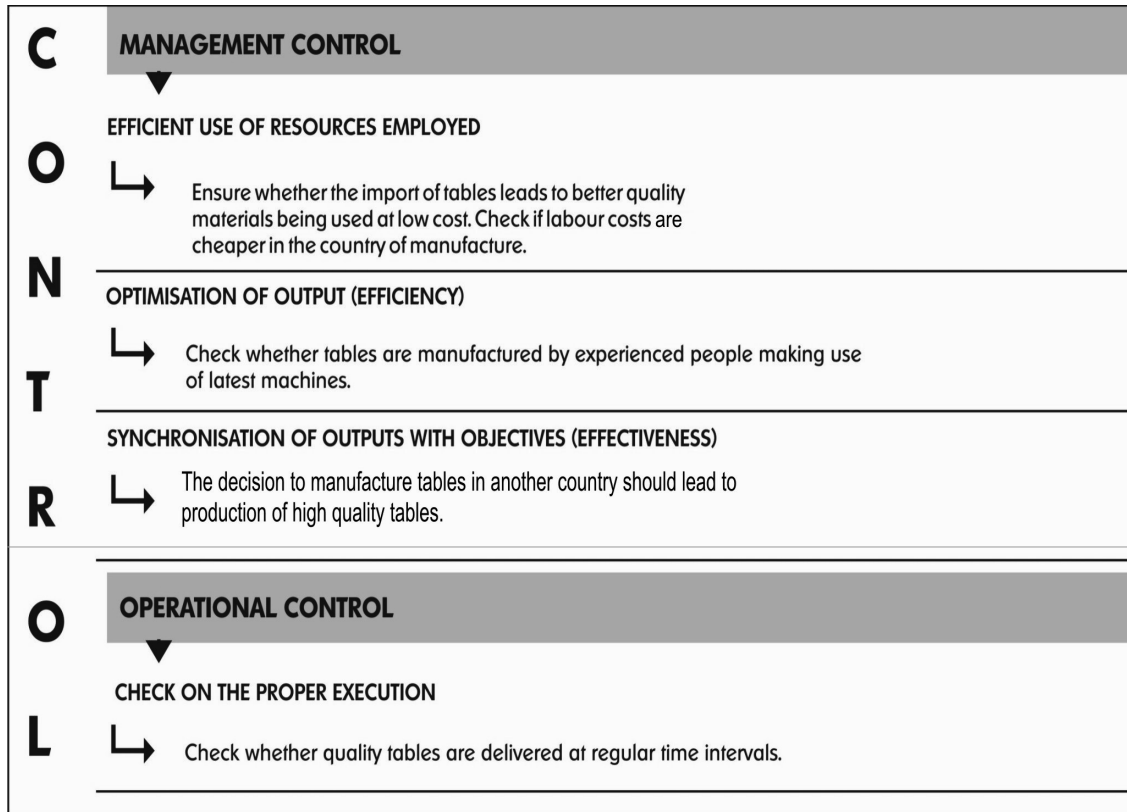


**Continued on the next page**

<b>D</b>	<b>IDENTIFICATION OF</b>
	<b>GOALS</b>
	↳ To earn a minimum 15% per year return on capital employed
<b>C</b>	<b>OBJECTIVES</b>
	↳ To be producer of cheapest dining tables in London.
<b>S</b>	<b>PROBLEMS OR CONSTRAINTS</b>
	↳ Procurement of quality wood or ply. Short supply in local market and material available at very high prices.
<b>I</b>	<b>RECOGNISING</b>
	<b>ALTERNATIVE SOLUTIONS</b>
	↳ To import quality wood at cheaper rate.
<b>O</b>	<b>ALTERNATIVE OPPORTUNITIES</b>
	↳ To get the dining tables manufactured as per customer requirement from a different country and import it.
<b>N</b>	<b>EVALUATION</b>
	<b>COLLATE AND ANALYSE INFORMATION</b>
<b>M</b>	↳ Prepare a cost sheet of manufactured tables and the cost of tables imported. Compare the prices.
	<b>CHOICE OF BEST ACTION</b>
<b>K</b>	<b>MAKE THE DECISION</b>
	↳ To import the dining tables.
<b>I</b>	<b>STATE THE EXPECTED OUTCOME</b>
	↳ There will be a saving of \$50 per set. Annual saving will be around \$50,000. Return on investment is approximately 18%
<b>N</b>	<b>ENSURE THAT THIS IS IN LINE WITH THE IDENTIFIED GOALS AND OBJECTIVES</b>
	↳ Company remains producer of cheapest tables in London.
<b>G</b>	<b>POTENTIAL PROBLEMS</b>
	↳ If custom duty increased from the existing rates then profitability may come down.

Continued on the next page

## 28: Cost Accounting, Cost Classification and Coding



### Test Yourself 7

For any plan to be good, it should be:

- A Flexible
- B Economical
- C Practicable
- D All of the above



### Test Yourself 8

Decision making is an exercise of:

- A Choosing a particular alternative out of several in order to achieve the given objective
- B Comparing actual results with the expected results
- C Setting long term and short term goals of the organisation
- D Making assessment of external and internal environment



### Test Yourself 9

What are the three stages of control process?

- A Assessment of environment, identification of goals and planning
- B Implementation of decision, collection of data and comparison of results
- C Recognising alternatives, evaluation and choosing the best alternative
- D None of the above

**7. Describe different users of cost accounting information.****[Learning Outcome g]**

The information generated by the cost accounting system of an organisation is used by groups both within and outside the organisation. The internal and external users of cost accounting information have been discussed below.

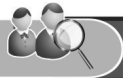
**7.1 Internal users of cost accounting information:**

- 1. Employees:** employees can use cost accounting information in order to ensure that they are meeting their targets and allotted responsibilities.

**Example**

Jeff is a machine operator in a manufacturing concern. He needs to be aware of the production levels that he is expected to generate in each of his shifts in order to ensure that he meets his target. This information can be provided to him by the cost accounting system of his organisation.

- 2. Production managers:** production managers use the reports generated by the cost accounting department in order to ensure that resources are being used and activities are being performed as planned. In case of any deviations from the standards set, variance reports are also generated by the cost accounting system and the production managers can take necessary corrective measures (in case deviations go beyond accepted limits) to improve future performance.

**Example**

- Robert is the production manager of Alpha Plc. He is responsible for overseeing and controlling the productive hours (including overtime hours) clocked in by the labours of the factory. Labour reports generated by the cost accounting department would enable Robert to determine the productivity of labour.
- Roy is the production manager of Beta Plc. He is responsible for overseeing and controlling the flow and usage of material in the factory. Inventory (material) reports generated by the cost accounting department would enable Roy to determine the effective usage and movement of raw materials, including planned and unplanned wastages.

- 3. Sales managers:** sales managers, along with cost accountants, evaluate the effect of alternate pricing decisions on business activities and profit levels; determine the sales budget, breakeven point (no profit, no loss point), etc. Sales managers need to know exactly in what ways different levels of pricing would affect profitability and what minimum price can be quoted if the organisation is operating in a highly competitive environment.

**Example**

Esther is the production manager of a company which manufactures and sells steel ingots. Recently, she has been approached by a new customer who is willing to place a large order if the ingots are sold at a price which is 10% less than the current rate. In such a situation, Esther can consult the cost accountant of the company who would be able to determine the profitability of the offer and advise Esther whether to accept the offer or reject it.

- 4. Senior management:** senior management take the help of cost accounting information to evaluate the financial and qualitative implications of various decisions that they take for the business. Cost accountants evaluate the financial feasibility of various business related policies and recommend to the senior management regarding the economic and social viability of such policies. The reports generated for the senior management team are specific in nature. Some of the decisions taken with the help of cost accounting information have been illustrated in Table 1 earlier in this Study Guide.

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#### 7.2 External users of cost accounting information

- 1. Cost auditors:** cost auditors are generally appointed by the board of directors (in consultation with the government in case of statutory cost audit) of a company to conduct cost audit (meaning of cost audit has been discussed earlier in this Study Guide). Cost auditors use information contained in the cost accounting records to establish whether the principle, procedures and practices of cost accounting have been followed by the firm while ascertaining and reporting costing data.
- 2. Customers:** in case of cost plus contracts, the customer may want a report based on cost audit regarding the procedure followed by the company in ascertaining the cost and to establish whether the cost figure quoted is fair or not. The provision for such a scrutiny may be included as a part of the contract.
- 3. Government:** statutory cost audit (to be undertaken by certain categories of manufacturing industries) report needs to be submitted to the government. Such an audit is conducted with a view of making industries cost conscious and improving the overall industrial efficiency and productivity of the economy.
- 4.** The government may also scrutinise the cost records in case a company approaches it for subsidies. This is done to establish the authenticity of the company and the efficiency with which the production processes are run.
- 5.** Additionally, the government may also order cost audit of a company / industry to be carried out in the general interest of the society.
- 6. Trade associations:** in certain industries, trade associations may be responsible for maintaining the price level of the product produced by the member firms. Additionally, the individual firms may also be contributing funds which are held by the association. In such a case, the association may on a regular basis, go through the cost accounting records of the member firms.



#### Test Yourself 10

Who of the following is an internal user of cost information?

- A Trade associations
- B Customers
- C Government
- D Sales managers

#### 8. Discuss value of cost information (financial and non-financial) in management decision making process.

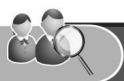
[Learning Outcome h]

##### 8.1 Nature of financial and non-financial cost information

The types of information used by management for decision making are:

###### 1. Financial cost information

Financial cost information mainly deals with the costs of products and services, their selling prices, profits, income and expenses.



#### Example

The total receivables data will reveal the total money receivable from customers of the business, which helps one to get information on the sales of the organisation. Total payables data will reveal the total money that is payable to the suppliers which will reveal the total dues of the organisation towards payables.

###### 2. Non-financial information

Non-financial information informs us about the overall environment in which the entity operates. These include all factors other than monetary ones, such as human resources, customer preferences and market trends.



**Example**

The number of miles a truck drives will be non-financial information. When this data is combined with the fuel costs it can be used to work out the average price of petrol per mile.

**3. A mixture of financial and non-financial information**

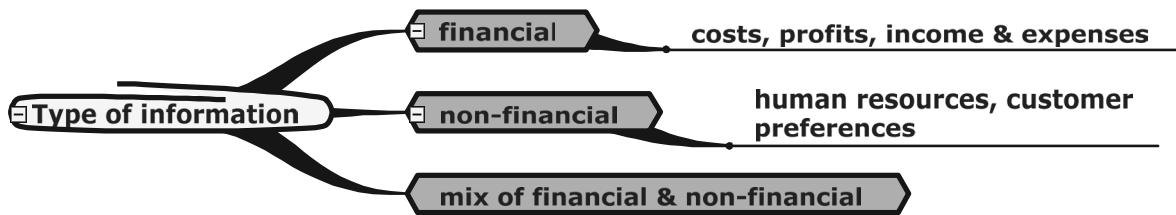
This is a combination of the above two where we attach a monetary value to the non-financial factors.



**Example**

A list of customer names, along with the amount outstanding from them, will give data on the actual amount outstanding from each customer. If the total receivables are Tshs1,000,000 then a list showing the names of the customers and the outstanding amount against each name will reveal the customers who owe the most money. For example, if one customer owes Tshs250,000 then he alone will account for 25% (250,000/1,000,000) of the receivables, and hence should be asked to pay his dues continually, until he does.

**SUMMARY**



**8.2 Sources of financial and non-financial cost information**

Relevancy, one of the attributes of good information, requires information to be correct so that it is useful to the recipient. The nature and source of cost information plays a very important role in this. The sources can be either **internal or external to the organisation**. Internal sources are those that **originate from within the organisation**, the external sources are those that **originate from outside the organisation**.

**1. Internal sources of cost information**

A piece of information that comes from an internal source is one that has been generated by the organisation itself. The main sources for this type of information are the various departments of the organisation such as the:

- Finance;
- Marketing;
- Human resources and
- Production department.

**(a) Finance department**

The types of information a finance department will provide will include:

- level of funds held by the organisation (e.g. bank balances, investments etc);
- level of funds the organisation owes to payables (e.g. monies owed to suppliers);
- level of funds owed to the organisation (e.g. pending bills from customers) and
- level of revenues, expenses and profits being made by the organisation.

**(b) Marketing department**

The types of information a marketing department will have will include:

- Details of past sales (e.g. which products have been bought by which customers);
- Forecasts of expected future sales (e.g. which products are likely to be bought by which customers);
- Customer details (e.g. which types of customers buy which products) and
- Marketing research reports (e.g. the expected demand for present and upcoming products).

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### (c) Human Resources department

The types of information a human resources department will have will include:

- Details on the employees of an organisation (e.g. designations, salaries, number of years with the organisation etc);
- Details on the departments of the organisation (e.g. number of employees, main responsibilities etc);
- Details on various job vacancies throughout the organisation and
- Details on training (which employees have been on / should go on which training courses).

### (d) Production department

The types of information a production department will have will include:

- Production schedules (e.g. which products are to be produced by when);
- Actual production outputs;
- All costs incurred with production and
- Quality levels attained during production (e.g. number of defective products).

## 2. External sources of cost information

Any piece of information that comes from an external source is one that has not been generated by the organisation but by an outside party instead. Naturally, the number and potential sources that external information can come from are almost innumerable.

Common sources of external information for an organisation include:

- (a) Customer feedback;
- (b) Trade associations and journals of their particular industry;
- (c) Newspapers, magazines and television;
- (d) The internet;
- (e) Surveys / market research conducted for the organisation by third parties (e.g. market research firms) and
- (f) External consultants and auditors.

Unlike information from internal sources, over which the organisation has control, the organisation has no control over external conditions and external sources of information.



### Example

A liquor company may consider expanding its operations to a new country. The internal sources of information such as availability of resources and costs involved can be provided by the company's management, on demand. However, external information, such as the new country's government policy towards the sale of liquor, and the estimated demand for the new product cannot be obtained by the company, and would be available at the discretion of external parties.

## 8.3 The importance of financial and non-financial cost information for managerial decision making

At a strategic level, both, financial and non-financial cost information gathered from internal and external sources is very useful for planning, decision making and control purposes. Top level management is responsible for setting the strategic direction and long-term objectives of the organisation.

The cost information obtained from internal and external sources can be used to exercise controls in the following:

1. Setting standards (benchmarking, standard costing)
2. Budgeting
3. Performance evaluation

A strategic plan for implementation is prepared, and various decisions on the best strategies to achieve the organisation's goals are taken. A combination of financial and non-financial information facilitates effective and timely decision-making.

The following table gives some examples of the cost information required at managerial level, and its use.

**Table 2**

Information obtained	Use of the information
Physical condition and performance (such as production capacity etc.) of the assets of the organisation	to know the production level at which the organisation can operate (i.e. number of units to be produced in the coming year) to decide whether to upgrade or purchase a new plant, machinery or equipment
Efficiency and effectiveness of the workforce (e.g. employees, managers etc.)	to know the requirements for training or employing a larger workforce to know the number of units that the organisation can produce with the present workforce, and accordingly to decide the number of units to be produced when it is not possible to procure extra workers immediately
Details (e.g. material required, labour hours required etc. to produce one unit of the product, per unit contribution etc.) of the various products	to take decisions such as which product to produce most and which product line can be discontinued i.e. to decide the product mix
Data of past sales of the products / services	to decide the strategies for increasing the sales to decide the product mix
Working capital requirement and the ways by which it can be met	to decide the arrangements for raising funds, if needed

At the operational level, financial information such as various sales, production, costing, profit reports are useful to assess performance by comparing the actuals with the budgets.



**Test Yourself 11**

Which of the following information can be obtained by checking the physical condition and performance of the assets of the organisation?

- A Management report on the number of units to be produced in the coming year
- B Management's decision outlining strategies for increasing sales
- C Management's strategy on the arrangement of funds
- D Management's decision on employing new factory workers.



**Test Yourself 12**

Uncle Bread is a manufacturer of bread and bakery products. It wants to introduce a tangy mint chocolate flavored bread into the market, by the start of next summer. For this purpose, Uncle Bread's management has gathered the following information:

- (i) Demand for the product offered
- (ii) Availability of the resources
- (iii) Competitors' pricing policies
- (iv) Feedback from the customers

The above information would typically fall under:

- A Product mix decision
- B Pricing decision
- C Make or buy decision
- D None of the above



### 9. Explain the impact of information technology on the generation, evaluation and promotion of cost information.

[Learning Outcome i]



#### Definition

Information Technology (IT) can be defined as the term used to label the subject area in which technology is used to transfer and process information quickly and efficiently to users, with the help of computer hardware and software.

In a business context, IT deals with the aspect of managing and processing information for organisations. Having an efficient IT system in place facilitates the exchange of information across the organisation. It allows information to flow more accurately and quickly than the paper-based manual predecessors. An IT system not only allows each department to perform its function more efficiently, but also enables each department to nurture the role it plays in the organisation.



#### Example

Supermarket chains like Wal-Mart Stores use computerised inventory control systems to electronically place order for their merchandise. The transfer of the merchandise from their warehouses to their shelves at retail outlets is also tracked and maintained by sophisticated IT systems.

IT is now recognised as an important business weapon. Moreover, traditional data processing applications designed to increase business efficiency through cost-reduction, instead, information technology is being used to improve effectiveness, e.g., through improved information for decision-making and faster customer response times. More radically, IT can be a key component in carrying out business in new ways and even transforming a business or sector.

It is clear that, while developing an IT system is a necessary condition for success, it is by no means sufficient. The question, therefore, is how new products, services, processes and ways of working involving IT can be managed to obtain business benefits. Today, the availability and cost of IT are not the major constraints on its effective application in business. The potential applications of IT which can be cost-justified and are technically feasible far exceed the capability of organisations to exploit these opportunities.

#### Impact of information technology on the generation, evaluation and promotion of cost information

Designing and implementing an efficient cost accounting system requires an arrangement for collecting and monitoring such data efficiently. Information technology can be used effectively to generate, evaluate, analyse and use cost accounting information in an organisation. Establishing an information technology system requires an understanding of the constituents of such a system and the specific needs of a business organisation.

A computerised information system may be designed to collect cost information regarding actual performance against functional goals in the form of quantity produced, amount of material wasted, idle labour, labour efficiency, quantity sold by divisions, inventory levels, delay in receiving payments from customers, delay in paying suppliers, amount of power wasted, product failures, customer complaints, customer satisfaction etc. A sound computerised information system enables management to fulfil its cost control function and conduct business effectively.

#### 9.1 There are four main types of information systems used by organisations.

##### 1. Transaction processing systems

Transaction processing systems (TPS) were the first type of information systems. As their names suggests the purpose of TPS is to **record and process the routine transactions** of an organisation.



#### Definition

A transaction is a business activity or exchange that occurs between an organisation and an external party. Transactions can also occur between the different divisions of an organisation.



### Example

In a furniture store, a transaction occurs when a customer buys a dining table.

These transactions were recorded on paper before the time of computers. Today many TPS are on-line, meaning that the transaction is actually recorded as it happens.



### Example

At a supermarket, purchases of customers are automatically entered into the TPS at the time payment is made at the check-out counter.

TPS for organisations not only keep an official record of transactions they also serve as the **data source for other systems** of the organisation such as:

- Customer billing systems;
- Vendor payment systems and
- Material control
- Payroll accounting



### Example

One Tree is an organisation that specialises in selling different types of lumber to construction companies. Whenever an order of lumber leaves the organisation's premises its TPS records the payment details such as the amount / type of lumber bought. This information is then used to automatically update the organisation's record of inventory (amount of inventory physically at the premises), thus, helping in material management.

## 2. Management information systems

Used broadly, an MIS is considered to be a system which satisfies all the information needs of managers. An MIS is the system of providing information to people who make choices about the allocation of valuable resources in a timely, accurate and complete manner at a minimum of cognitive and economic cost for acquisition, processing, storage and retrieval.



### Definition

**Management information system** is a system that provides data and information to the managers in the form of reports, including exception reports of matters requiring action, analysis and other information to support the functions of planning and control as well as decision making and its various aspects such as analysis and modelling.

MIS is used to pull together all the organisation's resources to equip all levels of management from every part of the organisation with the necessary information. This enables timely and effective decision making at all three levels of planning for which management is responsible.



### Example

The employee details in an organisation are recorded in a number of different files. Organisations today increasingly follow the system of creating a database of information which will practically fulfil any information request. MIS of an organisation is equipped with abilities to extract any information pertaining to an employee from the database thus prepared.

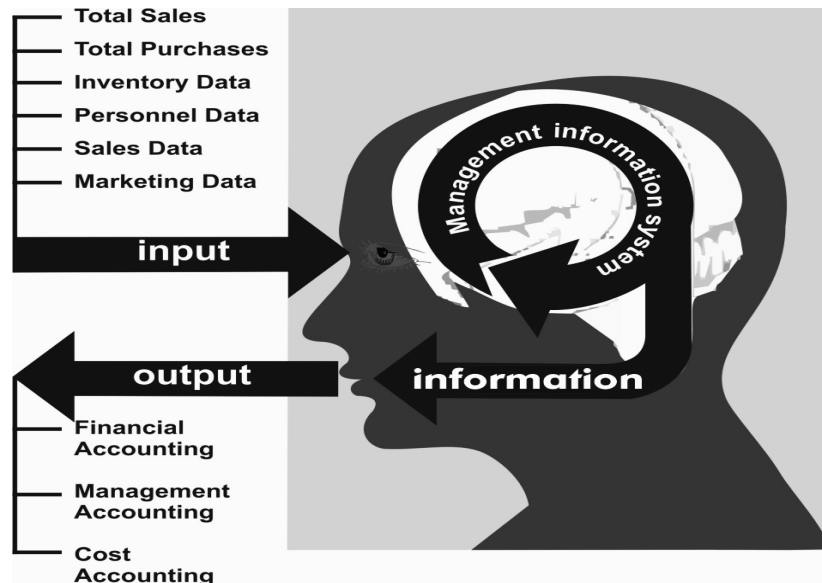
In case the management wants the information of an employee relating to his age, remaining years of service, date of joining, his salary structure or his leave record then the MIS has the capability to extract all this information from the different locations in the database.

### 36: Cost Accounting, Cost Classification and Coding

The role of management information systems (MIS) is to generate a regular series of reports for the managers and executives of an organisation. These reports will contain the necessary information that this group requires to make **strategic / managerial decisions** and **monitor the progress** of an organisation.

MIS will typically take raw data from TPS as their inputs. MIS will then perform **calculations and / or data comparisons** on this information to generate its outputs (reports). The reports generated will fall into one of three broad categories: summary, detailed and exception. Summary records provide a summarisation of all of an organisation's various transactions.

Diagram 8: Functioning of an MIS



An MIS may include

**Accounting records:** bill books, purchase order book, cash book.

**Financial statements:** statement of comprehensive income, statement of financial position

**Inventory data:** stores ledger, dispatch notes

**Production schedules:** specifying the daily and weekly output targets to be achieved

**HR (Personnel) records:** employees' personnel files, time sheets

**Marketing data:** including market trends and customer expectations

**Processed information:** to be used by management in the attainment of the organisational objectives

### 3. Decision support systems

The objective of decision support systems (DSS) is to help management / executives make decisions in situations with high levels of uncertainty. DSS comprise of a set of tools and techniques that will allow the decision makers of an organisation to **run various "what if" scenarios on cost accounting data**. It is particularly helpful for decision makers who would like to compare what the potential outcomes of a number of different strategies would be.



#### Example

A common example of a very basic DSS is a spreadsheet. A spreadsheet can be used to provide users with an indication of how changing one variable (e.g. the price of a product) will affect all the other variables involved in a business equation (e.g. sales of the same product).

### 4. Office automation systems

Office automation systems (OAS) use a combination of hardware, software and networks to enable employees to perform traditional paper based tasks electronically. Their purpose is to increase efficiency and productivity amongst employees when they are processing costing data and information.



#### Example

One of the most common examples of an OAS is Microsoft's Office XP product.

## 9.2 Systems facilitating remote input of cost accounting data

In today's rapidly developing business world, data entry has become one of the fastest growing trends. Data entry is defined as the process of entering data into a computerised database or spreadsheet. Data is entered into the computer by means of a keyboard or by a scanner. Data entry services are offered for all kinds of textual or non-text (e.g. images) data captured from paper documents, manuscripts, scanned image files, old databases, microfilms, web research, etc.

In today's business environment, data capture is one of the most significant components of any content management solution. It is a process that reduces the tedium and expense of manually entering data from forms (hard copies) and other sources including barcode labels, employee pass cards and electronic sensors of all kinds.

Generally, the data input remotely done by using computer devices is termed Remote Data Input (RDI). The traditional methods used for capturing data include tally charts, batch keying, interactive capture and magnetic recordings. In the modern era, data capture capability includes a wide range of mobile data collection technologies. Electronic data capture is the latest version; mainly conducted in three ways: OCR (Optical Character Recognition) and ICR (Intelligent Character Recognition), OMR (Optical Mark Recognition). Multiple data capture options allow selection of the best data capture method for every business need.

There are a number of new techniques that allow employees to enter data (including cost accounting data) remotely. There is now no need to enter data manually. A key advantage of these techniques of data capture is that the data can be entered into the organisation's computer system whether the individual is in the office or elsewhere in the world. Data entry via the following mediums reduces errors as all data is entered at source automatically and not by human transcription. The techniques are as follows:

1. **Barcode reader:** these offline machines are based on barcode identification technology. Every ID card is printed with a barcode and laminated. A retail product also has a barcode printed on it and the price of the product and other related information can be captured by decoding the barcode. A barcode reader is used to read the code. The reader uses a laser beam that is sensitive to the reflections from the barcode lines and space thickness and variation. The reader translates the reflected light into digital data that is transferred to a computer for immediate action or storage.
2. **MICR:** MICR (magnetic ink character recognition) readers detect characters and convert them into digital data. Although optical methods (OCR) have become as sophisticated as the early MICR technology, magnetic ink is still used. MICR is a technology used to verify the legitimacy or originality of paper documents, especially cheques. It serves as a deterrent to fraud, because a photocopied cheque will not be printed with magnetic ink.
3. **OCR:** optical character recognition, often abbreviated to OCR, refers to the branch of computer science that involves reading text from paper and translating the images into a form that the computer can manipulate (for example, into ASCII codes). An OCR system enables you to take a book or a magazine article, feed it directly into an electronic computer file, and then edit the file using a word processor.
4. **ICR:** ICR (intelligent character recognition) is the computer translation of handwritten characters. Data is entered from hand-written forms through a scanner, and the image of the captured data is then analysed and translated by sophisticated ICR software. ICR is similar to optical character recognition (OCR) but is a more difficult process since OCR is from printed text, as opposed to handwritten characters.
5. **OMR:** OMR (optical mark recognition) is a scanner that reads marks on specific areas of a page. This technology is used to electronically extract intended data from marked fields, such as checkboxes and fill-infields, on printed forms. OMR technology scans a printed form and reads predefined positions and records where marks are made on the form.
6. **Fingerprint recognition:** electro-optical fingerprint recognition is a biometric technology that enables the scanning, comparison and identification of fingerprints without the traditional need for ink and paper.
7. **EPoS:** EPoS (electronic point of sales) is found in almost all major retail stores, restaurants and other businesses. EPoS systems provide businesses with a convenient way of recording purchase transactions. EPoS systems generally include some sort of store inventory database, which is updated automatically when a purchase is made. Other tasks are carried out by the EPoS system, including the printing of receipts, processing of credit cards and storage of customer and other records. An EPoS system is highly efficient, thereby easing the queues at checkouts, while registering all the relevant information that the business needs to record and manage.

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The **other remote input devices** include **digital cameras, RFID devices** and **scanners**.

The IT systems today facilitate the data input process by providing easy to use and user friendly input mechanisms. They do not require the user to understand cost accounting or finance; the user can still input the data which forms the very basis of accounting records.



#### Example

By using a hand held device, a supermarket or departmental store staff can take physical inventory of all items, which is used by the system that works at the backend to compute the valuation. The idea here is to capture the data electronically rather than requiring anyone to input it manually. The data so collected is then transmitted to the central computer wherein it gets converted into a format that is suitable for processing.

This ensures accuracy and speed, which are very important for being efficient and effective.

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### 9.3 Systems facilitating access to cost accounting data

The following systems facilitate access to cost accounting data throughout the organisation:

#### 1. Database management system

A **database management system (DBMS)** is computer software designed for the purpose of managing databases (including databases relating to cost records). The DBMS accepts requests for data from the application program and instructs the operating system to transfer the appropriate data. It provides the user with the means of accessing the database.

When a DBMS is used, information systems can be changed much more easily as the organisation's information requirements change. New categories of data can be added to the database without disruption to the existing system.

Organisations may use one kind of DBMS for daily transaction processing and then transfer the processed information onto another DBMS which is better equipped for random enquiries and analysis.

A relational database management system (RDBMS) is a database management system that is based on the relational model as introduced by E.F. Codd. Relational databases are the most common kind of database in use today.

#### 2. Data warehouse

A **data warehouse** is the main repository of an organisation's historical data; its corporate memory. It contains the raw material for management's decision support system. It contains data regarding the internal transactions of a business (Sales / Purchase ledger details), whilst also containing external data. The critical factor leading to the use of a data warehouse is that a costing data analyst can perform complex queries and analysis, such as cost data mining, on the information without slowing down the operational systems.

An ideal data warehouse should have the following features:

- (a) The data in the database is organised so that all the data elements relating to the same real-world event or object are linked together;
- (b) The changes to the data in the database are tracked and recorded so that reports can be produced showing changes over time;
- (c) Data in the database cannot be over-written or deleted, once committed.
- (d) The data is static, read-only, retained for future reporting; and
- (e) The database contains data from most or all of an organisation's operational applications, and this data is made consistent.

#### 3. Intranet

An **intranet** is a private computer network that uses internet protocols and network connectivity to securely share part of an organisation's information or operations with its employees. Sometimes the term refers only to the most visible service: the internal website.

An intranet benefits an organisation:

- (a) By allowing people to share a set of data and thereby eliminating the need for storage, printing, and distribution of documents
- (b) By providing easy access to the information, e.g. documents leading to improvements in productivity and efficiency
- (c) By enabling information to be updated electronically
- (d) By enabling employees to access corporate information easily and thereby increasing work flexibility

#### 4. Extranet

'Extranets' differ from 'intranets' in that the later are generally restricted to employees of the organisation while extranets can generally be accessed by customers, suppliers or other approved parties.

Those who are allowed to access the information in an extranet, are required to enter their respective username and password. Based on the level of information allowed to be accessed, the levels of accessibility to outsiders are defined.

#### 5. Data mining

**Data mining** can be described as the nontrivial extraction of implicit, previously unknown, and potentially useful information from data. Data mining may also be described as the science of extracting useful information from large data sets or databases.

Data mining is the principle of sorting through large amounts of data and selecting the relevant information. It is usually used by business intelligence organisations and financial analysts, but it is being increasingly used in the sciences to extract information from the enormous data sets generated by modern experimental and observational methods.

Companies can use data mining feature to extract cost accounting data relating to previous periods for the purposes of comparison over different time horizons.

#### 6. Groupware

Groupware is collaborative software that is designed to help people involved in a common task to achieve their goals.

Groupware services can include the sharing of calendars, text chat, collective writing, e-mail handling, shared database access and video conferencing (electronic meetings with each person able to see and display information to others).

Collaborative management tools facilitate and manage group activities. Examples of these tools are:

- (a) Project management systems: schedule, track and chart the steps in a project as it is being completed
- (b) Knowledge management systems: collect, organise, manage and share various forms of information
- (c) Online spreadsheets: collaborate and share structured data and information
- (d) Electronic calendars: schedule events and automatically notify and remind group members

#### 7. Enterprise Resource Planning (ERP) systems

ERP is an enterprise-wide software system which is a transaction processing and reporting mechanism through an integrated approach. ERP enables the organisation to use a unified database so that the transactions are recorded and processed in an integrated manner. The different business intelligence tools like EIS enable managers to access dash board reports almost on an online basis. The facility is usually access-controlled so managers can access only relevant data. In the previous versions of IT systems, managers did not have a direct access to the required data and had to depend on IT or the accounts department for information.

Cost accounting measures such as budgets, standards or any other benchmarking parameters can be fed into the system. According to the defined time frequency (which can be real time online!), the system processes the comparison of actual vs. benchmarks and updates variance reports for managers. These reports are useful in measuring the performance and controlling the activity by initiating actions in time.

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### 9.4 Monitoring cost and overall business performance

Businesses are set up to earn and, wherever possible, maximise profits. If a business is not aware of whether its objective of profit maximisation has been achieved, the purpose of setting up the business may be questioned. The monitoring of cost and overall business performance requires an arrangement for collecting and monitoring cost and business performance data. The data compiled in this way enables management to evaluate business performance in comparison to pre-determined objectives. Any variation on important measures works as a warning, and management can take timely corrective action.

The system of IT in an organisation may be designed to collect information regarding actual performance against functional goals in the form of quantity produced, wastages of material, idle labour, labour efficiency, quantity sold by divisions, inventory levels, delay in receiving payments from customers, delay in paying suppliers, wastage of power, product failures, customer complaints, customer satisfaction etc.

#### The advantages of implementing information technology in cost accounting

1. Implementation of information technology not only **enables the sharing of cost information** across different departments but also **provides flexibility to respond to changes** in such information.



#### Example

In Royal Dutch Shell, worldwide technology enables planning managers and general managers to share information about their business instantly. Sharing of experiences with new techniques, information about emerging issues in cost accounting and discussion on topics of interest and concern are supported by this network. Internet benchmarking is greatly facilitated and strategic developments in Lausanne are immediately available to managers located in Louisiana, Lucknow and London.

2. **Improves performance** via pooled resources, innovation and collaboration across organisational boundaries.
3. **Enhances service development capabilities and administrative efficiency** to shorten product design time, reduce the number of prototypes that must be built, cut costs, improve quality and foster better collaboration, communication and coordination among project members. The vast amount of costing and other information that is readily available to employees and the availability of information on the internet now **makes competitive and industry analysis much easier and considerably more effective**.
4. Within the organisation, the integrated systems offered by software such as SAP and Oracle **allow senior managers to "drill down" to the smallest transaction**. While it is patently absurd for the CEO of a major company to go down to the detail of a trivial accounting transaction in a small and remote sales office, this access to operational information can be and is being put to effective use by top management.



#### Example

The CEO of CNG, a major energy company headquartered in Pittsburgh, Pennsylvania, can, at 7.00 a.m. Eastern Time, access the databases of the company's exploration and production division based in Houston, Texas and leave e-mail messages that the head of the division reads and acts on at 7.00 a.m. Central Time.

5. Formerly complex and challenging problems of cost accounting have now transformed into more routine and streamlined problems, thereby **reducing the burden on senior managers** who can now shift their attention and capabilities to other issues.



#### Test Yourself 13

What is the basic difference between OCR and ICR?



#### Test Yourself 14

Write a brief note on Groupware.

### Answers to Test Yourself

#### Answer to TY 1

The correct option is **B**.

Option A is incorrect as it refers to the definition of cost centre  
Option C is incorrect as it relates to the definition of cost object.  
Option D is incorrect as it relates to the definition of cost.

#### Answer to TY 2

The correct answer is **A**.

The profit / loss made by a company in an accounting year are reported by financial accounting.

#### Answer to TY 3

The correct option is **B**.

The format for financial accounting statements is often declared by law and the Financial Reporting Standards.

#### Answer to TY 4

The correct answer is **C**.

Coding involves assigning codes to a unique set of in order to distinguish and identify it from another unique category of items.

#### Answer to TY 5

Budgetary control is an important function of the cost accounting system. It is aimed at ensuring that the standards set in the planning process (budgets) are achieved and costs are within the acceptable limits. The budgetary control system compares the actuals with the budgeted figures and reports variances for corrective action to be taken.

#### Answer to TY 6

The correct answer is **D**.

Steps involved in installation of a cost accounting system: identifying the objective of the system, evaluating the existing organisational functions, determining the structure of cost accounts, obtaining consensus and establishing responsibilities of the cost office.

#### Answer to TY 7

The correct option is **D**.

A good plan is flexible according to the situation, economical (having low costs) and achievable under the given set of conditions – practicable. Therefore all the answers are correct.

#### Answer to TY 8

The correct option is **A**.

Choosing the best alternative implies making a decision. Comparison of results is a part of the control process. Goal setting is a planning exercise. Assessment of the internal and external environments is again a part of planning.

#### Answer to TY 9

The correct option is **B**.

The first option of assessment implies the steps of planning. Second option outlines the control process. Third alternative is the decision making process.



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### Answer to TY 10

The correct answer is **D**.

Sales managers are internal users of cost information. They evaluate the effect of alternate pricing decisions on business activities and profit levels; determine the sales budget, breakeven point etc.

### Answer to TY 11

The correct answer is **A**.

In order to take a decision to increase the level of production for the coming year, management would have to check the feasibility of the proposal by verifying the physical condition and the capacity of the assets. The other options relate to sales, financing and employment decisions.

### Answer to TY 12

The correct answer is **A**.

The above information would help the management of Uncle Bread to take the necessary decisions to launch the new product. This information would also indicate whether the available resources are enough to fulfill the production requirements, and the kind of feedback (positive or negative) they will get from their potential customers.

### Answer to TY 13

OCR (optical character recognition) can read printed text not handwritten text whereas ICR (integrated character recognition) can read handwritten text.

### Answer to TY 14

Groupware is collaborative software that is designed to help people involved in a common task achieving their goals. Groupware services can include the sharing of calendars, text chat, collective writing, e-mail handling, shared database access and video-conferencing (electronic meetings with each person able to see and display information to others).

## Self Examination Questions

### Question 1

The cost of manufacturing product Hester is Tshs20,000 per unit. It is a practice of the company to add a profit margin of 25% to the cost of production while determining the selling price. Calculate the selling price (per unit) of product Hester.

### Question 2

**Which of the following sentences ascertains that cost accounting is a profession?**

- A** Cost accounting helps in comparing data of various years.
- B** Cost accounting helps in ascertaining the cost of production and selling price of a product.
- C** Cost accounting is a specialised body of knowledge.
- D** Cost accounting facilitates preparation of other financial statements.

### Question 3

**Which of the following is a function of a budgetary control system?**

- A** The budgetary control system helps in coding of costs.
- B** The budgetary control system helps in reporting variances.
- C** The budgetary control system helps in determining the break even sales.
- D** The budgetary control system helps in evaluating whether the cost records have been maintained in accordance with the principles and practices of cost accounting.

**Question 4**

Which of the following statements regarding computers is not true?

- A A computer can provide accurate information in multiple forms.
- B A computer takes decisions in the absence of managers.
- C A computer can easily link different users, which helps to improve the distribution of data.
- D A computer has fast computational capacity and can store information systematically.

**Question 5**

Explain any five techniques that can be used for the remote input of cost accounting data.

**Question 6**

Cost accounts present cost, revenue and profit / loss related information for:

- A The entire organisation
- B A product, service or activity
- C A separate section or department
- D All of the above

**Question 7**

The users of management accounting information are the same as those of financial accounting information.

- A True
- B False

**Question 8**

The primary purpose of \_\_\_\_\_ accounting is to determine whether the business is profitable or unprofitable and to determine its financial position at a particular point of time.

- A Management
- B Cost
- C Financial
- D Cost and management

**Question 9**

Financial accounting is primarily historical in nature.

- A True
- B False

**Question 10**

The alternative chosen as the best through the decision making process should be one that yields:

- A Maximum benefits with maximum possible risk and cost
- B Minimum benefits with minimum possible risk and cost
- C Maximum benefit with minimum possible risk and cost
- D Minimum benefits with maximum possible risk and cost

**Question 11**

What is control referred to when applied to high level planning?

- A High level control
- B Operational control
- C Critical control
- D Management control

**Answers to Self-Examination Questions**

**Answer to SEQ 1**

The selling price (per unit) of product Hester = Tshs25,000

The selling price (per unit) of product Hester can be determined as follows:

$$\begin{aligned} \text{Selling price} &= \text{cost of production} + (25\% \text{ of cost of production}) \\ &= \text{Tshs}20,000 + (25\% \text{ of Tshs}20,000) = \text{Tshs}25,000 \end{aligned}$$

**Answer to SEQ 2**

The correct answer is **C**.

Cost accounting is a specialised body of knowledge. The principles and practices of cost accounting need to be acquired by individuals with formal education and training. Thus, it is a profession.

**Answer to SEQ 3**

The correct answer is **B**.

The budgetary control system compares the actual costs and revenues with the budgeted figures and reports variances for corrective actions to be taken.

**Answer to SEQ 4**

The correct answer is **B**.

Computers can support management by providing timely, accurate and relevant information for decision making, but they cannot make the decisions. The final decision will always remain with the managers.

**Answer to SEQ 5**

The following techniques can be used for the remote input of cost accounting data:

- (a) **MICR:** is a character recognition system that uses special ink and characters. MICR technology is used by banks. Numbers and characters found on the bottom of cheques (usually containing the cheque number, sort number and account number) are printed using magnetic ink. MICR provides a secure, high-speed method of scanning and processing information. MICR readers detect the characters and convert them into digital data. Although optical methods (OCR) have become as sophisticated as the early MICR technology, magnetic ink is still used.
- (b) **OCR:** (optical character recognition) is the recognition of printed or written text characters by a computer. This involves photo-scanning of the text character-by-character, analysis of the scanned-in image, and then translation of the character image into character codes, such as ASCII, commonly used in data processing. An OCR system enables you to take a book or a magazine article, feed it directly into an electronic computer file and then edit the file using a word processor.
- (c) **ICR:** the machine recognition of handwritten characters as well as machine printing that is difficult to recognise. ICR is similar to optical character recognition (OCR) but is a more difficult process since OCR is from printed text, as opposed to handwritten characters. Data is entered from handwritten forms through a scanner, and the image of the captured data is then analysed and translated by sophisticated ICR software.
- (d) **OMR:** a scanning device that recognises marks made on the page. OMR (optical mark recognition) is frequently used when processing questionnaires and answer sheets, i.e. any type of form in which boxes have been ticked. Technically optical mark recognition is the process used by an optical mark reader to detect marks on a form being scanned.
- (e) **Barcode reader:** (or **barcode scanner**) is an electronic device for reading printed barcodes. A barcode reader is used to read the code. Every ID card is printed with a barcode and laminated. Like a flatbed scanner, it consists of a light source, a lens and a photoconductor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain **decoder** circuitry analysing the barcode's image data provided by the photo conductor and sending the barcode's content to the scanner's output port.

**Answer to SEQ 6**

The correct option is **B**.

Cost accounts present information separately for a product, service or an activity. Cost accounts are more internally focussed and as such present detailed information. Financial accounts present the entire organisation's information and only a section or department is covered when you present management information according to the requirements specified.

**Answer to SEQ 7**

The correct option is **B**.

False, financial accounting information is available to persons external to the organisation whereas management accounting information is usually not available to them.

**Answer to SEQ 8**

The correct option is **C**.

Financial accounting is aimed at determining the profitability, performance and financial position of an organisation at a particular point of time.

**Answer to SEQ 9**

The correct option is **A**.

Financial accounts always show the historical results of operations undertaken in the past period.

**Answer to SEQ 10**

The correct option is **C**.

Maximum benefits with maximum risk can land the organisation in heavy losses. Minimum benefit with minimum risk is again compromising on low profits and the long term objective of maximisation of profits. Minimum benefit with maximum risk is also a bad option, logically.

**Answer to SEQ 11**

The correct option is **D**.

Management control means monitoring the efficient and effective use of the resources employed by an organisation towards the desired goals. High level control is exercised by management. Operational control is performed by the lower level staff and critical control is any control which is exercised in a crucial situation.



## STUDY GUIDE A2: COST CLASSIFICATION AND COST CODING

### Get Through Intro

It is essential to accumulate the expenses under appropriate account heads. These have to be further classified under direct and indirect expenses. Indirect expenses form part of the overheads, to be absorbed into unit costs. Classification of costs under various heads holds significance to managers for several reasons such as it aids managers in tracking their annual budget expenditure and it helps managers in determining where their greatest expenditure comes from.

This Study Guide helps you to understand the importance of cost classification and how it forms the basis of cost coding.

The contents of this Study Guide will be very useful in your professional life as it is likely that you will have to produce the costing reports for management.

### Learning Outcomes

- a) Define cost classification.
- b) Define cost coding.
- c) State the importance of cost classification.
- d) Explain various types of cost coding systems.
- e) State the importance of cost coding.

### 1. Define cost classification. State the importance of cost classification.

[Learning Outcomes a and c]

#### 1.1 Cost and cost classification

Cost is the expenditure incurred on resources that are used to achieve a particular objective. Resources may be tangible (materials or machinery) or intangible (labour, patent, copyright etc.).

A cost objective is the reason for which the resource is exhausted. Cost represents the amount incurred on, or attributable to, a “cost objective”.

Costs can be of various types and the same set of costs may be analysed in different ways. Under the traditional system of costing, costs are classified functionally as production and non-production costs. Production cost and non-production cost collectively become the **total costs**.



#### Definition

Cost classification is the segregation of costs (expenses) into different categories.

**Costs** can be **classified based on the purpose** of their classification (responsibility, function, behaviour, direct / indirect):

1. **Responsibility cost:** costs are assigned as per the responsibility.
2. **Function cost:** classification showing the nature of the output for which the costs are incurred, like product packaging, sales promotion, or other such specific activities.
3. **Behaviour cost:** classification showing behaviour, like fixed costs, variable costs, mixed costs (semi-variable costs and stepped up fixed costs).
4. **Direct cost:** costs which can be traceable to units of production, like direct materials, direct labour and direct expenses.
5. **Indirect costs:** cost which cannot be easily or perfectly traceable to each unit of production, like overheads (production, administration and selling and distribution).

Moreover, costs may be required for the purpose of **external reporting** or **internal management use**.

#### 1.2 Importance of cost classification

Classification of costs under various heads holds significance to managers for several reasons such as it aids managers in tracking their annual budget expenditure and it helps managers in determining where their greatest expenditure comes from. Cost classification split down costs into separate groups of similar categories. Costs are classified in various ways depending upon purpose.

For example, organisational managers may require the cost data for the following purposes:

- For preparing external financial reports,
- For preparing planning budgets, or
- For making short-term or long-term decisions

Each particular use of cost data needs to be differently classified and defined. For example, while preparing external financial reports, organisations require historical cost data, whereas for decision making organisations may have need of predictions about future costs. Cost classification is also required for assigning costs, controlling costs and preparing cost accounting statements. The following paragraphs highlights why specific classifications are important for organisations.

**1. Classification as production cost and non-production cost**

The distinction of costs into production and non-production cost is very important from the viewpoint of inventory valuation. Finished goods or finished products are products that are complete and ready for sale. Finished goods still in the warehouse are generally valued **excluding non-production costs** such as selling, distribution and administrative overheads etc. Remember, production costs are product costs and non-production costs are usually period costs. This is the reason why the **finished goods** inventory is valued at **production costs**. The items of costs that are included in the costs of the finished goods still in the warehouse are called inventoriable costs. Sometimes **non-production costs** incurred within the factory itself may be added to the finished goods inventory cost. This is because these costs are incurred directly to facilitate production.

**Closing inventory** at the end of the year is valued at **production cost** since the non-production costs are usually not yet incurred on this. Non-production costs are charged to the cost of sales of the product only when it is sold. Costs such as selling and distribution costs will be incurred on the inventory when it is sold. Until the time these are in finished goods inventory, only production costs form a part of their cost.

**2. Classification as fixed cost and variable cost**

The distinction of costs into fixed and variable components is very important from the viewpoint of decision-making. It helps a manager to make crucial decisions such as whether to manufacture a component in-house or buy it from outside vendors, whether to continue the business or shut down, whether to start a new business etc.

**3. Classification as direct cost and indirect cost**

Costs are classified into direct and indirect by nature. The distinction of costs into direct and indirect is necessary because they need different treatments for cost computation and control. Most cost accounting techniques employed in decision making also consider this distinction to be essential for cost analysis.

**4. Functional classification of costs**

Costs are **classified by function** as **administrative, selling, distribution and research and development**. These are all a part of indirect expenses / overheads. For the entire organisational activity, these costs are directly taken to the SOPL (statement of profit or loss).

**5. Behavioural classification of costs**

Often, organisational managers are required to predict how costs will change in response to changes in activity. For example, by increasing or decreasing production, how costs will get affected. To determine the extent of these changes, behavioural classification is necessary.



**Test Yourself 1**

Which of the following cost classification helps an organisation for short-term decision making?

- A Functional classification
- B Behavioural classification
- C Classification as direct cost and indirect cost
- D Classification as fixed cost and variable cost



2. Define cost coding.  
Explain various types of cost coding systems.  
State the importance of cost coding.

[Learning Outcomes b, d and e]



**Definition**

A code is a system of symbols designed to be applied to a classified set of items to give a brief accurate reference, facilitating entry, collation and analysis.

CIMA Official Terminology, 2005

**Cost coding**

Cost coding is symbols applied to sets of cost items (which may be cost elements, products, cost centres), giving a brief, accurate and logical reference, which facilitates entry, collation and analysis of items in the accounts to meet information requirements.

Cost classification forms the basis of any cost coding. It aids in understanding the specific of any cost through a short symbolised form.

Cost should be correctly coded in order to be accurately accounted. In most organisations both income and expenditure are coded before they are incorporated in the accounting records. In both credit and cash transactions, it is advisable to code every item in order to identify it.

Usually in order to determine direct and indirect cost all the required source documents (e.g. for material cost-purchase invoice, for labour cost- payrolls and pay slips and for overheads- invoice, petty cash voucher and cash memo etc.) should be sequentially coded / pre-numbered. Sequential coding helps the accounts department to determine that every invoice has been accounted.



**Example**

A coding system uses a combination of letters and numbers to classify costs. The first two digits of each code represent the cost centre, the third and fourth digits represent the type of expense and the fifth and sixth digits represent the detail of the expense.

Relevant codes for a particular expense are:

	Code
Selling expense	24
Northern division	ND
Commission	SC

What is the correct code for the above expense?

**Answer**

ND24SC – ND for cost centre, 24 for selling expense and SC for detail of selling expense

**2.1 Importance of cost coding**

The method of giving a code to items / set of items is known as coding. Correct coding makes it easy to determine if two item codes can be billed together, with or without a modifier. Through correct coding one always has the most current information.

In order for costs to be accurately accounted for, they should be correctly coded. Nowadays, in most organisations, both the income and expenditure are coded before they are incorporated in the accounting records. Codes can be alphabetic or numeric. Alphabetical codes are generally used for company names or a person's name. In both credit and cash transactions, it is advisable to code every item in order to identify it.

**Coding** involves giving symbols to items for the purpose of classification.

Here, codes are used in place of detail and lengthy written description. Coded items can be easily classified into relevant groups for the purposes of recording and processing data. A general ledger will consist of a large number of coded accounts. A business will decide its own codes for its general accounts. Each customer is allocated an account which is identified by a unique code number.

The following are some basic benefits of coding items:

- Saves data entry and processing time because codes are shorter than lengthy descriptions
- Saves storage place in computer
- Easy to identify
- Easy to classify
- Easy to analyse

 **Example**

Gorgeous Plc deals in cosmetics. It has adopted a coding system for various kinds of perfumes and foundations. The codes are designed to provide information about the type of perfume, pack type and pack size. This enables all the products to be classified according to their characteristics. This helps to identify the products, even if the same perfume is available in several pack types and sizes.

**2.2 Various types of cost coding systems**

How do we allocate a code to a specific item or a specific cost? This mainly depends upon the company's needs. The following are some methods adopted for coding:

- Sequence codes
- Block codes
- Digital codes (codes in mathematical digits or alphabets)
- Faceted codes
- Hierarchical codes
- Mnemonic

**1. Sequence codes**

Sequence coding is a simple method of coding data. A sequential code follows an alphabetical or numerical sequence. For example, for the first item, the code could be 1, i or A, for the next, 2, ii or B, and so on. Although simple, sequence coding may not be suitable for all purposes such as sales products.

 **Example**

Normally, invoices or receipts are coded sequentially. For example, sales vouchers could be coded as 1, 2, 3... and so on.

**2. Block codes**

The block coding system is modification of the sequence coding system. In the block coding system, there is a different sequence for each different group of items. A group of persons, customers, countries etc. is divided into subgroups which are then allotted codes. It usually forms the basis for a chart of accounts.

 **Example**

Symphony Inc is a large dealer in ready-made clothes. It has divided its customers into four groups:

- For local customers it has given code numbers from 1,000 to 2,000.
- For non-local customers, code numbers are within the block 2,001 to 4,000.
- For international customers, code numbers begin from 4,001.

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### 3. Digital codes

Digital coding is also a very simple method of coding items in accordance with their characteristics and description.

It may be numerical, alphabetical or alphanumerical.



#### Example

#### Continuing the previous example

The clothes can be classified according to material and coded as follows:

Cotton clothes	code: A, 1 or A1
Synthetic clothes	code: B, 2 or B2
Silk clothes	code: C, 5 or C5

### 4. Faceted codes

It is useful when an item can be classified in more than one way. When there are number of sections and groups / subgroups, the faceted coding system can be used to represent their distinguishing features. A faceted code is one that is broken down into a number of facets or fields, each of which signifies a unit of information.



#### Example

A shoe shop might use a code based on the aspects of type of footwear, type of customer, colour and size.

If 'LF' stands for leather footwear, 'G' stands for gents' footwear; 'BLK' stands for black and 9 is the size, then this particular item of footwear will be coded as 'LF G BLK 9'.

### 5. Hierarchical codes

Hierarchical codes are used when there is a interrelationship between the items. The coding systems used by libraries, such as the Dewey Decimal system, are examples of hierarchical codes. The advantage of such a system is that it is infinitely expandable in a logical, structured, way.



#### Example

Usually in bookstores or public libraries, books and magazines are arranged according to subject or section. In a bookstore, books are coded 1, 2, 3, 4 and 5 for religious books, fiction, non-fiction, general knowledge and language respectively.

Now in the language section, it has coded English, Spanish, German, Urdu and Swahili books as 5.1, 5.2, 5.3, 5.4 and 5.5.

For grammar books, the codes 5.1.1, 5.2.1, 5.3.1, 5.4.1 and 5.5.1 are used.

### 6. Mnemonic coding

Mnemonic means something that helps the memory. Mnemonic codes give visible hints concerning the products they represents. Often, it is derived from the description of the product.



#### Example

A good example of a mnemonic code is the three character code used to designated international airports:

London Heathrow	LHR
Hong Kong	HKG

The key benefit of mnemonic coding is that it is very easy to memorise, as the concept is based on man's abilities to relate simple word constructs with the subject matter.



**Test Yourself 2**

Which of the following is incorrect?

- (i) Coding helps in rectifying errors in accounting.
- (ii) Coding data saves data entry and processing time because codes are shorter than lengthy descriptions

- A (i) and (ii)
- B (i)
- C (ii)
- D None of the above



**Test Yourself 3**

Sequence codes follow \_\_\_\_\_ sequence.

- A Only Alphabetical
- B Only Numerical
- C Both A and B
- D None of the above

**Answers to Test Yourself**

**Answer to TY 1**

The correct option is **D**.

Classification of costs into fixed and variable elements help the organisational management in short-term decision making as fixed costs remain static during budget period or during a specific time frame.

**Answer to TY 2**

The correct option is **B**.

Coding is only for identification purpose, not for rectifying accounting entries.

**Answer to TY 3**

The correct option is **C**.

Sequence codes follow both sequence.

**Self Examination Questions**

**Question 1**

Which of the following is not the benefit of coding system?

- A Easy to identify
- B Easy to classify
- C Easy to analyse
- D Easy to workout

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### Question 2

When an item classified more than one way, in that case which coding method is used?

- A Sequence codes
- B Faceted codes
- C Block codes
- D Digital codes

### Question 3

How are costs classified under the traditional costing system?

## Answers to Self Examination Questions

### Answer to SEQ 1

The correct option is **D**.

Coding system is tedious, not very easy to work out.

### Answer to SEQ 2

The correct option is **B**.

When an item classified more than one way, faceted coding method is used.

### Answer to SEQ 3

Under the traditional system of costing, costs are classified functionally as production and non-production costs. Production cost and non-production cost collectively become the total costs. Non-production costs are charged to the cost of sales of the product only when it is sold. Until the time these are in finished goods inventory, only production costs form a part of their cost. Production costs are product costs, whereas non-production costs are usually period costs.

Examples of production costs include:

- Direct and indirect materials
- Direct and indirect labour
- Direct / chargeable expenses

Examples of non-production costs include:

- Selling and distribution expenses
- Administration expenses
- Research and development expenses

It is important to note that finished goods inventory is valued at production costs since they are incurred directly to facilitate production.

## STUDY GUIDE A3: COST CLASSIFYING TECHNIQUES

### Get Through Intro

Incurring costs is an inevitable part of running any business. Evaluating business ideas, finalising an idea, setting up a business and running it are all activities that incur costs.

Costs are classified into various categories based on behaviour, purpose, function and nature. These classifications help management in decision-making, forecasting and budgeting.

This Study Guide will help you understand costs, classify them into various categories and use them for management purposes and total cost calculations.

In the role of a management accountant you will need to have a thorough understanding of various costs and this Study Guide will prepare you for that. This is the basic introduction to costing and hence will help a strong foundation to understand the further Study Guides and complex concepts.

### Learning Outcomes

- a) Explain the various types of costs.
- b) Describe the elements of cost.
- c) Classify costs according to cost elements.
- d) Classify costs according to their traceability to cost units (Direct and Indirect).
- e) Classify costs according to the major functions of an organization (Manufacturing, Administrative).
- f) Classify costs according to their reaction to changing levels of activity (fixed, variables etc).
- g) Classify costs according to timeframe (historical, current, future).
- h) Classify cost into prime cost and overhead.
- i) Analyse a semi-variable cost into fixed and variable elements by using the high-low method.

1. Explain the various types of costs.

[Learning Outcome a]



**Definition**

Cost is the expenditure incurred on resources that are used to achieve a particular objective. Resources may be tangible (materials or machinery) or intangible (labour, patent, copyright etc.) It is the amount of money required to produce a product or perform a service.

A cost objective is the reason for which the resource is exhausted. Cost represents the amount incurred on, or attributable to, a “cost objective”.

Costs can be of various types and the same set of costs may be analysed in different ways. Costs are generally classified on the following basis:

**Function:** depending upon the functions for which the costs are incurred, like product packaging, sales promotion, or other such specific activities. These are all functions in the production process for which costs need to be incurred and hence these are called functional classification of costs.

**Behaviour:** depending upon the behaviour of the cost in response to changes in production levels, like fixed costs, variable costs, mixed costs (semi-variable costs and stepped up fixed costs). These costs change according to the changes in production volume and activity levels and hence are called behavioural classifications since they behave differently with change in volumes.

**Direct / indirect cost:** depending upon whether the cost can be traced to each unit of production. Direct cost is directly incurred for producing the main product whereas indirect costs are incurred on the support activities.

**Responsibility:** costs are assigned to different cost centres that are responsible for the entire costs incurred in these cost centres. These cost centres are also called responsibility centres.

Under the traditional system of costing, costs are classified functionally as production and non-production costs. Production cost and non-production cost collectively become the **total costs**.

1.1 Production cost



**Definition**

Costs incurred in relation to the operation of a manufacturing process are **production costs**.

The production process generally involves processing raw materials into the final product. All the costs incurred in a factory, directly or indirectly, until the stage when the goods can be marketed as final products are considered production or manufacturing costs.



**Example**

In the production of glassware (glasses, glass plates etc), the costs incurred for glass, wages paid to labour and the cost of fuel used in making the glassware will all qualify as production costs.

Packing costs, where the products require primary packaging in order to sell the goods, are a part of production costs. In these cases, the product is incomplete unless it is packed, e.g. milk packed in bottles / cartons or hair shampoo bottled in plastic containers.

Production costs are sub-classified as:

- Direct material
- Direct labour
- Direct expense
- Production overheads (factory overheads)

Production or manufacturing costs incurred in the manufacture of a product are also termed **product costs**.

Manufacturing costs are also known as inventory costs under the absorption costing system. This is because until the time the product is actually sold in the market, these costs are recorded in the finished goods inventory account. This account eventually forms a part of current assets in the statement of financial position.

**1.2 Non-production cost**

**Definition**

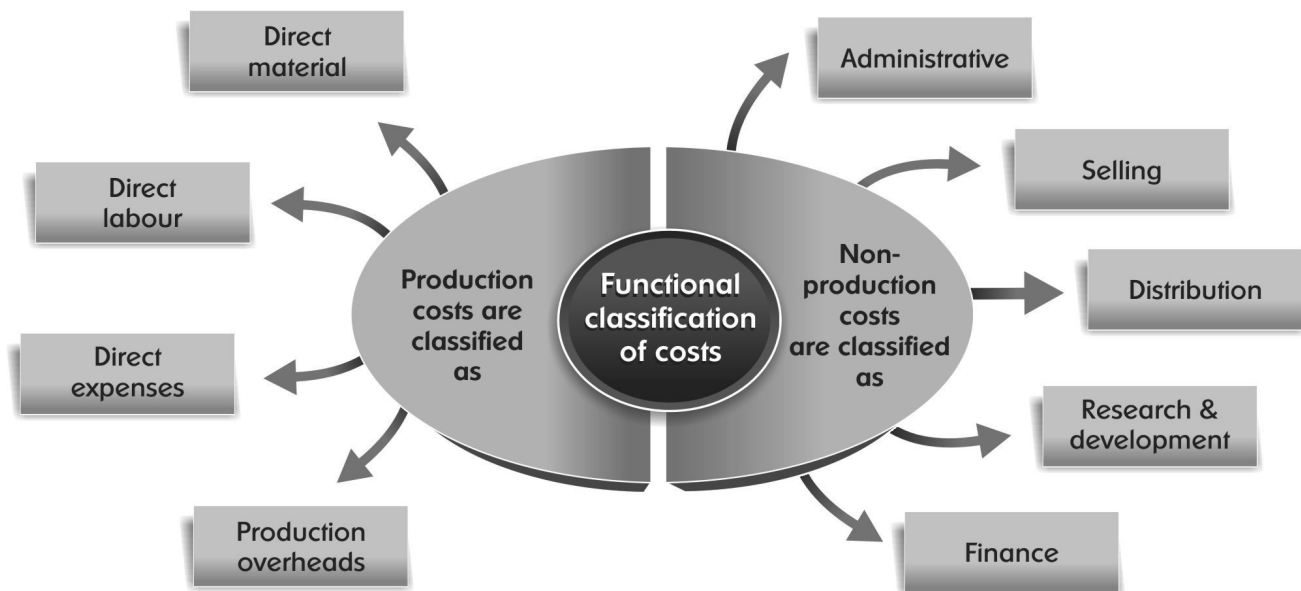
All the costs incurred from conceptualisation to sale of a product, other than those attributable to production activity, inclusive of administration costs, selling costs, distribution costs, finance costs and research and development costs are the **non-production costs**.

**Example**

Salaries paid to office staff of the finance department are non-production costs. These are not spent on actual production but are essential for the running of the organisation.

Non-production or non-manufacturing costs are also known as **period costs**. These are costs incurred in relation to a period and not in relation to a product.

**Diagram 1: Functional classification of cost**

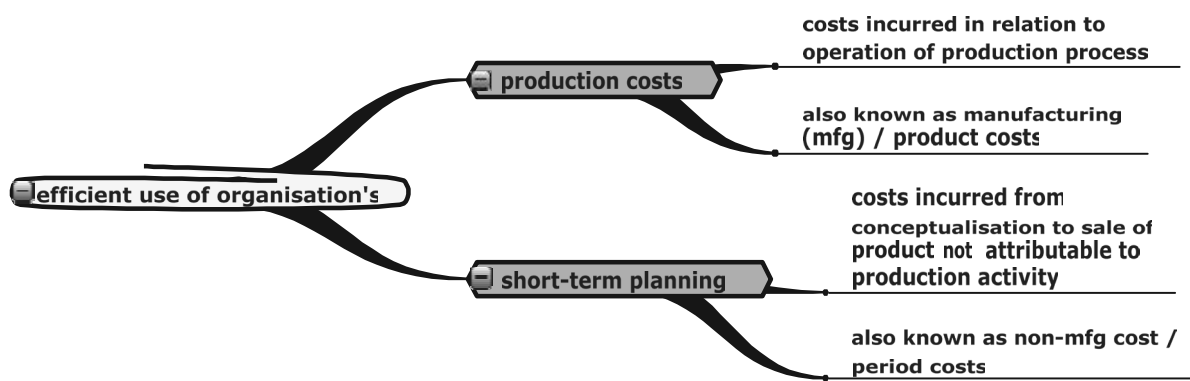


On the basis of the above discussion, we can distinguish between production and non-production costs.

Production costs	Non-production costs
Costs incurred in relation to a production process	Incurred to provide support to or facilitate the production process
Sub-classified into prime costs (direct materials, direct labour, direct expense) and production overheads	Sub-classified into research and development, administration, selling and distribution, finance and other costs
Known as product costs or inventoriable cost in absorption costing method	These costs are period costs



**SUMMARY**



**Test Yourself 1**

The salary of a security guard for office premises is a:

- A Production cost
- B Non-production cost
- C Manufacturing cost
- D Direct cost



**Test Yourself 2**

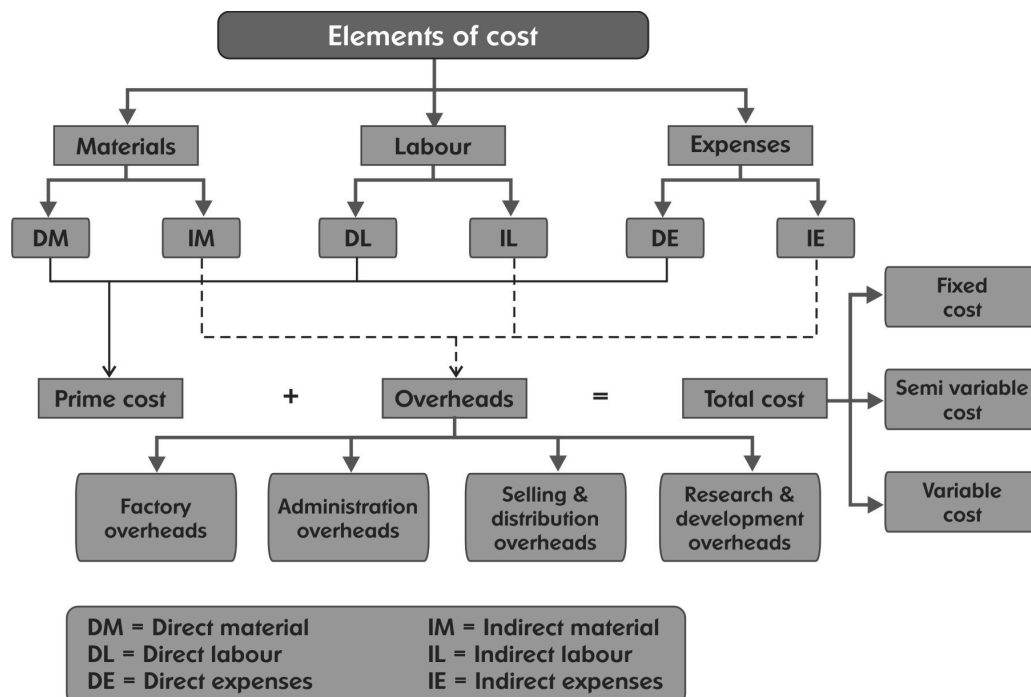
The cost incurred for the purchase of wood for the manufacture of wooden tables by a furniture manufacturer will be a:

- A Production cost
- B Fixed cost
- C Routine cost
- D Management cost

**2. Describe the elements of cost. Classify costs according to cost elements.**

[Learning Outcomes b and c]

Diagram 2: Elements of cost



## 2.1 Direct material



### Definition

The costs of goods bought, which are used in producing a product, are known as **direct material costs**.

Materials are considered to be direct materials when:

- a **direct relationship** can be established between the **input** and the **output**
- these are **physically identifiable** in the product
- the materials can be easily **traced** to the product **without any clerical effort or extra cost or time spent**

Material costs may include the costs of:

- the ingredients from which the product is manufactured e.g. the spares and parts used for completion of the product
- materials transferred from one process to another as input to the process (work in process)
- primary packing wherever essential in order to sell the product



### Example

**Main ingredient:** Plastic used in the production of pens. Leather used to make leather shoes.

**Spares and parts:** Nuts used in the assembling of cars

**Work in process:** Processed ointment in large jars which is transferred to the packing department where the ointment is transferred to tubes. The ointments in large jars here is a direct material for the next process of packaging.

**Primary packing:** The cartons, in which the packed milk is kept, are a direct material as milk cartons cannot be complete unless milk is packed in the cartons.



### Tip

Any material that can be visibly identified in the final product is a direct material and hence the cost associated with it is a direct cost. However, in practice, any scrap or waste of material is still charged as direct material even though it is not actually in process product or a final product.

## 2.2 Direct labour



### Definition

The costs which are directly identifiable with the production of product, rendering of services or completion of job are known as **direct material costs**.

Labour cost can be considered as a part of total direct cost when:

- a direct relationship exists between labour cost and the product or process
- labour cost can be measured in the light of this direct relationship
- labour cost is significant enough and
- it is economically feasible to identify it as a direct cost

Direct labour costs are computed either on the basis of the hours of work put in by the workers or the number of units produced by them. Labour costs include:

- the cost of labour engaged in the actual production activity
- charges paid to special labour engaged in any production activity

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### Example

The salaries of people writing books for a textbook publication company. Generally basic pay and overtime wages are a part of the direct labour cost.

The salary of a qualified accountant handling audits in an audit firm.

### 2.3 Direct expenses



### Definition

Direct expenses include all expenses other than direct material or direct labour that are **specifically incurred for a particular product or process**.

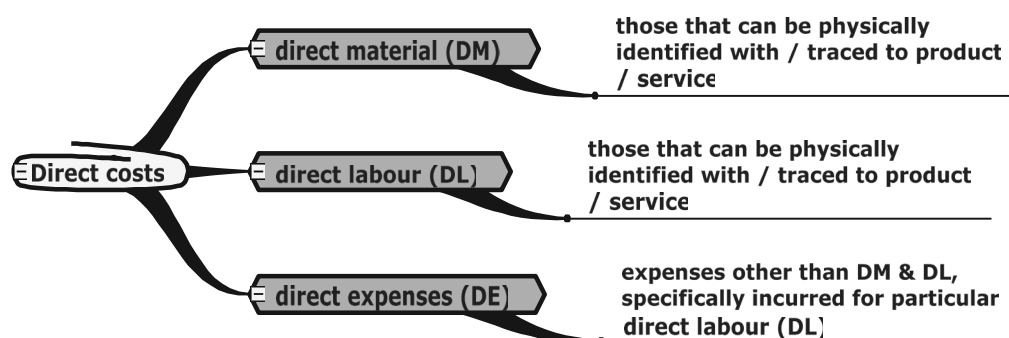
Apart from direct material and direct labour costs, some other costs may also be traced directly to a product or a service. These are categorised as direct expenses.



### Example

Royalties paid to authors while publishing books  
Freight, or carriage inwards  
Hire charges paid by a construction contractor for hiring a hot mix plant. (cement mixing machine)

### SUMMARY



### 2.4 Indirect materials, indirect labour and indirect expenses



### Definition

Indirect expenses incurred in a factory and forming a part of product costs are the **production overheads**.

Production overheads incur in relation to the ancillary activities of the production. Ancillary activities are activities other than the actual production activity that are essential for a product to come into existence.



### Example

Costs incurred on resources used in production such as:

**Indirect materials:** Lubricants for machines, glue used in furniture assembly

**Indirect labour:** Factory supervisor's salary, support technicians' wages, material handlers' wages

**Indirect expenses:** Factory utilities, factory depreciation, factory maintenance and repairs



### Test Yourself 3

Which of the following is/are example(s) of indirect material?

- (i) Wooden plank used in a wooden chair.
- (ii) Glue used in a wooden chair.
- (iii) Small 1 cm screws used in a wooden chair.

- A Only (i) above
- B Only (i) & (ii) above
- C Only (ii) & (iii) above
- D Only (iii) above

### 3. Classify cost into prime cost and overhead.

[Learning Outcome h]

The production costs discussed earlier can be further split into prime costs consisting of direct material, direct labour and direct expenses and production overhead costs. These form the major divisions of production costs. The next section explains each of these terms.

#### 3.1 Prime costs

Direct labour, direct material and direct expenses are also called as **prime costs**.

##### 1. Material costs



#### Definition

The costs of goods purchased for use in producing a product are known as **material costs**.

Materials that are used in producing the finished product are termed direct materials. The costs incurred on these can be **identified** with the product.

Material costs may include costs of:

- The ingredients from which the product is manufactured
- The spares and parts used for completion of the product
- Materials transferred from one process to another as input to the other process (work in process).
- Primary packing wherever essential in order to sell the product



#### Example

- Main ingredient - Plastic used in the production of pens. Leather used to make leather shoes.
- Spares and parts - Nuts used in the assembling of cars
- Work in process - Processed ointment in large jars which is transferred to the packing department where the ointment is transferred to tubes. The ointments in large jars here is a direct material for the next process of packaging.
- Primary packing - The cartons, in which the milk is packed, are a direct material as the product 'milk cartons' cannot be complete unless milk is packed in the cartons.



#### Tip

Any material that can be visibly identified in the final product is a direct material and hence the cost associated with it is a direct cost.

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### Example

Canvass cloth, used in producing 'Canvass bags', is a visible input in the final product. It is a direct material.

---

## 2. Labour costs



### Definition

The remuneration paid to workers who are directly involved in the production process or the provision of a service is termed **labour costs**.

---

Direct labour costs are computed either on the basis of the hours of work put in by the workers or the number of units produced by them. Labour costs include:

- The cost of labour engaged in the actual production activity.
- Charges paid to special labour engaged in any production activity.



### Example

The salaries of people writing books for a publication company. Generally basic pay and overtime wages are a part of the direct labour cost.  
The salary of a qualified accountant handling audits in an audit firm.

---

## 3. Direct expenses



### Definition

**Direct expenses** include all expenses other than direct material or direct labour that are specifically incurred for a particular product or process.

---



### Example

Royalties paid to authors while publishing books  
Freight, or carriage inwards  
Hire charges paid by a construction contractor for hiring a hot mix plant. (cement mixing machine)

---

## 3.2 Overheads

Overheads are all the indirect costs (material, labour and expenses) which are not directly identifiable with a product. Overheads in the context of production are production overheads.



### Definition

Indirect expenses incurred in a factory and forming a part of product costs are the **production overheads**.

---

Production overhead costs include:

- Indirect materials
- Indirect labour
- Indirect expenses

These are incurred in relation to the production activity, in the factory or any place of production.

Production overheads are incurred in relation to the ancillary activities of production. Ancillary activities are activities other than the actual production activity that are essential for a product to come into existence.

**Example**

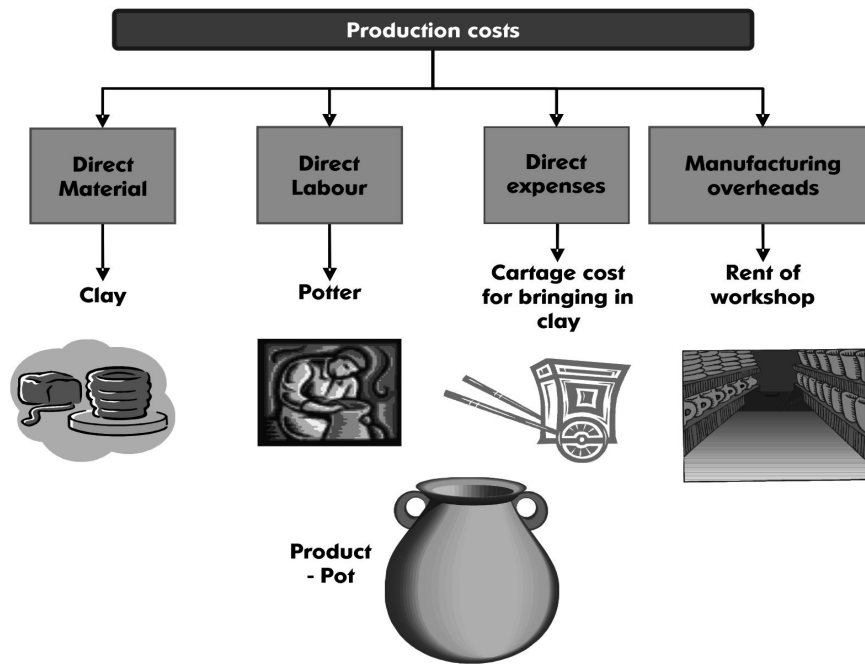
Costs incurred on resources used in production such as

**Indirect materials:** lubricants for machines, fuel used in a factory

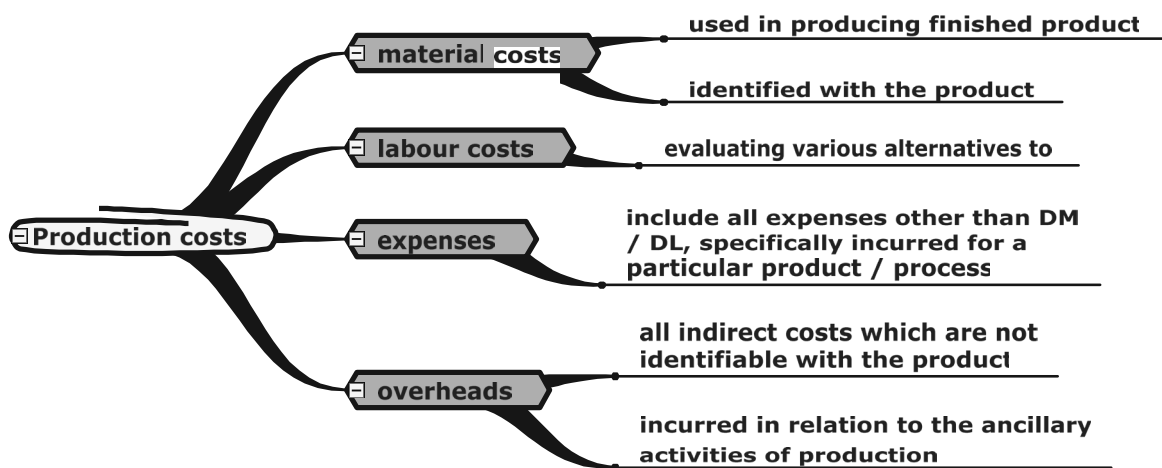
**Indirect labour:** factory supervisor's salary, support technicians' wages, material handlers' wages

**Indirect expenses:** factory utilities, factory depreciation, factory maintenance and repairs

Diagram 3: Production costs



**SUMMARY**



**Test Yourself 4**

The production cost of cars includes:

- A Tyre costs
- B Salary of technician engaged in car production
- C Wages of foreman for the machinery used
- D All of the above

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### Example

All the indirect materials costs, indirect wages and indirect expenses incurred in a factory are called:

- A Production overheads
- B Production cost
- C Non-production overheads
- D Non-production cost

### 4. Classify costs according to their traceability to cost units (Direct and Indirect).

[Learning Outcome d]

Costs are classified into direct and indirect by nature. The distinction of costs into direct and indirect is necessary because they need different treatments for cost computation and control. Most cost accounting techniques employed in decision making also consider this distinction to be essential for cost analysis.

#### 4.1 Classification of costs as direct or indirect (classification of cost by nature)

This classification is based on the principle of **traceability of costs to the final product or service**.



### Definition

Cost that can be specifically identified, or traced in full to the product or service, in an economically feasible manner is a **direct cost**.



### Definition

Cost that cannot be specifically identified with a product or a service is an **indirect cost**.



### Example

Potatoes and salt are the direct ingredients in the preparation of potato chips. Costs incurred on these will be direct costs.

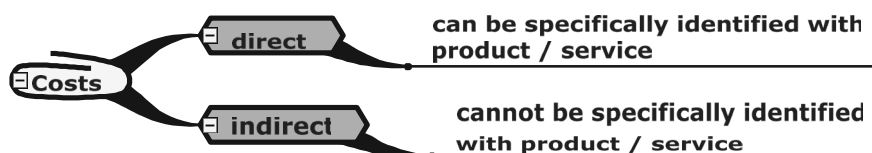
Apart from being easily traceable to the products, the traceability of costs should also be economically feasible for the costs to be classified as direct. If the traceability is not cost beneficial, a cost that is direct by nature will be classified as indirect.



### Example

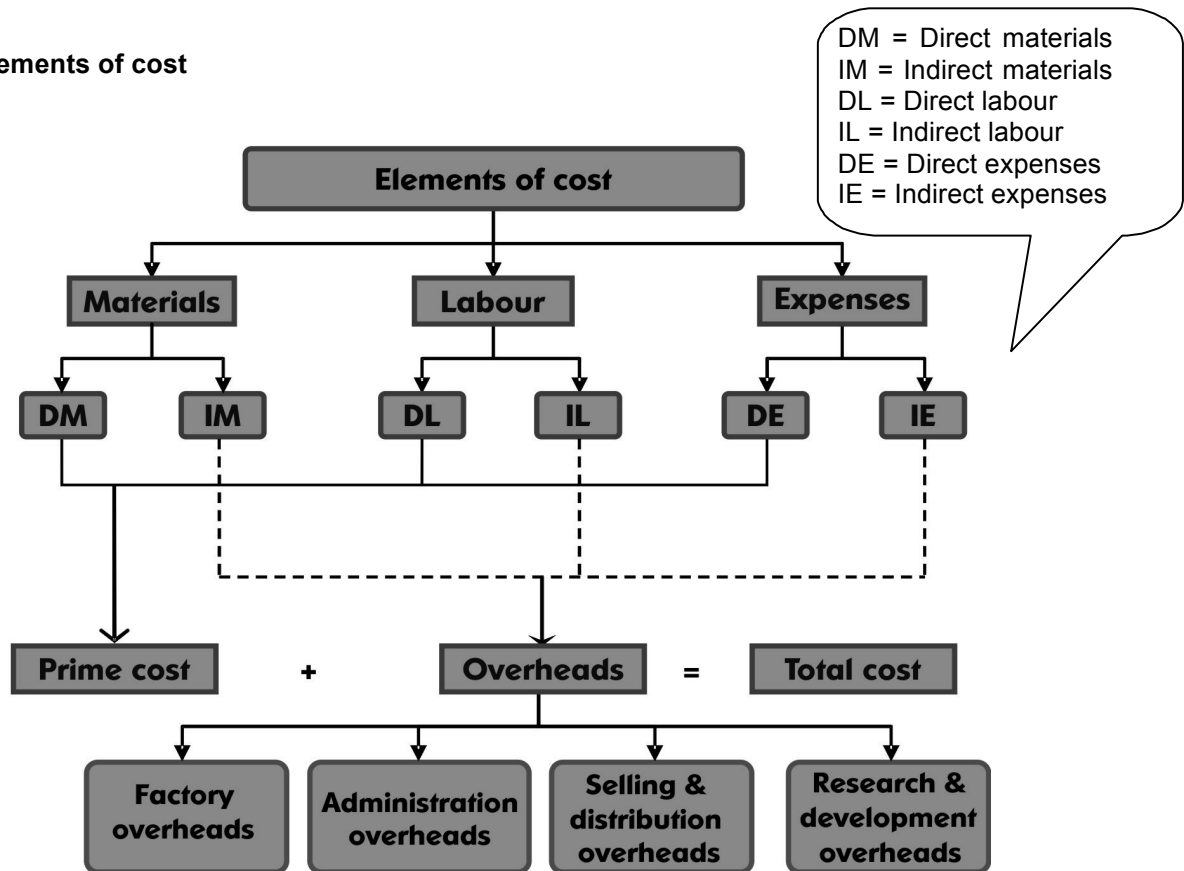
In the above example of potato chips, it is a difficult and costly affair to trace the amount of oil consumed by each pack of chips and so it will be treated as an indirect cost. Oil is easily traceable to the chips but still is classified as indirect cost.

### SUMMARY



Direct costs consist of all the **direct materials, direct labour and direct expenses**. Indirect costs consist of **indirect materials, indirect labour and indirect expenses**. These are collectively also termed overheads. According to the functional classification, overheads are classified as administrative, selling, distribution and research and development costs.

Diagram 4: Elements of cost



The basis of classification for the costs as direct and indirect does not change in the non-manufacturing sector as compared to the manufacturing sector. However, given the different work carried out by these two organisations, certain costs that are direct in one sector can be indirect in the other. The classification of specific costs as direct and indirect is dependent upon the type of industry for which the costs are being classified.

 **Example**

Threads used in cloth manufacturing are direct materials for the end product of rolls of cloth. However, in stitching clothing, thread is an indirect cost as the amount of thread used for each unit of clothing stitched cannot be economically traced to each item of clothing.

 **Test Yourself 6**

Direct material cost means a material cost that can be:

- A Specifically, easily, or conveniently identified with a cost objective
- B Attributed to, or allocated to a cost objective on a rational or logical basis
- C Associated with a cost objective as it relates to the production process in general
- D All of the above

 **Test Yourself 7**

Direct expenses are those which:

- A Can be included in direct material or direct labour
- B Are the same as direct material and direct labour
- C Are incurred specifically in connection with a product or service
- D All of the above



**5. Classify costs according to the major functions of an organization (Manufacturing, Administrative).**

[Learning Outcome e]

Direct costs are made up of direct materials, direct labour and direct expenses. Whereas indirect costs are made up of all the overhead expenses - manufacturing overheads, administration overheads, selling and distribution overheads and research and development overheads. Manufacturing overheads are generally incurred in manufacturing organisations.

**5.1 Manufacturing overheads**

These consist of the costs incurred on:

**1. Indirect materials**



**Definition**

Materials of minor importance in comparison to direct materials are known as **indirect materials**. They are not identifiable easily with the final product.

In a manufacturing organisation, indirect materials are those that cannot be easily and precisely traced to any individual product or service. These are materials that are essential, but used in negligible quantities or are used to bring the product in existence but are not traceable to it.



**Example**

Glue used in production of wooden tables: this is used in negligible quantity but is essential for the production of tables. The cost of the glue cannot be traced down to each table as it is used in very small quantities. Glue will therefore be classified as an indirect material and the cost incurred on this will be an indirect material cost.

Gas or fuel used in the preparation of food in hotels is an indirect ingredient in food items sold. It is essential for the preparation of food but is not physically traceable to it.

In non-manufacturing organisations, indirect materials would constitute the cost of materials that are not physically traceable to the provision of the services but are used in providing the service.



**Example**

Stationery items such as pens, notepads etc. used by any software development organisation are indirect materials. These are not traceable to the product developed, but are essential for providing the service of software development.

**2. Indirect labour**



**Definition**

Labour costs that **cannot be traced** to the production of specific goods or provision of services are **indirect labour costs**.

Certain direct labour costs are also sometimes treated as indirect costs as it is more appropriate to classify them in this way e.g. overtime premiums, shift differentials (extra payment for working in odd hours like night shifts) and holiday pay. This is done because these payments are made only during abnormal conditions and hence it is convenient to classify them as indirect costs rather than direct labour costs.

In a manufacturing organisation, indirect labour costs consist of labour costs in service departments such as purchasing or engineering. The labour cost of certain workers in the production departments will be considered indirect labour, such as foremen and supervisors, as their time is split between many items produced and cannot be apportioned easily.



### Example

Wages paid to labour working in the storeroom or factory office and maintenance staff in the factory will be the indirect labour costs.

In a non-manufacturing organisation, indirect labour costs consist of wages paid to security service personnel, accountants, janitors, cleaners etc.



### Example

The maintenance staff for vehicles in a transport service operation business  
Quality analysts who debug a program for potential errors, before it is sent to the ultimate consumer in a software development company

## 3. Indirect expenses

Indirect expenses include costs that might be incurred for the overall production or service in order to ensure that operations are carried out smoothly. In a manufacturing organisation, indirect expenses will include rent and rates for factory premises and insurance charges to be paid, if any.

In a non-manufacturing organisation, these costs include the rent of office premises and other charges that are paid for the maintenance of the office.

### 5.2 Non-manufacturing overheads

**Non-manufacturing overheads** include administration, research and development, selling and distribution overheads. These are also all a part of indirect expenses / overheads.

For the entire organisational activity, these costs are directly taken to the SOPL (statement of profit or loss).

#### 1. Administrative costs



### Definition

Any cost incurred for the management or administration of the business that includes planning and controlling its operations, is an **administrative cost**.

Administrative costs of an organisation include the costs incurred in formulating the policy, directing the organisation and controlling its activities. In a big organisation, administrative costs are split into two types:

- (a) Costs incurred at the factory level that are incurred to provide the staff with administrative support
- (b) Costs incurred at head office level that are allocated to the factory



### Example

Office rent  
Salary of office staff – cleaners, clerks  
Electricity and telephone costs of the office  
Legal fees, audit fees, insurance expense of office

## 2. Selling costs



### Definition

Costs incurred in relation to the sale of a product or rendering of a service and allied activities are known as **selling costs**.

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A product needs to be marketed and advertised so that the customers are aware of it, thereby creating a demand for the product in the market. Selling costs include all costs that help the sale of the product in the market place.



### Example

Sales promotion expenses, showroom expenses  
Advertising costs such as catalogues, banners, brochures  
Salaries of sales and marketing personnel, commissions paid to salesmen

---

### 3. Distribution costs



### Definition

Costs incurred for the transport of goods from the factory or depot to the customer and / or the costs incurred for maintaining the channel of distribution are known as **distribution costs**.

---

This cost also covers the cost of recovering and reconditioning empty containers for reuse.



### Example

The transportation cost of goods between two points, namely the receipt point of goods from production and the delivery point to the customer  
The insurance cost of the goods between this period  
Depreciation on vehicles used for the distribution of goods  
Fuel used by vehicles in the distribution department  
Repairs and maintenance cost of the above vehicles

---

### 4. Finance costs



### Definition

Costs incurred in relation to the provision of finance to the business, mainly interest costs, are known as **finance costs**.

---

To incur all the previously discussed costs, the business needs a constant flow of money. This includes initial start-up costs – capital investment, working capital and costs required for the day to day running of the business, expansion costs – capital investment required for the expansion of the existing activities.

The money for these costs is raised by obtaining a loan from the bank or raising capital from the market by issue of shares and debentures. Finance costs are incurred to meet the working capital as well as long term finance needs of the organisation. This cost cannot be traced to the individual products, but will have to be allocated using a suitable base.

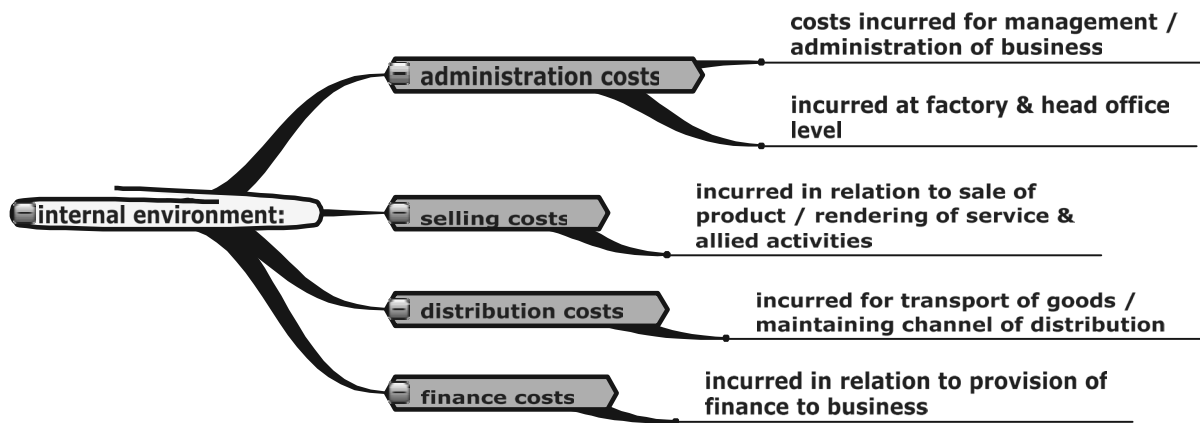


### Example

Interest paid on a fixed-term loan taken for the construction of a building  
Interest paid on a fixed-term loan taken for the purchase of plant and machinery  
Interest paid to debenture holders

---

**SUMMARY**



These various types of costs make up the total cost of a product. A cost sheet is the prime document for presenting the costs according to their function under the traditional absorption system of costing.

**Extract of Cost sheet**

	Tshs	Tshs
Direct material	X	
Direct labour or direct wages	X	
Direct expenses	X	
<b>Prime cost</b>		<b>X</b>
Production overheads		X
<b>Production or factory or manufacturing cost</b>		<b>X</b>
Administration cost		X
Selling and distribution cost		X
<b>Cost of sales</b>		<b>X</b>
<b>Total cost</b>		<b>X</b>

**6. Classify costs according to their reaction to changing levels of activity (fixed, variables etc).** **[Learning Outcome f]**

Costs are classified into fixed and variable costs based on their behaviour. Variable costs and fixed costs behave differently with change in the activity levels and hence this classification is called the behavioural classification.

The distinction of costs into fixed and variable components is very important from the viewpoint of decision-making. It helps a manager to make crucial decisions such as whether to manufacture a component in-house or buy it from outside vendors, whether to continue the business or shut down, whether to start a new business etc.

**6.1 Fixed and semi-fixed or stepped fixed costs**

**1. Fixed cost**

**Definition**

A cost that remains constant in total, within the current budget period, irrespective of changes in volume of activity, is called a **fixed cost**.

Fixed costs are the expenses which do not change in proportion to the activity of a business, within the relevant period of time.



**Example**

A retailer must pay rent and utility bills irrespective of the volume of sales he makes.

Fixed costs **do not vary in total**. The per **unit fixed cost decreases as production volume increases** and vice-versa.

They are also known as “**period cost**” as the cost is incurred in relation to a time period or “**stand-by cost**” because this cost will be incurred even if no production activity takes place.

**All fixed costs are overheads but all overheads are not fixed costs.** Overheads include certain costs that vary with the level of activity. These depict a direct relationship with the activity level and hence are categorised as variable overheads, e.g. overtime premium that changes with the number of hours of overtime worked, power costs, fuel costs and any other utility costs. Certain overheads, on the other hand, always remain fixed irrespective of the activity level, e.g. insurance costs, depreciation on assets etc.



**Example**

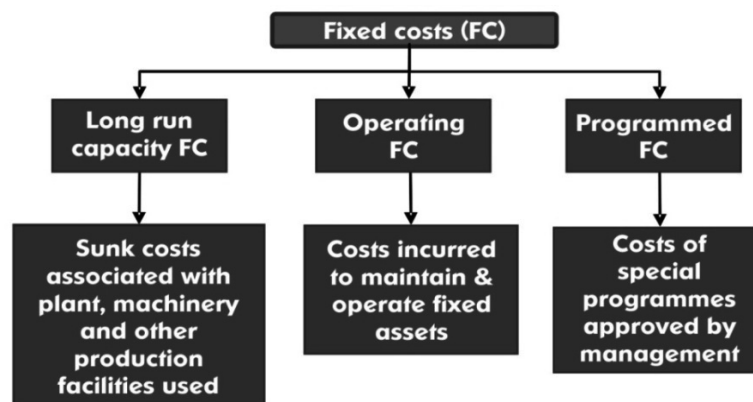
**Fixed costs**

- Rent of office building, factory premises
- Depreciation of building, plant and machinery
- Pay and allowances of managers, secretary and accountants
- Legal or audit fees

There are three types of fixed cost

- (a) **Long-run capacity fixed costs:** these are sunk costs (i.e. costs already spent) associated with plant, machinery and other non-current assets used in factory or in office.
- (b) **Operating fixed costs:** these overheads are incurred to maintain and operate non-current assets and include any other fixed costs relating to the factory, e.g. depreciation, factory manager’s salary etc.
- (c) **Programmed fixed cost:** these are the costs of special programmes approved by management, e.g. costs relating to research and development, market promotion expenses, staff training expenses.

**Diagram 5: Types of fixed costs**

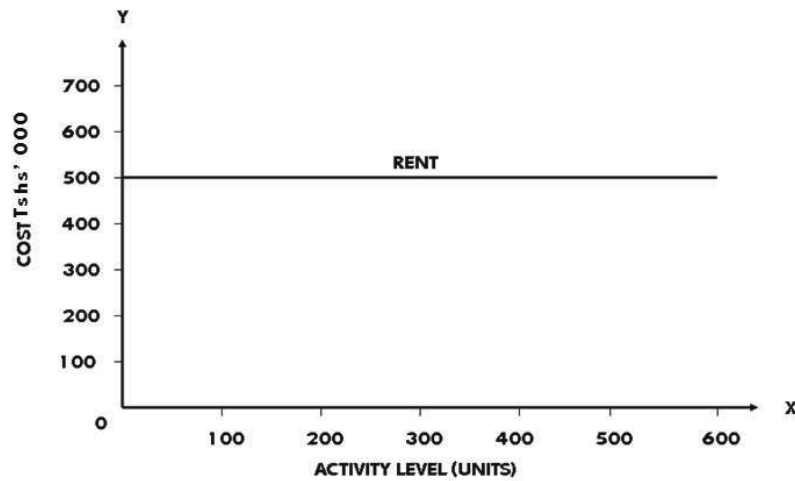


To have an idea of the graphical representation of fixed costs let us try to plot the graph using a simple example.

**Example**

Tim runs a saw mill and has hired a factory shed for the purpose. He pays Tshs6,000,000 (i.e. Tshs500,000 per month) as the annual rent. Although his other monthly expenses change each month, the rent cost remains the same. The following graph depicts the fixed cost remaining constant during the period.

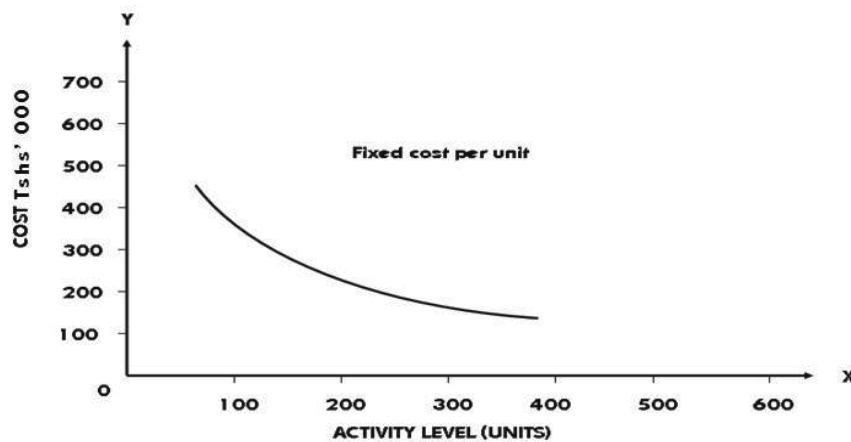
**Diagram 6: Total fixed cost**



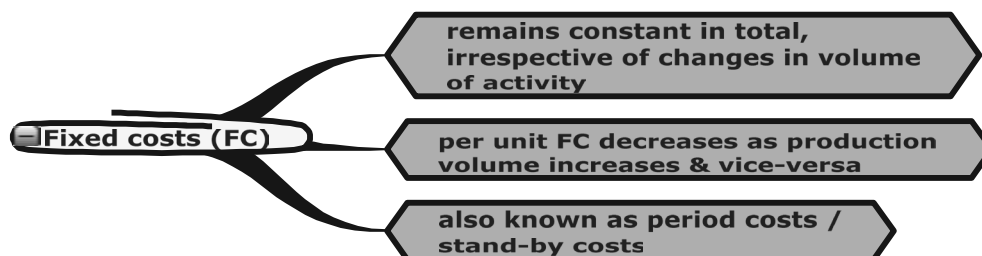
It can be observed from the above diagram that total annual rent cost remains constant throughout the budget period of one year.

The above graph shows the total fixed cost. The graph below shows how the per unit fixed cost decreases as the volume of production increases.

**Diagram 7: Fixed cost per unit**



**SUMMARY**





**Test Yourself 8**

Which of the below best describes a fixed cost?

- A Remains fixed in a budget period
- B Remains fixed forever
- C Always varies
- D Varies per hour

**2. Stepped fixed cost or semi fixed cost**



**Definition**

Cost that are fixed for a given level of activity but in due course changes by a constant amount at some point is a **stepped fixed cost**.

A stepped fixed cost remains the same up to a certain level of activity or a certain period of time, then changes and again remains constant up to a new activity level or a period of time.



**Example**

Sera International School has started to offer a pick-up service for its students this year. The cost of hiring one bus is Tshs100,000 per day. One bus can accommodate a maximum of 50 students.

At the beginning of the session only 40 students opted to take the bus. Therefore only one bus was hired at a cost of Tshs100,000 per day. The cost of this bus will remain Tshs100,000 until the number of students rises above 50.

However, the number of students using the bus rose from 40 students to 80 students by the middle of the session. As a result, the school had to hire another identical bus for the additional 30 students (80 - 50). The cost then became Tshs200,000 per day. This cost will again remain constant until the student count exceeds 100 (50 + 50).

Increasing salaries of managerial and administrative employees will cause fixed employee costs to step up. Similarly if there is a revision in the rent agreement that increases the monthly rent within the period under consideration, the cost will step up.

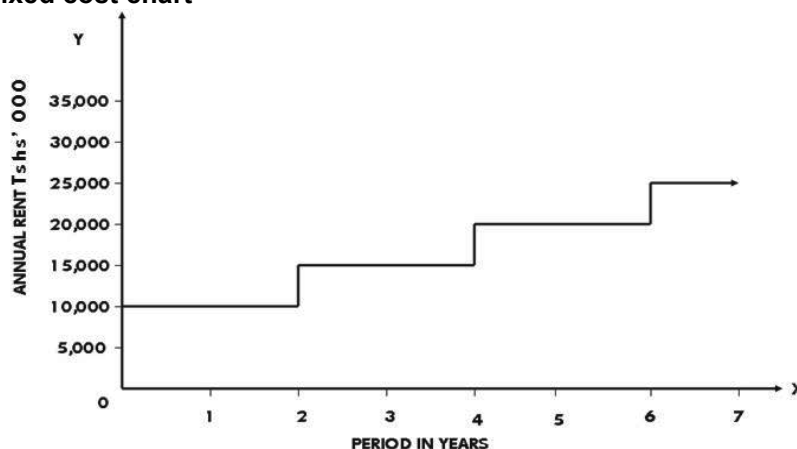
Graphical representation of stepped fixed cost is explained with the help of the following example.



**Example**

Matrix Plc has its office in rented premises. The annual rent is Tshs10,000,000. The rent cost rises every two years by Tshs5,000,000 according to the rent agreement. This cost again remains constant at Tshs15,000,000 until the end of the fourth year and again rises by Tshs5,000,000. This therefore depicts a stepped fixed cost.

**Diagram 8: Stepped fixed cost chart**



**SUMMARY**



**Test Yourself 9**

Which of the below sentence / s describes a stepped fixed cost?

- A Remains unchanged irrespective of activity levels
- B Has a fixed component only
- C Is constant up to a certain activity level, then rises and remains constant up to a new level of activity
- D All of the above

**6.2 Variable Cost**



**Definition**

The portion of total cost that varies with a change in the volume of activity is known as **variable cost**.

It **varies in total but its value per unit cost remains constant**. For example, 1 item costs Tshs10,000 and 10 items cost Tshs100,000. The cost of each individual unit is Tshs10,000, but in total the costs are Tshs100,000. Variable costs are expenses that change in **direct proportion** to the activity of a business.



**Example**

- Direct material and labour cost
- Indirect material and labour cost
- Power and fuel
- Lubricants
- Tools and spares
- Products purchased for resale

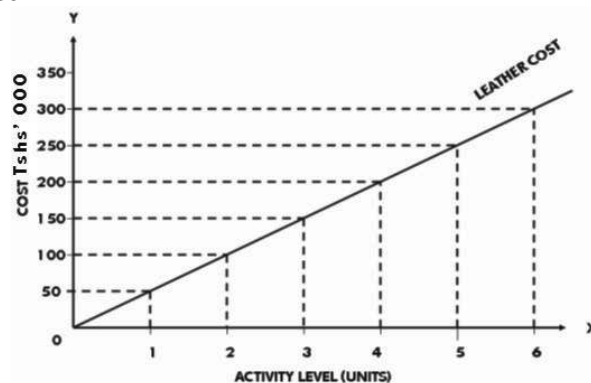
A graphical representation of variable cost is shown in the example given below.



**Example**

To plot the variable cost line on a graph, consider the production of leather bags. Suppose each bag requires 2 square metres of leather that costs Tshs50,000. This is the material cost (i.e. a variable cost) that increases with every bag produced. This shows that it increases proportionately with the increase in output. It will increase by Tshs50,000 with each additional bag manufactured. The graph showing this increase in the cost will be as below:

**Diagram 9: Total variable cost**



The above figure shows that variable cost varies in direct proportion to the change in the level of activity (in this case Tshs50,000 per unit), that is, it increases in total as the output increases.

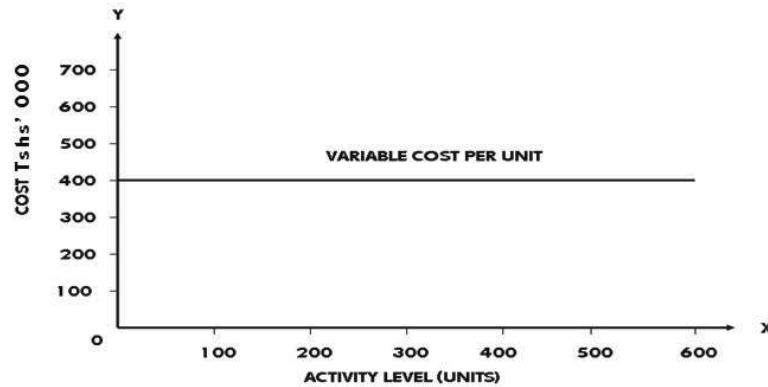


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The above graph shows total variable cost. Per unit variable cost remains the same irrespective of the volume of production. The graph depicting this is given overleaf.

**Diagram 10: Per unit variable cost**

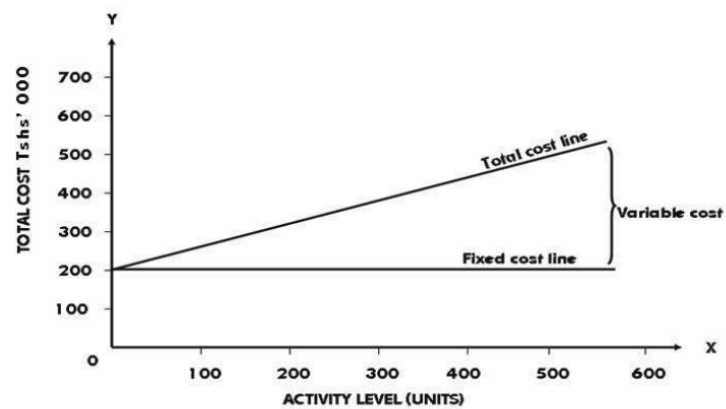
Assuming, the per unit variable cost per product to be Tshs400,000.



The total cost line consisting of fixed and variable cost is plotted below.

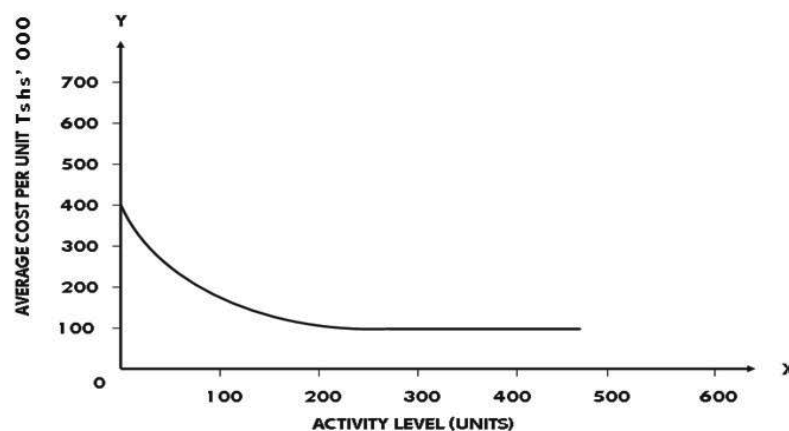
**Diagram 11: Total cost graph**

Assuming, the per unit variable cost per product Tshs30,000 and total fixed costs Tshs200,000.



**Diagram 12: Average cost per unit**

Assuming, cost per unit Tshs400,000.



Total cost (fixed + variable) shows a rising trend as variable costs always increase with an increase in production. The average total cost i.e. per unit cost consisting of the fixed and variable elements, decreases with an increase in the volume of production. This is because the variable cost per unit remains constant but the fixed cost per unit decreases as the volume of production increases.

 **Example**

Trim Plc manufactures helmets. The fixed costs of production for the year are Tshs4,000,000. The variable costs per helmet are Tshs18,000. Although the total fixed costs will be incurred irrespective of the number of helmets manufactured, the total variable costs will increase in direct proportion to the number of helmets manufactured. If Trim manufactures 50 helmets, the total fixed cost for this will be Tshs4,000,000 and the total variable cost will be Tshs900,000. The total fixed cost to manufacture 70 helmets would again be Tshs4,000,000 but the variable cost would rise from Tshs900,000 to Tshs1,260,000.

Let us now calculate the fixed and variable costs per unit at the two volumes of production.

**Variable cost per unit**

At level of 50 helmets variable cost per helmet =  $Tshs900,000 / 50 \text{ helmets} = Tshs18,000$   
 At level of 70 helmets variable cost per helmet =  $Tshs1,260,000 / 70 \text{ helmets} = Tshs18,000$

**Fixed cost per unit**

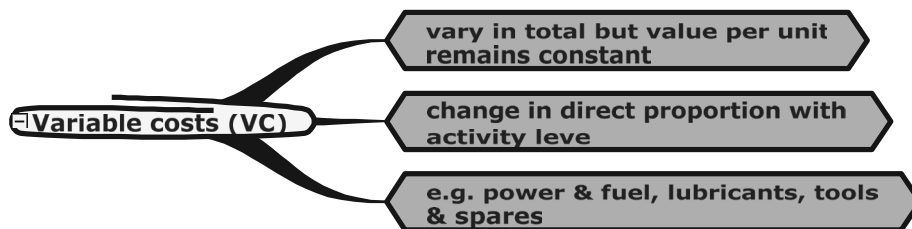
At level of 50 helmets fixed cost per helmet =  $Tshs4,000,000 / 50 \text{ helmets} = Tshs80,000$   
 At level of 70 helmets fixed cost per helmet =  $Tshs4,000,000 / 70 \text{ helmets} = Tshs57,140$

Hence total cost per unit at the two levels = variable cost per unit + fixed cost per unit

50 helmets -  $Tshs18,000 + Tshs80,000 = Tshs98,000$   
 70 helmets -  $Tshs18,000 + Tshs57,140 = Tshs75,140$

The cost per unit falls from Tshs98,000 to Tshs75,140

**SUMMARY**



 **Test Yourself 10**

In a computer chip manufacturing unit, one chip requires 2.5 hours of labour per chip at Tshs10,000 per hour, direct material worth Tshs20,000 and direct expenses per chip amounting to Tshs5,000. The rent of the workshop is Tshs1,000,000; the watchman's monthly salary is Tshs1,000,000, administrative staff salary amounts to Tshs2,500,000 per month and the floor manager is paid a salary of Tshs2,500,000 per month.

**Required:**

Prepare a monthly statement showing the fixed and the variable cost components at the output level of 500 computer chips for the month.

**6.3 Semi-variable costs**

 **Definition**

A cost that is composed of a mixture of fixed and variable components is known as a **semi-variable cost**. It is also known as a mixed cost.

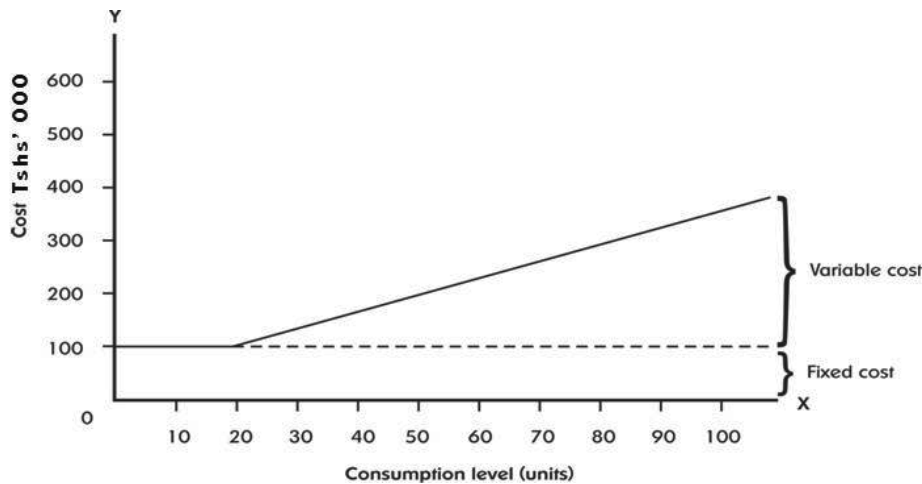
In other words, these costs show a mixed relationship, when plotted against volume.



**Example**

A good example of a semi-variable cost is the telephone bill. This is generally divided into two components - a fixed charge payable per billing period (where there is no extra charge up to a certain level of usage) and a variable per unit usage charge (depending on the number of units consumed above the certain level of usage).

**Diagram 13: Semi-variable cost chart**



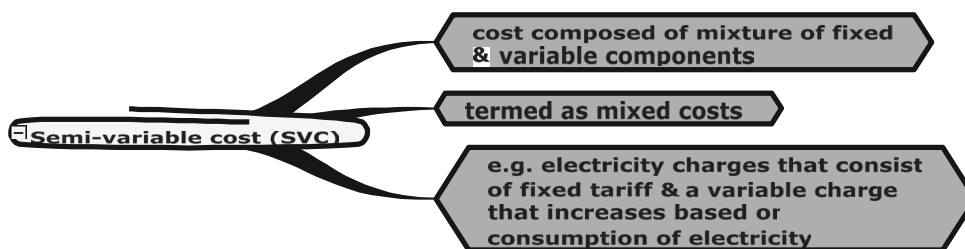
In the above graph, the fixed charge is Tshs100,000 up to the consumption level of 20 units. Then variable cost is charged for every unit consumed above this level. This shows that there is a fixed element of Tshs100,000 in the cost and the remaining portion varies depending upon the units consumed.



**Example**

You are a member of a local country club. You pay an annual membership fee, which enables you to stay on the club's list of members. So from your perspective, this is a fixed cost. You also pay to use club facilities, such as facilities for sport and social gatherings, if and when you use them. These are variable costs because they are paid for only in the event of utilisation of a particular facility. Also, the charge is on a per facility basis and not a gross charge for all facilities.

**SUMMARY**



**Test Yourself 11**

Which of the following can be a semi-variable cost?

- A Telephone charges
- B Internet usage charges
- C Vehicle hire charges
- D All of the above



**Example**

Cost type with examples		Explanation
<b>(a)</b>	<b>Fixed costs</b>	
	Insurance	Cost incurred to protect against events that could damage business property. No relationship to activity of production and therefore does not vary with the volume of units manufactured.
	Depreciation on buildings	Accounting convention to reflect the reduction in value of assets due to wear and tear. No relationship to activity.
	Interest on borrowed money	Cost of money borrowed for the business. This cost generally does not change with the change in the level of activity or volume of production.
<b>(b)</b>	<b>Stepped fixed costs</b>	
	Depreciation on company owned vehicles	If the company operates a fleet of vehicles to reduce the delivery time, the depreciation cost on the vehicles will step up each time the number of vehicles increases.
	Rent costs for extra storage	The rent of the warehouse is a fixed cost as long as the storage does not exceed the capacity of the warehouse. Once the volume of materials increases beyond this limit, a new warehouse is rented and the rent cost steps up.
<b>(c)</b>	<b>Variable costs</b>	
	Direct material Direct labour Direct expenses	The cost of materials, labour or expenses per unit of production is constant, and as the units of production increase, so does the cost. A direct relationship with activity.
	Sales commission	The cost of rewarding sales persons according to the sales volume they achieve has a direct relationship with sales activity.
<b>(d)</b>	<b>Semi-variable costs</b>	
	Monthly telephone costs, electricity costs	Both telephone and electricity charges comprise fixed and variable components. Fixed component remains unchanged for any quantum of usage and the variable component varies with a change in usage level.



**Test Yourself 12**

Semi-variable costs:

- A Change in the same direction and same proportion with the change in output
- B Fluctuate with volume because of a variable element.
- C Do not change in direct proportion to output because of the variable element.
- D All of the above

**7. Classify costs according to timeframe (historical, current, future).**

**[Learning Outcome g]**

Costs can be classified in accordance with the time-frame to which they belong, into historical, current and future categories."

**7.1 Historical cost**



**Definition**

Historical cost, also known as term cost, refers to the price paid by an organisation to obtain the title and utility of an asset, including all expenses involved in getting the asset in the place and condition necessary for it to offer its services in the operations of the organisation.

Historical cost refers to the actual amount of money spent on various transactions and operations of a firm.

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### Features of historical cost:

1. Historical costs are available only after a transaction is complete, an operation is done or a product / service has been manufactured or offered. For example, a purchase of Tshs5,000,000 will be recorded only after the transaction takes place (either on cash or credit basis).
2. As historical costs are based on recorded facts, they are objective in nature. Such costs can be verified at any given point of time as the evidence of such costs are present within and organisation. For example, the sales done by an organisation can be verified from the sales invoices present with the sales department.
3. In historical cost analysis, the actual cost of operation of a period is determined based on the actual amount of expenses incurred. Such analysis of cost takes a long duration as costs can be calculated only after they have been actually spent and accounts relating to them are prepared. For example, the actual cost of producing a product can be calculated after the production process is completed and various costs that have been incurred are recorded.
4. According to the principles of historical cost, an asset needs to be reported at its original cost. In subsequent periods, even if there is an appreciation in the value of the asset, the increase in the value is not recognised (unless such an increase is recognised by the concerned accounting standards). Thus, historical cost ignores replacement costs of assets and other resources.



### Example

500 units of item Raxo were acquired 2 months back for Tshs 1,000 per unit. The price of Raxo in the market today is Tshs1,100 per unit. The inventory of Raxo will appear in the Statement Of Financial Position at Tshs500,000 and not at Tshs550,000.

5. Historical costs also do not take the effects of inflation on costs of resources, operations and assets into account.

Since historical costs are recorded after their occurrence, they cannot be used for cost control purposes.

### 7.2 Current costs



### Definition

Current cost, also known as replacement cost, refers to the actual (or estimated) prices of assets, resources and costs of operation when the product is being produced or the service is being offered.

### Features of current cost:

1. Current cost is related with the present market value of the concerned asset. While estimating an asset's current cost, care should be taken to compute the cost taking into account the present value of the assets, its working condition, age and the remaining years of its life.
2. In computing the current cost, inflationary trends in the market and the depreciation to which the asset in question has been subjected to play a vital role.
3. The process of establishing the current cost of an asset starts with the original cost at which the asset had been acquired and various adjustments (like inflation) are made in order to arrive at its present replacement value. This has an advantage over using the concept of historical cost, as the historical cost would concentrate on recovering only the original value of the asset, thus, ignoring the actual present worth of the asset.
4. Current cost can be used to replace almost all types of asset, including plant and machinery, real estates, shares and stocks, etc. By determining an asset's current cost, management can decide whether an asset can be replaced immediately or not.



### Example

Gawk plc, a courier company owns five big delivery vans. The management of the company is contemplating regarding replacement of one of the vans and have asked the company's accountant, Mohammed, to help them in their decision.

Mohammed has advised the management to determine the current cost (present market value) of the van before replacing it based on the following parameters:

- working condition of the van, based on especially the wear and tear and the interiors of the van
- current efficiency of the engine
- current condition of the exterior of the van
- conditions and rate of inflation in the economy

## 7.3 Future cost



### Definition

Future cost, also known as estimated cost, refers to the **current projection** of the total end cost that will be incurred when a specific task is completed, or a final product is produced or a service is rendered. This approximation of the estimated cost is calculated based on the cost information available with an organisation.

#### Features of future cost:

1. Future costs are relevant. Expected future costs that are a direct outcome of a decision are the only relevant costs in taking the decision and any cost that has already been incurred is not at all relevant. Whenever a decision is taken to do a job or to take up an activity, the costs related to that job or activity are future costs and relevant. However, had a cost been incurred before taking the decision, the decision-maker would not need to consider that cost any longer and therefore the past costs (or sunk costs) are not relevant to the decision.



### Example

Lindsey owned two houses. She lived in one and the other was empty. Even though the other house was empty, she needed to pay property taxes for this house of Tshs1,000,000 every year.

In the year 20X9, Lindsey decided to rent out the other house at Tshs12,000,000 per annum. The payment of Tshs1,000,000 as property taxes is unaffected by the decision to rent out the house. These taxes are incurred irrespective of whether or not the house is rented out. Therefore these costs are irrelevant to the decision-making. However, the net gain of Tshs12,000,000 (from rent) is a relevant cost for decision-making.

2. Budgeted costs are future costs. A budget is an operational level plan that is followed in order to achieve a financial target. Basically, it is an estimate of the expenses to be incurred to meet a particular target, e.g. in order to make Tshs100,000,00 of sales, an organisation may have to spend Tshs50,000,000 on manufacturing, Tshs2000,000 on advertising and Tshs10,000,000 on distribution expenses. These estimates are future costs.
3. Future costs of alternate proposals help the management of an organisation to compare the economic viability of the the proposals and make an informed choice between them.



### Test Yourself 13

Which of the following can be classified as a historical cost?

- A An asset originally costing Tshs30,000,000 is now revalued as Tshs35,000,000
- B The relevant cost of manufacturing a new product which is computed as Tshs100,000,000
- C The standard cost of raw material X which stands at Tshs100 per kilogram
- D An amount of Tshs20,000,000 paid to the suppliers of raw material

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### 8. Analyse a semi-variable cost into fixed and variable elements by using the high-low method.

[Learning Outcome i]

**High/low** analysis compares the costs at two different activity levels so as to identify the fixed and variable cost components of the total cost.

Since the fixed element of the total cost is likely to remain unchanged during different periods, changes in the total costs at two different levels of activity can be attributed solely to the **variable elements**.

Variable cost per unit is calculated as:

Select the highest level of activity and the lowest level of activity in the given series of data. The difference in costs during these periods should be divided by the changes in output during the same periods.

This calculation can be expressed mathematically as follows:

$$\text{Variable cost per unit} = \frac{\text{Highest total cost} - \text{lowest total cost}}{\text{Highest units} - \text{lowest units}}$$

**Fixed cost** = Total cost (at the highest / lowest level of activity) – (Total units (at the highest / lowest level) x Variable cost per unit (as calculated above))

Generally the highest and the lowest volumes of production are used to compute the variable cost per unit.



### Example

The following data relates to the monthly output and related costs for Only Clean Plc, a soap manufacturing company.

Month	Output (Units)	Total Cost (FC + VC) Tshs'000
April	10,000	50,000
May	11,000	54,000
June	12,000	58,000
July	13,000	62,000

To separate total cost into the fixed and variable elements, apply the high or low method.

$$\begin{aligned} \text{Variable cost per unit} &= \frac{\text{Highest total cost} - \text{lowest total cost}}{\text{Highest units} - \text{lowest units}} \\ &= \frac{\text{Tshs}62,000,000 - \text{Tshs}50,000,000}{13,000 - 10,000} \\ &= \frac{\text{Tshs}12,000,000}{3,000} \\ &= \text{Tshs}4,000 \text{ per unit} \end{aligned}$$

Fixed cost can be computed by using the following formula:

$$\begin{aligned} \text{Fixed Cost} &= \text{Total high cost} - (\text{Total high units} \times \text{Variable cost per unit}) \\ &= \text{Tshs}62,000,000 - (13,000 \text{ units} \times 4,000) = \text{Tshs}10,000,000 \end{aligned}$$

Let's check this with the low activity (at 10,000 units)

$$\begin{aligned} \text{Total variable cost} &= \text{Total cost} - \text{Fixed cost} \\ &= \text{Tshs}50,000,000 - \text{Tshs}10,000,000 \\ &= \text{Tshs}40,000,000 \end{aligned}$$

$$\begin{aligned} \text{Per unit variable cost} &= \frac{\text{Tshs}40,000,000}{10,000} \\ &= \text{Tshs}4,000 \end{aligned}$$



### Test Yourself 14

A company incurs the following costs at various activity levels:

Activity level (units)	Total cost Tshs'000
5,000	250,000
7,500	325,000
10,000	400,000

Using the high-low method what is the variable cost per unit?

- A Tshs25,000
- B Tshs30,000
- C Tshs35,000
- D Tshs40,000

### Situations involving stepped fixed cost and changes in variable cost per unit

There are situations where the stepped fixed costs occur along with changes in per unit variable costs.



### Example

An organisation has the following total costs at three activity levels:

Activity level (units)	Total cost Tshs'000
4,000	38,000
6,000	54,000
8,000	68,000

The variable cost per unit is constant within this activity range and there is a step up of Tshs2,000,000 in the total fixed costs when the activity level exceeds 5,000 units.

What is the total cost at an activity level of 7,000 units?

### Answer

There is a step up of Tshs2,000,000 when the activity level exceeds 5,000 units. Hence to calculate the per unit variable cost, we will have to reduce this amount of step up in the costs. This is because these are stepped fixed costs occurring due to a change in the activity level and the analysis assumes that the total fixed costs remain the same throughout the activity period. Hence by deducting the step up in the fixed costs we consider only the pure increase in the costs due to the increase in variable costs.

**Continued on the next page**



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$$\begin{aligned}\text{Variable cost per unit} &= \frac{\text{Highest total cost} - \text{Lowest total cost}}{\text{Highest units} - \text{Lowest units}} \\ &= \frac{(\text{Tshs}68,000,000 - \text{Tshs}2,000,000) - \text{Tshs}38,000,000}{8,000 \text{ units} - 4,000 \text{ units}} \\ &= \frac{\text{Tshs}28,000,000}{4,000} \\ &= \text{Tshs}7,000 \text{ per unit}\end{aligned}$$

Fixed costs at the activity level of 4,000 units = Tshs38,000,000 – (4000 x Tshs7,000/unit) = Tshs10,000,000

Therefore, the total cost at the activity level of 7,000 units = Variable cost + Fixed cost + Stepped up fixed cost  
= 7,000 x Tshs7,000 + Tshs10,000,000 + Tshs2,000,000  
= Tshs61,000,000



### Test Yourself 15

Summer Ltd produces a product, Winter. For 20X3, production was 10,000 units with total costs of Tshs150,000,000. For the next year, 20X4, the budget is prepared for the production of 15,000 units with total costs of Tshs220,000,000. The production capacity of the company is 12,000 units per annum. If the company exceeds its limit, its fixed costs will increase by Tshs20,000,000.

What will be the variable costs per unit?

- A Tshs14,000
- B Tshs10,000
- C Tshs16,000
- D Tshs20,000

### Answers to Test Yourself

#### Answer to TY 1

The correct option is **B**.

The salary paid to the security guard of the office premises will be a non-production cost. This is because he is not engaged in production activity; he guards the office premises.

#### Answer to TY 2

The correct option is **A**.

Cost incurred for the purchase of material for the manufacture of the main product will always be a production cost. Fixed cost is one of the elements of total cost. Routine cost is any cost incurred on a regular basis. Management cost is again a cost incurred for the overall management and functioning of the organisation.

#### Answer to TY 3

The correct option is **C**.

**Indirect material is a material which cannot be directly traced to the finished output.**

The other options are incorrect because:

Option A: Wooden plank used in a wooden chair constitutes material, but not indirect material. It forms a major portion of the wooden chair and can be easily traced to it. Hence, it is an example of direct material.

Option B: Glue used is an indirect material but wooden plank, as explained above, is a direct material.

Option D: Small 1cm screws used in a wooden chair are also indirect material, but this option excluded glue, hence it is incorrect.

**Answer to TY 4**

The correct option is **D**.

Production cost includes all direct material cost, direct labour and direct expenses. The tyre cost, technician's salary and wages of foreman satisfy the criterion of production costs. As such they all are a part of the production costs.

**Answer to TY 5**

The correct option is **A**.

All these costs are a part of production overheads. Production cost includes all costs related to production. Non-production costs and overheads are related to activities outside the factory until the products are sold.

**Answer to TY 6**

The correct option is **A**.

Direct cost is specifically and easily identifiable with the cost object. Direct material cost is not allocable; it is identifiable with a cost objective or cost unit. Direct material cost is not related to the production process in general but is specifically identifiable with the product.

**Answer to TY 7**

The correct option is **C**.

These are called direct expenses because they are directly attributable to production or service provision i.e. incurred in such a way that their benefit can be easily visualised in a product and form a substantial part of the total direct costs. Direct expenses are separately identifiable and cannot be included in direct material or direct labour costs and can be distinguished from them.

**Answer to TY 8**

The correct option is **A**.

Fixed costs remain fixed in a budget period. Although fixed costs remain fixed for a certain period they do not remain fixed forever. They may change for each period under study.

**Answer to TY 9**

The correct option is **C**.

A stepped fixed cost is one that is constant up to a certain activity level or a certain period, then rises and again remains constant up to a new level of activity or a new period. It can be compared with stairs that make up a staircase in that they rise up to a certain height, become flat and then rise again.

**Answer to TY 10**

Labour cost, material cost and direct expenses vary with each unit produced. They qualify as variable costs.

The rent of the workshop, watchman's salary, salary of the administrative staff and floor manager's salary will have to be paid even if there is no production in any month. These are therefore fixed costs.

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The statement of cost can now be made as follows:

**Statement showing cost of producing 500 chips during the month**

	<b>Calculations and reasons</b>	<b>Tshs</b>
<b>Variable costs</b>		
Material cost	Tshs20,000 x 500 chips	10,000,000
Labour	2.5 hrs/chip x Tshs10,000/hour x 500 chips	12,500,000
Direct expenses	Tshs5,000 x 500 chips	2,500,000
(a)Total variable cost		25,000,000
<b>Fixed costs</b>		
Rent of workshop	Monthly rent	1,000,000
Watchman’s salary	Monthly salary	1,000,000
Administrative staff salary	Monthly salary	2,500,000
Salary of floor manager	Monthly salary	2,500,000
(b)Total fixed cost		7,000,000
<b>Total cost (a + b)</b>	Tshs25,000,000 + Tshs7,000,000	<b>32,000,000</b>

**Answer to TY 11**

The correct option is **D**.

Telephone charges include certain fixed charge (rental) plus per unit usage charges based on the time spent making calls. Often in the case of internet charges, there is a fixed minimum charge plus a variable charge based on actual usage or downloading. Vehicle hire charges also include a fixed minimum charge plus a variable charge based on actual running of the vehicle.

**Answer to TY 12**

The correct option is **B**.

Semi-fixed costs contain fixed and variable elements. Because of the variable element, they fluctuate with volume and because of the fixed element they do not change in direct proportion to output. These costs change in the same direction as that of the output but not in the same proportion. For example depreciation for operating two shifts may be only 50% more than that for a single shift. It may change with comparatively small changes in output but not in the same proportion.

**Answer to TY 13**

The correct answer is **D**.

The amount of Tshs20,000,000 paid to the suppliers of raw material represents an actual transaction that has taken place and the cost has been reported post the transaction.

**Answer to TY 14**

The correct option is **B**.

The variable cost per unit is **Tshs30,000**.

**Answer to TY 15**

The correct option is **B**.

There is a step up of Tshs20,000 in fixed costs, when the activity level exceeds production capacity of 12,000 units. Hence, to calculate the per unit variable costs, we will have to reduce this amount of step up in the costs.

$$\begin{aligned} \text{Variable cost per unit} &= \frac{\text{Highest total cost} - \text{Lowest total cost}}{\text{Highest units} - \text{Lowest units}} \\ &= \frac{(\text{Tshs}220,000,000 - \text{Tshs}20,000,000) - \text{Tshs}150,000,000}{15,000 \text{ units} - 10,000 \text{ units}} \\ &= \frac{\text{Tshs}50,000,000}{5,000 \text{ units}} \\ &= \text{Tshs}10,000/\text{unit} \end{aligned}$$

**Self Examination Questions**

**Question 1**

Production employees work directly on the goods being manufactured, their labour costs are recorded as:

- A Direct expenses
- B Direct labour
- C Indirect labour
- D Manufacturing overhead

**Question 2**

A person gets payment in the form of fixed salary of Tshs750,000, commission based on productivity of Tshs300,000 and an annual bonus of Tshs250,000. What is the total direct labour cost?

- A Tshs250,000
- B Tshs750,000
- C Tshs300,000
- D Tshs1,050,000

**Question 3**

Primary packing materials, such as wrappers and cartons, are known as:

- A Indirect expenses
- B Indirect material
- C Direct material
- D Direct expenses

**Question 4**

Direct expenses should be considered part of:

- A Product cost
- B Period cost

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### Question 5

The maintenance cost of office building forms a part of:

- A Direct expenses
- B Selling and distribution cost
- C Indirect expenses
- D Administration cost

### Question 6

Excise duty paid is an example of:

- A Direct material
- B Selling cost
- C Direct expense
- D Factory overhead

### Question 7

Find the production cost per unit from the following details. The total number of units manufactured is 500. All the units are sold during the year. Assume that there is no opening and closing inventory.

The cost per unit is as follows:

	<b>Tshs</b>
Materials	1,500,000
Direct wages	1,200,000
Indirect material	500,000

The total costs incurred are as follows:

Indirect wages	Tshs500,000
Administration overheads	Tshs345,000
Selling and distribution overheads	Tshs202,500

- A Tshs3,200,000
- B Tshs2,700,000
- C Tshs5,295,000
- D Tshs4,200,000

### Question 8

Sun Co produces a product, M. For each unit of product M, it requires 1kg of material A and 2 kg of material B. The market prices of materials A and B for the current year are Tshs1,500 and Tshs2,000 per kg respectively. Next year, the price of material A will increase by 10%, while the market price of B will remain as it is. If Sun Co wants to produce 5,000 units of product M next year, calculate the total price of direct materials.

- A Tshs8,250,000
- B Tshs20,000,000
- C Tshs28,250,000
- D Tshs15,000,000

### Question 9

Which of the below can be an example of a stepped fixed cost?

- A Machine maintenance where beyond an output level an additional machine is needed to produce more
- B Telephone and electricity charges
- C Annual factory rent and insurance
- D All of the above

**Question 10**

Which of the below could be examples of fixed costs?

- A Rent of office or factory premises
- B Insurance of current and non-current assets
- C Repairs and maintenance according to the annual maintenance contract
- D All of the above

**Question 11**

Which of the below could be examples of variable costs?

- A Plywood used for making tables
- B Cement and other materials per square metre of building construction
- C Concrete used per square metre of a road
- D All of the above

**Question 12**

Which of the following statements is incorrect?

- A Semi-variable cost is a mixture of fixed and variable components
- B The per unit variable cost changes in direct proportion with change in output
- C Non-linear cost changes disproportionately with change in output
- D Fixed cost remains the same regardless of the amount of product the company makes or sells

**Question 13**

Find the production cost per unit from the following details. The total number of units manufactured is 500, and all the units are sold during the year. Assume that there is no opening and closing inventory.

The cost per unit is as follows:

	Tshs'000
Materials	1,500
Direct wages	1,200
Indirect material	500

The total costs incurred are as follows:

	Tshs'000
Indirect wages	500,000
Administration overheads	345,000
Selling and distribution overheads	202,500

- A Tshs3,200,000
- B Tshs2,700,000
- C Tshs5,295,000
- D Tshs4,200,000

**Question 14**

Beautiful Plc is a cosmetic manufacturing company. The costs incurred at three different production levels are given below.

Production (make-up kits)	Total cost
	Tshs'000
22,000	240,000
26,000	270,000
30,000	300,000

Find out the total fixed cost and variable cost per make-up kit using high / low analysis.

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### Question 15

Which of the following statements correctly brings out the feature of a future cost?

- A Future costs are relevant costs
- B Future costs are not relevant in decision making
- C Future costs are related with the present market value of an asset
- D Future costs are based on recorded facts

### Question 16

Thope pls, a manufacturing company owns six specialised heavy duty machines. The management of the company is contemplating regarding immediate replacement of one of the machines and have asked the company's accountant, Joy, to help them in their decision.

**Which of the following costs will be computed by Joy to help in the decision making?**

- A Historical cost of the machine
- B Future cost of the machine
- C Current cost of the machine
- D Fixed cost of the machine

### Question 17

Which of the following statements establishes that historical costs are objective in nature?

- A Historical costs are based on recorded facts
- B Historical costs are relevant costs
- C Historical costs are replacement costs
- D Historical costs play a very vital role in decision making

## Answers to Self Examination Questions

### Answer to SEQ 1

The correct option is **B**.

The wages of the shop floor employees form a part of the cost of labour employed. Direct expenses are the repairs and maintenance charges at the factory; indirect labour is the foremen and maintenance staff. Manufacturing overheads are the expenses incurred for the activities other than production in the factory.

### Answer to SEQ 2

The correct option is **D**.

The direct labour expenses are the fixed salary and the commission. The bonus is generally treated as an indirect expense. Hence the total direct labour cost = Tshs750,000 + Tshs300,000 = Tshs1,050,000.

### Answer to SEQ 3

The correct option is **C**.

Primary packing is essential for the goods to be complete. As such it forms a part of the direct materials. Indirect material is the material that does not form a part of the final product. Direct and indirect expenses are the expenses other than material costs.

### Answer to SEQ 4

The correct option is **A**.

Direct costs are all costs incurred in direct relation to production activity.

**Answer to SEQ 5**

The correct option is **C**.

Indirect expenses are those expenses which cannot be directly and conveniently allocated to cost units. For example rent and insurance of factory, depreciation, repairs and maintenance of machinery, building etc.

**Answer to SEQ 6**

The correct option is **C**.

Excise duty is a cost that can be identified with the product.

**Answer to SEQ 7**

The correct option is **D**.

Production cost per unit is Tshs4,200,000.

**Cost sheet**

	Per unit (Tshs'000)	Total costs (Tshs'000)
Materials	1,500	750,000
Direct wages	1,200	600,000
<b>Prime cost</b>	<b>2,700</b>	<b>1,350,000</b>
Indirect materials	500	250,000
Indirect wages (W1)	1,000	500,000
<b>Production cost</b>	<b>4,200</b>	<b>2,100,000</b>
Administration overheads (W2)	690	345,000
Selling and distribution overheads (W3)	405	202,500
<b>Cost of sales / Total costs</b>	<b>5,295</b>	<b>2,647,500</b>

**Workings**

**W1** Per unit indirect wages = Total indirect wages/Units produced  
 = Tshs500,000,000/500 units  
 = Tshs1,000,000

Note: administration overheads and selling and distribution overheads are period costs.

**W2** Per unit administrative costs = Total administrative costs/Units produced  
 = Tshs345,000,000/500 units  
 = Tshs690

**W3** Per unit selling and distributive costs = Total selling and distributive costs/Units produced  
 = Tshs202,500,000/500 units  
 = Tshs405

**Answer to SEQ 8**

The correct option is **C**.

For one unit of M, 1kg of material A and 2 kg of material B are required.  
 Hence, to produce 5,000 units of M, 5,000 kg of material A and 10,000 kg of material B are required

Cost of material A = (5,000 kg x Tshs1500) + 10% price increase  
 = 7,500,000 + 750,000  
 = Tshs8,250,000

Cost of material B = 10,000 kg x Tshs2,000  
 = Tshs20,000,000

Hence, the direct materials for product M will cost Tshs28,250,000 (Tshs8,250,000 + Tshs20,000,000).



## 90: Cost Accounting, Cost Classification and Coding

### Answer to SEQ 9

The correct option is **A**.

Machine maintenance cost is a stepped fixed cost, where beyond a certain output level an additional machine is needed to produce more. Telephone and electricity charges are semi-variable because they exhibit cost behaviour of both fixed and variable components. Annual factory rent and insurance are fixed costs. These do not depend on output, but remain unchanged irrespective of the output level.

### Answer to SEQ 10

The correct option is **D**.

All the instances given pertain to expenses that do not change or vary with respect to the overall activity level. In other words, these costs are incurred irrespective of whether operations are in progress or not.

### Answer to SEQ 11

The correct option is **D**.

Plywood will be the main ingredient (in terms of cost and volume) of a table. Its quantity will be fixed per table and therefore, will vary with the number of tables made. Cement and concrete used in building and road construction projects do not change per square metre but depend on the size of the building or road area respectively.

### Answer to SEQ 12

The correct option is **B**.

Semi-variable or semi-fixed cost contains an element of both fixed and variable cost. Variable cost per unit is constant but the total variable cost changes depending on the levels of output. Non-linear or curvilinear variable cost changes disproportionately with change in output. Fixed cost is independent of the volume of product the company produces or sells.

### Answer to SEQ 13

The correct option is **D**.

Production cost per unit is Tshs4,200,000.

### Cost sheet

	Per unit (Tshs'000)	Total costs (Tshs'000)
Materials	1,500	750,000
Direct wages	1,200	600,000
Prime cost	<b>2,700</b>	<b>1,350,000</b>
Indirect materials	500	250,000
Indirect wages (W1)	1,000	500,000
<b>Production cost</b>	<b>4,200</b>	<b>2,100,000</b>
Administration overheads (W2)	690	345,000
Selling and distribution overheads (W3)	405	202,500
Cost of sales / Total costs	<b>5,295</b>	<b>2,647,500</b>

### Workings

**W1** Per unit indirect wages = Total indirect wages/Units produced  
= Tshs500,000,000/500 units  
= Tshs1,000,000

**Note:** administration overheads and selling and distribution overheads are non-production costs.

**W2** Per unit administrative costs = Total administrative costs/Units produced  
= Tshs345,000,000/500 units  
= Tshs690,000

**W3** Per unit selling and distributive costs = Total selling and distributive costs/Units produced  
 = Tshs202,500,000/500 units  
 = Tshs405,000

**Answer to SEQ 14**

$$\begin{aligned} \text{Variable cost per unit} &= \frac{\text{Highest total cost} - \text{Lowest total cost}}{\text{Highest units} - \text{Lowest units}} \\ &= \frac{\text{Tshs}300,000,000 - \text{Tshs}240,000,000}{30,000 - 22,000} \\ &= \frac{\text{Tshs}60,000,000}{8,000} \\ &= \text{Tshs}7,500 \text{ per kit} \end{aligned}$$

**Fixed Cost** = Highest total cost – (Highest units x Variable cost per unit)  
 = Tshs300,000,000 – (30,000 x Tshs7,500)  
 = Tshs300,000,000 – Tshs225,000,000  
 = Tshs75,000,000

**Answer to SEQ 15**

The correct answer is **A**.

Future costs are relevant in nature, that is, future costs can bring out the financial viability of a proposed project and help the management take a decision whether to go ahead with the project or not.

**Answer to SEQ 16**

The correct answer is **C**.

Current cost helps in determining the replacement value of an asset.

**Answer to SEQ 17**

The correct answer is **A**.

Historical costs are objective in nature as they are reported based on recorded facts and their authenticity can be verified by inspecting supporting documents at any given point of time.



## STUDY GUIDE B1: MATERIAL COSTS AND ITS ACCOUNTING

### Get Through Intro

Vital materials used for the construction of a house are wood and bricks, for a dress it is the cloth and for a beautiful painting it is the canvas and paints. Raw materials are an important ingredient in the production of an item that can be directly traced to the products and hence form a part of the direct costs of the product.

This Study Guide takes you through the various recording and control procedures of raw materials (procurement, storing and so on).

It helps you correctly approach and perfectly solve the related questions in the exams. Also as a management accountant you will be in a position to guide management as to how efficiently the raw material costs can be managed and controlled in order to reduce total costs of the products.

### Learning Outcomes

- a) Describe material input to the production process.
- b) Apply procedures for purchasing, issuing, pricing documentation to account for material costs.
- c) Apply storekeeping procedures of stock acquisition, stores record keeping, stores control, stores issues and stock valuation.
- d) Calculate control levels EOQ. Re – order level, minimum and maximum.
- e) Calculate closing stock and Average Cost.
- f) Distinguish between centralised and decentralised stores.
- g) Describe the main features of JIT production and purchasing.
- h) State the general role of stock valuation for financial accounting purposes.

1. Describe material input to the production process

[Learning Outcome a]



Definition

A material can be defined as the basic substance which is altered, modified and transformed in different stages of a production process to obtain the finished product.

**Material input to the production process** can be in form of raw material, work in progress and in finished goods based on **the stage that they are in the production process**:

**Raw material:** purchased goods that form the basis of the final product.

**Work-in-progress:** an intermediate stage between raw materials and finished product. These are raw materials for which a portion of work is performed but not completed. These are no longer a part of raw materials and not yet a part of finished goods.

**Finished product:** goods which are ready for sale



Example

Cotton Moods Inc is a garment manufacturing company. Their raw materials would be cloth, threads, work-in-progress would be inventory at any stage between the raw cotton and the finished product i.e. semi-finished cloth that yet to be polished and finished goods inventory will be garments ready for despatch.

In addition to this, material is classified as direct material and indirect material based on **the role that they play in the production process**:

- 1. Direct material:** direct material is that part of material that can be specifically attributed to a unit of production or a specific job or service provided. For example the cloth and threads used in the manufacture of garments would be direct materials.
- 2. Indirect material:** cannot be directly attributed to a specific unit of production. For example the scissors used for cutting cloth and the measuring scale used for measuring the garment which are stitched are the indirect materials used in the manufacture of garments.

Material constitutes a very significant proportion of total cost of a finished product in most of the manufacturing industries. There are number of ways in which material, **which is an element of input in a production process**, can be classified. The three main ways are:

**(a) Physical properties:** Materials can be classified according to their physical properties. The following features can be taken into consideration while classifying material according to physical properties:

- Colour
- Shape
- Flexibility
- Quality
- Fire / water resistant

**(b) Substance:** Materials can also be classified according to the substances that make them up. Materials can be made of one or more substances. They may be made up of:

- Wood
- Plastic
- Metal
- Wool
- Glass

- (c) **Measurement:** Materials can be classified on the basis of their measurement i.e. how they are measured. The different types of measurement are:

Litre  
Meter  
Kilogram  
Bags  
Packets  
Numbers

Due to the immense importance of materials in the production process of an organisation, materials need to be managed in a systematic and efficient manner. It needs to be ensured that the right quality and quantity of material is being input at different phases of the production process.

### Objectives of materials management

The quality of raw material needs to be matched to the product specification as it is ultimately reflected in the quality of the finished product.



#### Example

In the manufacture of shoes, if the quality of leather is poor, then the shoes produced will not be comfortable, attractive or durable. This might be acceptable to a shop that sells cheap shoes, but not to a big showroom that sells expensive shoes.

Quality being compromised in return for a lower price is not desirable. The only consideration for procuring the raw material should be to have the right quality and quantity of the item as per the specification at the right price.



#### Example

Argio Gormani is a high end boutique that tailors clothes for the rich and famous. The quality of cloth used in the production is the best available. The cloth used costs much more than the lower quality material on the market. If Argio Gormani wished to decrease the cost of production, it should not look at using cheaper cloth as this would stop customers buying its suits. If however an alternative cloth producer could make the same quality material at a cheaper price, Argio Gormani would switch.

Stock-out or zero-inventory position should be avoided so that production does not come to a halt suddenly, due to the shortage or non-availability of required material. Though the stock-out costs are not recorded in the books of the accounts and are notional costs, stock-outs affect a company in other ways as it cannot sell the desired volume it could have, if the stock-out had not occurred.



#### Example

During the Christmas season, the demand for candies and confectionaries is very high. There has to be a continuous supply of candies to the stores during this period. If there is a shortage of sugar in the factory, the production will come to a halt. The company will not be able to supply candies and hence will lose on the amount of sales that it could have made.

Holding **excess inventory** should be avoided since this will unnecessarily cause money to be locked up in inventory, and moreover would lead to the deterioration of the unused inventory and cause its subsequent obsolescence.



#### Example

In the preparation of baked beans, a tinned food, the major raw materials used are tomatoes and beans. This material cannot be stocked in large quantities as it has a short shelf life and deteriorates quickly. Hence the overstocking of tomatoes and raw beans should be avoided.

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Wastage of raw materials during the storing process or manufacturing should be minimised. Proper storage and efficient use of raw material in the manufacturing process is essential for this purpose.



### Example

#### Storage of material

Cement used in the construction industry needs to be stored in air tight containers. If the cement comes in contact with moisture, it solidifies and hence is rendered useless for any construction activity. This is a case of a loss of raw material through incorrect storage.



### Example

#### Manufacture

In the manufacture of upholstered furniture a carpenter needs to cut cloth in different sizes before stitching it to the sofa. The cloth needs to be cut in perfect dimensions for it to be an exact fit for the sofa. In this situation, if the tailor is not well trained, and cuts the cloth in the wrong manner, the entire cloth will be ruined, as it will not be a perfect fit for the sofa.



### Test Yourself 1

Consider the following cases of finished products:

- (a) Jewellery
- (b) This text book that you are reading
- (c) An apartment building

#### Required:

What would be the raw material(s) in each of the above cases?

## 2. Apply procedures for purchasing, issuing, pricing documentation to account for material costs.

[Learning Outcome b]

This learning outcome deals with the implementation and maintenance of a proper material management system in relation to the procurement, receiving, handling, storing and utilisation of material in the production process.

**Perpetual inventory control systems** seek to control the material (by monitoring its movement) when it is in storage. It advocates that a system should be in place for recording all the receipts, issues and balance of material.

In fact, perpetual inventory control systems ensure **continuous record keeping** whenever any transaction takes place. It also ensures the close monitoring of every physical transaction. Continuously taking the inventory is part and parcel of the perpetual inventory control system. It ensures that the book records reflect the true physical balance, and at the same time reveals any discrepancies, if any, in the book balances and the physical balance of the items in store.

Understanding of the overall objectives of material management and the concept of perpetual inventory control systems helps to comprehend the different **procedures and documents** necessary for purchasing and issuing of material from inventory.

## 2.1 Purchase requisition

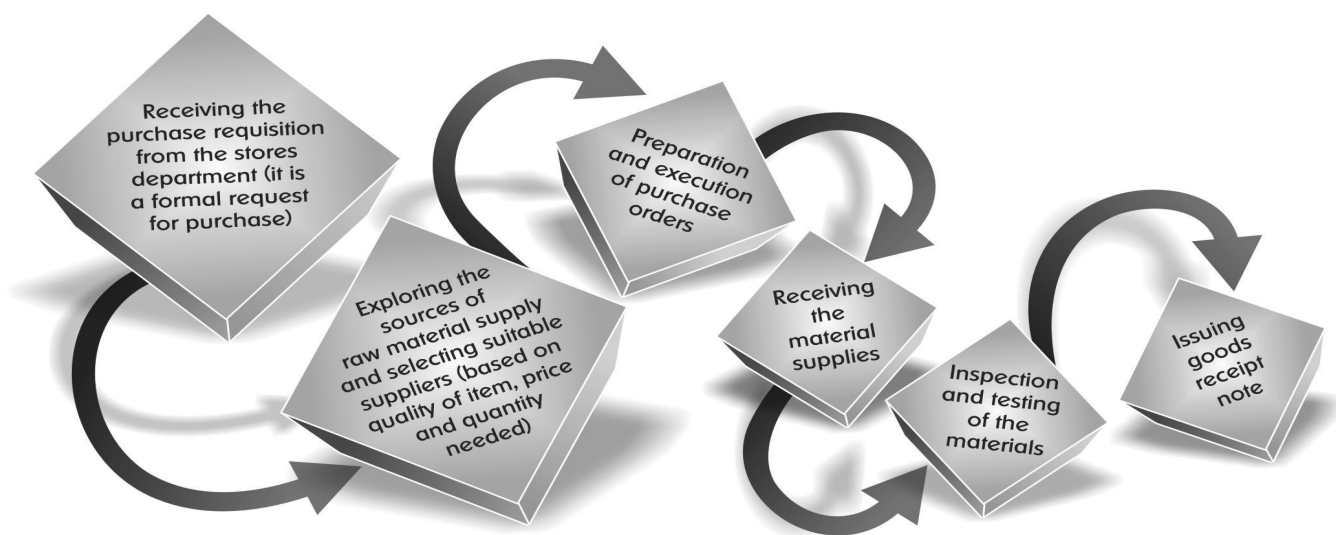
Raw material purchases involve the following decisions:

- a) What material should be purchased?
- b) How much should be purchase at a time?
- c) When should it be purchased?
- d) Where should it be purchased from?
- e) At what price should it be purchased?

Material procurement (i.e. ordering and receiving) can be made systematically by putting in place logical steps for procuring inventory, and by following this with a proper procedure of documentation of the material's movement.

This gives rise to the following procedures to be followed during the procurement and receipt of material.

**Diagram 1: Material procurement procedure**



Industries today operate on a large scale and require a proper system to track the movements of material. In order to scientifically manage the entire process of purchasing, receiving, inspecting material and recording every movement of the material, companies now have a separate purchase department that takes care of the raw material purchase procedures.

Since the raw materials are purchased for use in production, there should be **constant coordination** between the purchase and production departments.

The process of purchasing the raw materials starts when the stores department sends a formal **purchase requisition** to the purchase department. When the level of inventory slips down to a level where the store keeper feels that a **re-order of raw material** is required to avoid any delays or stoppages in production, he issues a purchase requisition.

A “**purchase requisition**” is a formal request for the purchase of material. The request may be for the replenishment of stocks (regular indent) or for a specific job (special indent). This form is usually filled by the **store keeper** for regular material, and by the **departmental head** concerned for special material (i.e. for items which are consumed in production or in a non-routine project).

A purchase requisition is made for regular material when the stock declines to the ordering level. On the other hand, special materials are requested on the basis of demand from the planning or production department. Either the works manager or plant superintendent, along with the person who made the original request, usually signs the requisition form.



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### Example

Digi Plc manufactures digital watches. In the manufacture of digital watches semi-conductor chips are an important raw material. The store department of the company has received a request from the production department to issue 10,000 chips.

At that point of time the stores department had 15,000 semi-conductor chips. In this case the stores will be left with only 5,000 chips, after issuing the material as per the request.

To avoid a stock out situation the stores in this case will immediately issue a purchase requisition to the purchase department for the purchase of more chips.

### Sample format of a purchase requisition

Purchase requisition			
No. _____			
Date _____			
Department name _____			
Date by which material is required _____			
Description of materials	Item code	Quantity required	Units of measurement
Signature of the dealing person: _____			
Signature of the department head or manger: _____			
(For record of stores department)			
Purchase order no. and date _____			
With (supplier name) _____			
Actual date of delivery _____			
_____ Signature of the stores manager			

### 2.2 Deciding the vendor and developing the pricing documentation

Once the purchase requisition is received, the head of the purchasing department will **select the appropriate vendor. Quotations and tenders** will be requested from prospective suppliers. Enquiries or quotations give information regarding the price of the goods, quality offered, delivery time, mode of transportation, terms of payment and reputation of the supplier. **The quotations will be summarised in a document called the price comparison sheet.**

The sheet will include the following details relating to each of the quotation received from the various vendors:

- Description of goods to be ordered
- Quantity of goods,
- Location of delivery
- Date of delivery of goods
- Mode of transportation,
- Terms of payment
- Warranty terms (if any)
- Reputation of the supplier (based on past performance) also confirmation that the vendor is not blacklisted ;
- and
- Price of the goods

The supplier offering the best terms is selected. The above documentation provides the basis for verifying whether the basis for decision to purchase from a particular vendor is appropriate

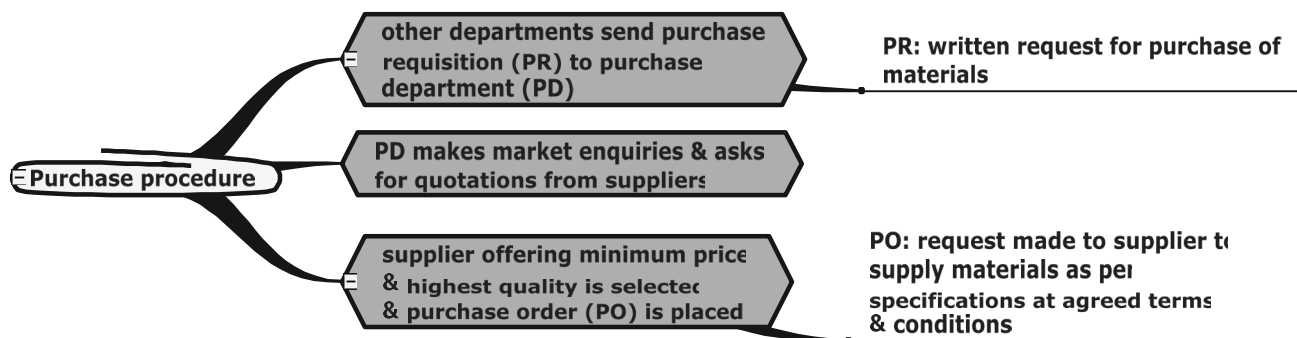
**2.3 Placing the purchase order**

Having decided on the best quotation, the purchase manager or officer proceeds to issue a **formal purchase order**. Whereas the tender is just an offer by the supplier, the purchase order binds both the organisation issuing it and the supplier in a contractual obligation. It is a written request to supply a specified quantity of material at a rate as agreed upon and according to the terms and conditions stipulated in the contract. A copy of the order is given to the stores department who placed the requisition, inspection department, purchase department and store accounting section. Copies of the purchase, order along with the relevant purchase requisitions are placed on a file to facilitate any subsequent referencing.

**Sample format of a purchase order (P.O.)**

Purchase order						
No _____						
Date _____						
Reference of quotation or enquiry _____						
To, (Supplier name) _____						
Sr. no	Item description	Code no	Quantity	Unit measurement	of	Total value
			Total			
			Add: Taxes			
			Add: Freight			
			Grand Total			
Date of delivery _____						
Place of delivery _____						
Mode of inspection _____						
Terms of payment _____						
Price variation clause (if any) _____						
<b>Terms and condition: (May contain the following)</b> 1. Goods will be accepted only after the testing of inventory. 2. Payment will be made after 8 days after the receipt of goods.						
Signature of purchase department head _____						

**SUMMARY**



**Test Yourself 2**

When is a purchase order issued?

- A When a formal purchase requisition for material is received from the departments requiring material.
- B At regular intervals as and when management thinks material should be ordered, based on their experience.
- C When correspondence is received from the stores department.
- D The accounts department wants to order material.



**Test Yourself 3**

After a comparison and analysis of quotations received from the suppliers is made, the supplier offering the \_\_\_\_\_ is selected:

- A Highest quality and lowest price
- B Lowest quality and highest price
- C Lowest quality and lowest price
- D Highest quality and highest price

**2.4 Receipt and inspection of material**

When material is supplied by a vendor, it is temporarily held by the receiving section. The material received is accompanied by the following documents:

- A despatch note from the supplier, indicating that the material has been despatched from his premises
- A delivery note from the carriers of the material

The receiving section sends the material to the inspection department for quality and specification checks.

The receiving section is generally attached to the main entry gate or directly with the inspection department. In large organisations, there are separate inspection departments where the volume of jobs handled is very high. The inspection department certifies whether the raw material received is of desired specifications and standards.

The stores department and the receiving section are kept separate for the purpose of internal control. The stores department is responsible for the physical receipt and issue of raw material whereas the receiving department is responsible only to check whether the requisite material is received.

**2.5 Goods receipt note / material receiving report / material inward note**

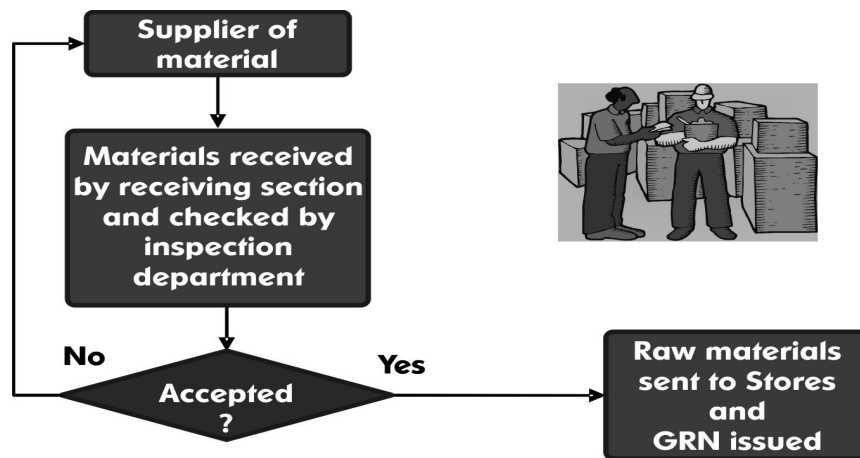
The goods once certified by the inspection department are forwarded to the stores for formal receipt. A 'goods receipt note' (GRN) is prepared, showing an endorsement of inspection on it or a certificate of inspection attached to it.

The GRN is prepared in multiple copies. The inspection department retains one copy. One copy is sent to the purchasing department to inform that the order has been executed. Another copy is forwarded to the accounts department, which is responsible for making payment after checking the goods received note, purchase order and the suppliers invoice. Copies are also sent to the stores and the production departments.

**Specimen format of a goods receipt note**

Goods receipt note		
Received from _____		No _____
Purchase Order no _____	Delivery note no _____	
Date of receipt _____	Date of inspection _____	
Description	Code	Quantity
Inspector _____	Store keeper _____	
Receiver _____	Stores ledger clerk _____	

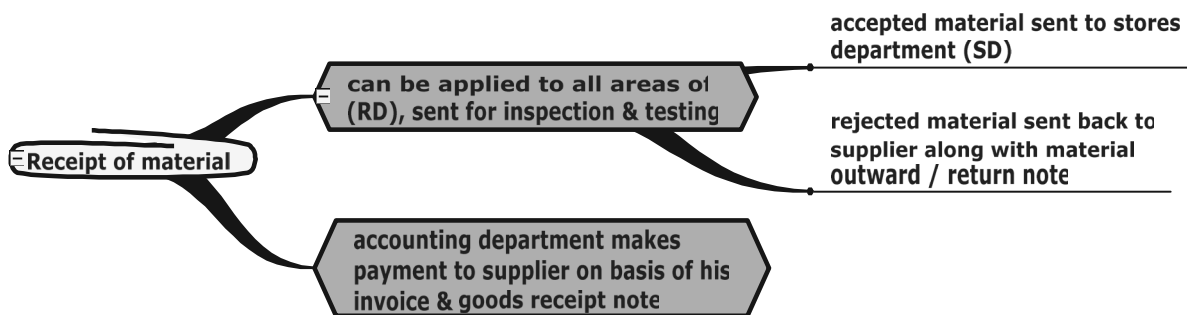
Diagram 2: Receipt and inspection of material



2.6 The role of the accounts department

Generally there is a time lag between the goods being received and the arrival of the suppliers invoice. The accounts department **compares the GRN with the suppliers invoice** and the purchase order, to process the invoice for payment. If the documents verified are found to be in order, the department pays the vendor by the due date. Yet another responsibility of the accounts department (in particular, the stores accounting or costing section) is to make a receipt entry in the priced stores ledger.

SUMMARY



Test Yourself 4

Generally the receiving section and the stores department are kept separate in terms of administration for the purposes of:

- A Keeping a check or internal control.
- B Saving money.
- C Increasing the number of departments.
- D Increasing staff strength by employing more people.

2.7 Materials Return Note

Material return note is used when materials need to be returned to stores from production. It may be due to a change in the production schedule, resulting in surplus materials held by the production department. The quantity and value of the items returned on this note are recorded on the receipt side of the stores ledger.

2.8 Material outwards note

Sometimes material has to be returned to suppliers for various reasons. This could include rejection of material on inspection, excess quantities delivered or different material sent mistakenly. In this case the stores or the dispatch department draws up a material outwards or returns note.

Normally, the return takes place before the preparation of the GRN and hence is not debited in the store books and ledger. In that case, **no adjustment** in the account books would be necessary.

**102: Accounting for Materials, Labour and Overheads**

**Bin cards and stores ledgers** are two different sets of records of material. The bin cards record the movement of material (receipt, issue and balance of the inventory) **quantity wise**, and the stores ledger maintains the record of material movement in terms of **quantity as well as the cost** of the material.

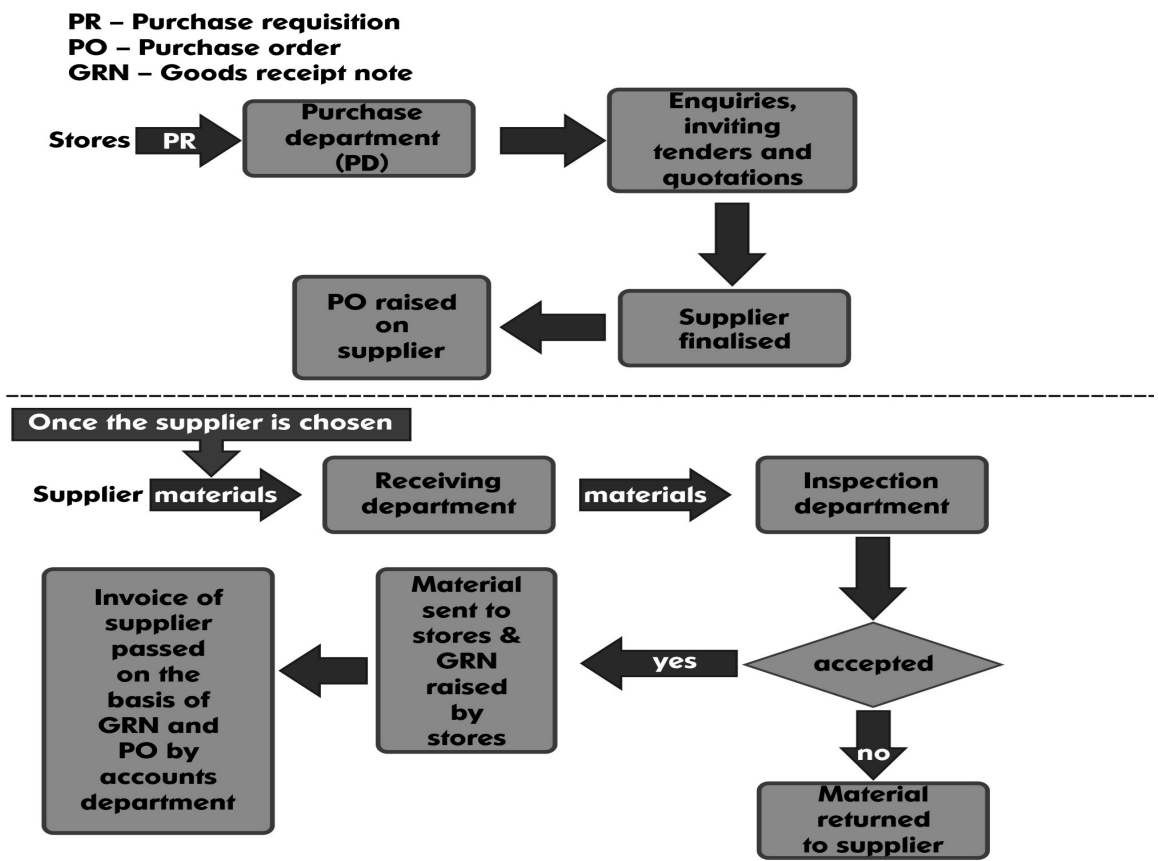
The stores department maintains bin cards and the accounts department maintains the stores ledger. A format of the stores ledger and bin card is shown in the next learning outcome.

**2.9 The role of accounts department**

The invoice received from the supplier is sent to the stores accounting section to check the authenticity and mathematical accuracy. The quantity and price are also checked with reference to GRN and the purchase order respectively. The store accounting section, after checking for accuracy, finally certifies and passes the invoice for payment.

The diagram below shows the whole process of purchase and receipt of material.

**Diagram 3: Materials purchase procedure**



**2.10 Material issue procedure**

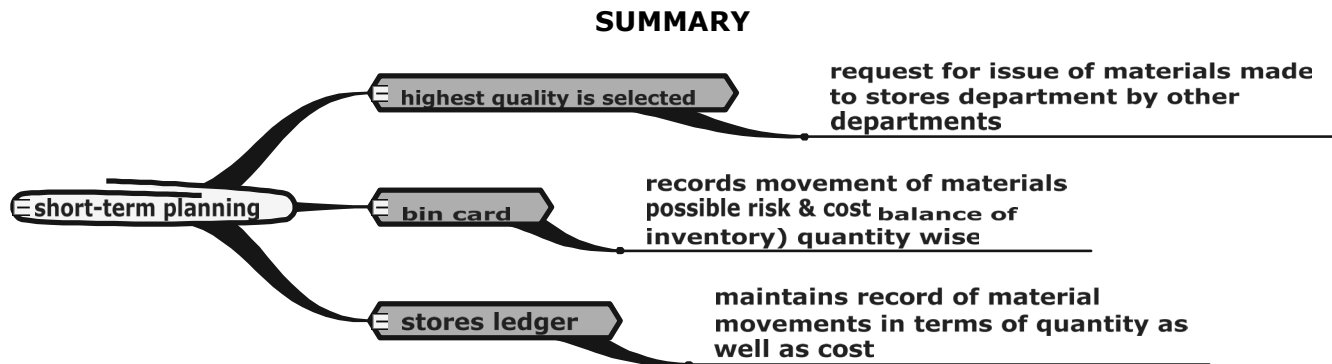
Only with the proper authorisation is the material is issued from the store. The production budget decides the quantity of output to be produced (for details on production budget see Study Guide C3). The production budget also defines the quantity of material required for production. This is listed on the 'material requisition note'. The production foreman forwards this slip to the stores department and obtains the material in exchange. Any material required by the production foreman in excess of the quantity budgeted needs the approval of a higher authority (e.g. the production manager).

Sample format of stores requisition slip

Material requisition slip					
Material required for _____ (job or overhead account)				No _____	
Department _____				Date _____	
Description	Code no.	Weight	Rate	Amount	Notes
Foreman _____					

Once the materials are issued to production on the basis of the material requisitions, the process of ordering, receipt and issue of material is complete. The procedure for the storage and maintenance of an accurate account of receipt, issue and balance is the next step.

The storekeeper makes the **entries in the bin card** for the issue of material from the stores. A copy of this is also forwarded to the stores accounting section that makes **entries in the stores ledger** for the issue of material in terms of quantity and value.



**3. Apply storekeeping procedures of stock acquisition, stores record keeping, stores control, stores issues and stock valuation.** [Learning Outcome c]

**3.1 Storekeeping procedures of stock acquisition**

This is discussed in detail in previous Learning Outcome.

Monitoring physical and book inventory is needed to ensure that the balances shown in the books (i.e. stores ledger, bin card, etc.) reflect the true balance of the stores items. The perpetual inventory control system takes care of monitoring the entire transactions that may take place at the stores department automatically.

**3.2 Stores record keeping**

As discussed in the previous Learning Outcome, perpetual inventory control systems aim at keeping a constant check on the physical inventory and the book inventory and identify any discrepancies. The procedure comprises of the maintenance of bin cards, stores ledger, recording of every transaction that takes place in the stores (e.g. receipt, issue of material), maintaining every document supporting the transactions (e.g. goods receipt note, material requisition note, etc.) and continuous inventory counting.

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**1. Bin cards**

Bin cards are the physical (quantitative) records of the movement of store items. The receipt, issue and balance of all the raw materials from the stores are recorded on bin cards. The GRNs and material return notes form the basis for an entry of receipt in the bin card. The material requisition notes form the basis of an entry of issue in the bin card. Any receipt or issue is immediately recorded when it takes place in the receipt column and the issue column respectively. The balance quantity is calculated and recorded regularly.

Separate bin cards are prepared for each item of material and are kept on the shelves or bins near the inventory. At any given point of time, the store keeper is aware of the level of inventory and can place orders for replenishment of material at appropriate time intervals.



**Example**

The stores department of an organisation has four hundred different types of raw material. The storekeeper will prepare a separate bin card for every item of material. This will record the receipts, issues and balances for each item of material so as to have a constant record for each item of material.

The two bin system is adopted by many organisations to keep an effective control on the level of inventory. In this system two separate bins are maintained.

**Part I bin** is the **smaller one**. It is used to store **minimum inventory** (inventory that is required to be kept in stores to avoid a stock out), **or the re-ordering level** (level of inventory at which the order for replenishment has to be placed).

**Part II bin** is used to keep the **remaining quantity**.

Material is issued from Part II bin, but as soon as it becomes necessary to use the quantity from Part I bin, an order is placed. This system helps keep a periodic review of inventory and facilitates placing timely purchase requisitions.



**Example**

Zips are an important component in the leather purses manufactured by Purse plc. The storekeeper uses the two bin system to keep a check on the quantity of the zips. The total zips in inventory are 1,000. The re-order level for the zips is 200. The store keeper keeps 200 zips in Bin 1 and the remaining 800 (1000 – 200) zips in Bin 2. He fulfils all the material requisitions from Bin 2 and when the inventory of zips in Bin 2 is insufficient to fulfil the requisitions he immediately raises a purchase requisition.

The two bin system is not very popular in organisations today as it is a duplication of work. The system requires two sets of records for two bins of the same item creating more work, rather than reducing it!

**Sample of format of a bin card**

Bin card						
Description _____			Bin no _____			
Code no _____			E.O.Q _____			
			Maximum level _____			
			Minimum level _____			
			Reorder level _____			
	Receipts		Issues		Balance	Remarks
Date	GRN no.	Quantity	MR no.	Quantity	Quantity	

**2. Stores ledger**

The stores ledger maintains the quantitative records of all the receipts, issues and balances along with the monetary details for them. The movement of the stores items are recorded in the stores ledger and in the bin cards from the same source documents.

The major differences between a bin card and a stores ledger are

A bin card is a quantity record of material, while the stores ledger is a record of quantity and value of material.

A bin card is maintained by the store keeper, while a stores ledger is maintained by the accounts department.

A bin card is kept inside the stores and the stores ledger is kept outside the stores.

Preparing the bin cards and the stores ledgers in parallel helps ensure there is an internal check over inventory to prevent pilferage or misappropriation.

A reconciliation of the bin cards and the stores ledger cards is done on a periodic basis to ensure that their balances are the same, and according to the records (it ensures internal check). Generally, there should be no difference in the balances, but at times differences might arise due to:

- Arithmetical errors in calculating,
- Mistakes in posting data or not posting some records at all, either in the bin card or in the stores ledger,
- Recording data in the wrong column e.g. receipts in the issues column and vice versa.

**Format of stores ledger**

Stores ledger account												
Material _____				Code _____				Maximum quantity				
_____								Minimum		quantity		
_____												
Date	Receipts					Issues				Balance		
	GRN no./ MRN no.	Quantity	Invoice reference	Price per unit	Amount	Store req. no.	Quantity	Price per unit	Amount	Quantity	Price per unit	Amount

\* GRN – Goods receipt note  
 \*\* MRN – Material return note

**3. Continuous physical inventory verification**

The continuous physical counting is required even when the bin cards and stores ledger presents a real picture of the balances in hand, as physical verification reveals the actual balance.

The **perpetual inventory control** consists of bin card, stores ledger and continuous stock-taking. It records quantity and value of inventory and undertakes the continuous verification of physical inventory in hand. The period or intervals at which the material should be reviewed is dependent on the value or importance of the inventory. Certain material might need verification more than once a year.

The perpetual inventory control system ensures that discrepancies and losses are minimised. The bin cards and the stores ledger record the receipts and issues of materials at the time when the transactions take place and continuous inventory counts are performed to compare the book records with the physical inventory.





**Example**

In the example of the zips given earlier, the perpetual inventory system will be as follows:

A bin card will be prepared for the item 'zips' that will have its unique code number. Any receipt or issue of zips will be recorded on this bin card when the zips are received in the stores and are issued to production.

A stores ledger will also be prepared for the 'zips'. This will record their receipt and issue, quantity-wise and amount-wise. It will ensure that all the records are up to date as per material movements.

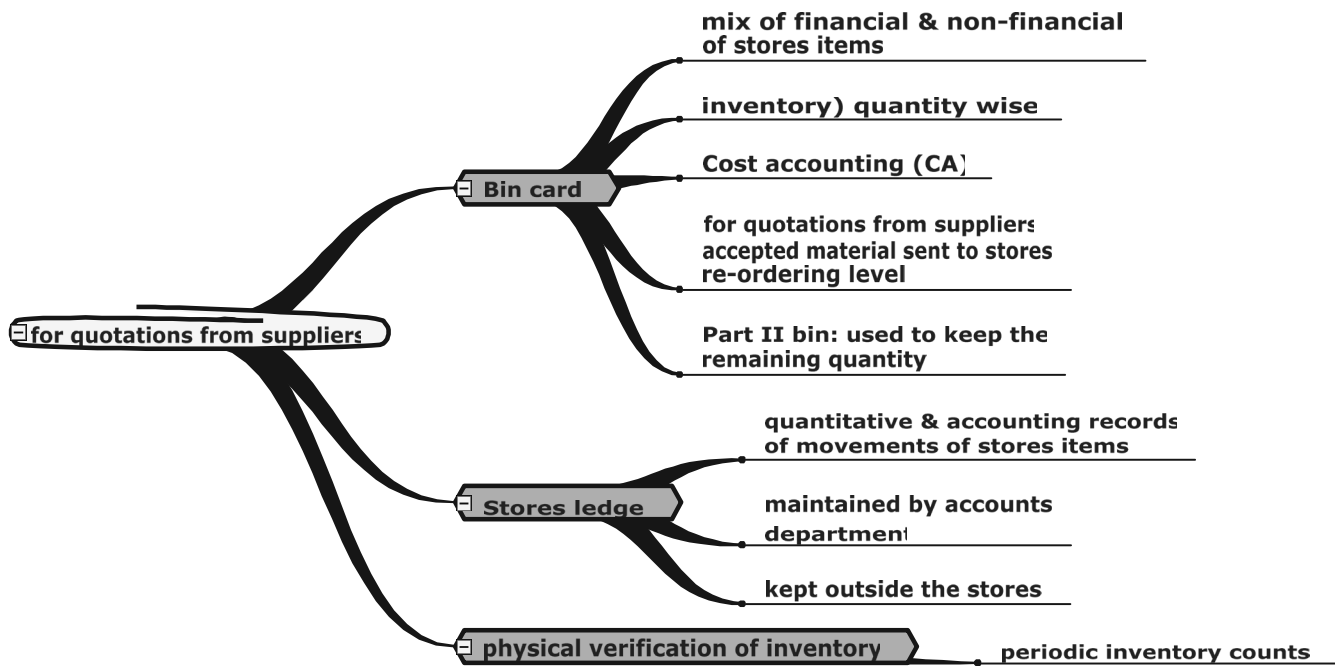
In addition to this, the inventory of the zips will be counted at regular intervals so that the total matches with the recorded amount in the bin cards and stores ledger.

In this exercise if at any stage the physical and book inventory do not match, then these discrepancies will be sorted immediately.

**Periodic inventory counts** are another widely practiced method to check the physical inventory balance. In this case the inventory is verified only once in a year, usually at the end of the year when the values are to be reflected in the financial statements.

A perpetual inventory system is a preferable method of inventory control as it provides information on inventory in hand, and thereby eliminates delays and any stoppages in production. In the periodic verification of inventories the inventory is verified only once a year and it can lead to serious deficiencies in the inventory.

**SUMMARY**



**3.3 Selective methods of stores control**

Inventory control refers to the systematic control of purchase, storage and use of material in order to maintain an adequate flow of production and avoid loss and material waste. Apart from perpetual inventory control and periodic inventory system, inventory can also be controlled effectively on a selective basis.

Some of the methods that involve selective inventory control are:

**1. ABC analysis**

All the items of inventory are divided into **three categories** according to their ranking based on their **value, consumption pattern** and **frequency** of replacement during a period.

Generally, 'A' Category items comprise a small volume of items of about 10% to 20% of the total items handled by the stores but require heavy capital investment of about 70% to 80% of total inventory value. It signifies that this category is the most precious and is relatively critical for operational activities. Accordingly, it requires careful handling and maximum attention by the store's manager.

Generally, 'B' Category items are relatively less important. They may be about 20% to 30% in terms of the total items of material handled by the stores, but the percentage of the investment required is about 20% to 30% of the total investment in inventories. They are monitored less frequently as they are less expensive as well as less critical from an operational point of view.

Generally, 'C' Category items account for almost 70% to 80% of the entire volume of inventory but do not require much investment. It is around 0% to 20% of the total inventory value. These items are the least monitored, since they account for the least investment made in inventory and normally the least important items.

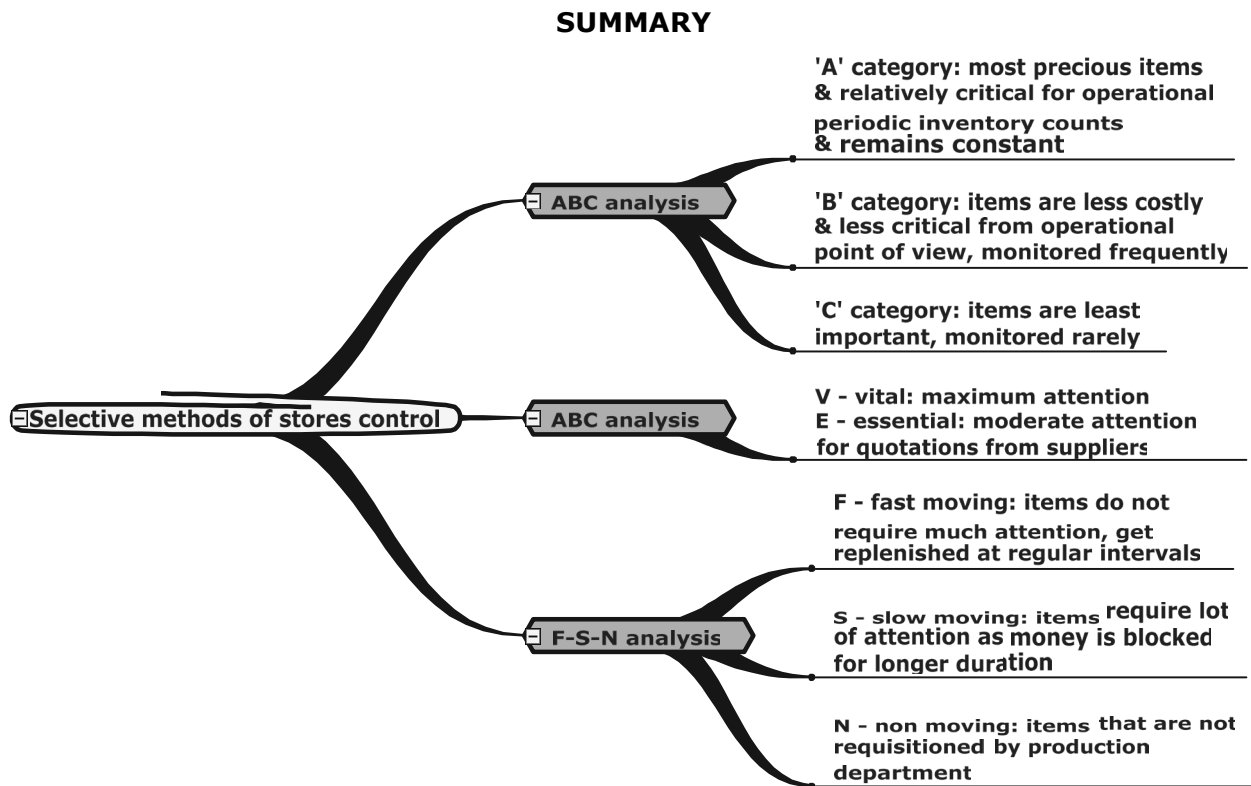
This system of inventory control leads to a lot of savings in time and cost as only the most valuable and important are monitored closely.

### 2. VED analysis

VED is yet another technique for selective inventory management. V stands for vital, E stands for essential and D stands for desirable. The materials are classified based on these categories. Maximum attention is paid to the management of vital inventories, moderate attention is paid to the essential inventories and the least attention is paid to the desirable category of inventories.

### 3. F-S-N analysis – fast, slow and non-moving items analysis

Materials can be fast, slow or non-moving depending on the speed of their consumption. The fast moving items do not require much attention since they get replenished at regular intervals and money is not blocked in them.



### Example

The item is considered slow moving when it is not used frequently in the manufacturing process. In a carpentry shop, varnish that is used to polish furniture is a slow-moving item as compared to the wood logs. Wood logs are used on a continuous basis compared to varnish. If the varnish is not used in as much quantity and at a similar rate, it qualifies as a slow-moving item.

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Slow moving items require a lot of attention, as money is blocked in these for a longer time. The rate of consumption for certain other materials may be very low in comparison to their inventory holding.

There are certain items that are not requisitioned by the production department for a long period of time. After a certain amount of time they are declared as non-moving items. Normally, an item becomes non-moving if it becomes obsolete, due to a change in the production plan or a change in the nature of the business.



### Test Yourself 5

The perpetual inventory system ensures:

- A The inventory count is done only once a year.
- B Records are maintained for the inventory.
- C Production stops so that the inventory verification is carried out smoothly.
- D Discrepancies and losses are sorted out as and when they occur.

### 3.4 Storekeeping procedures of stores issue

This is discussed in detail in the previous Learning Outcome.

### 3.5 Stock valuation

This is discussed in detail in the paragraph 8.2.

## 4. Calculate control levels EOQ, re – order level, minimum and maximum.

[Learning Outcome d]

Setting pre-determined inventory levels is an integral part of the perpetual inventory system. These levels are set as per the distinct requirements of an organisation. Consequently, defining the levels of inventory differs from organisation to organisation. In this Study Guide we have adopted one of the most widely used models.

### 4.1 Reorder level



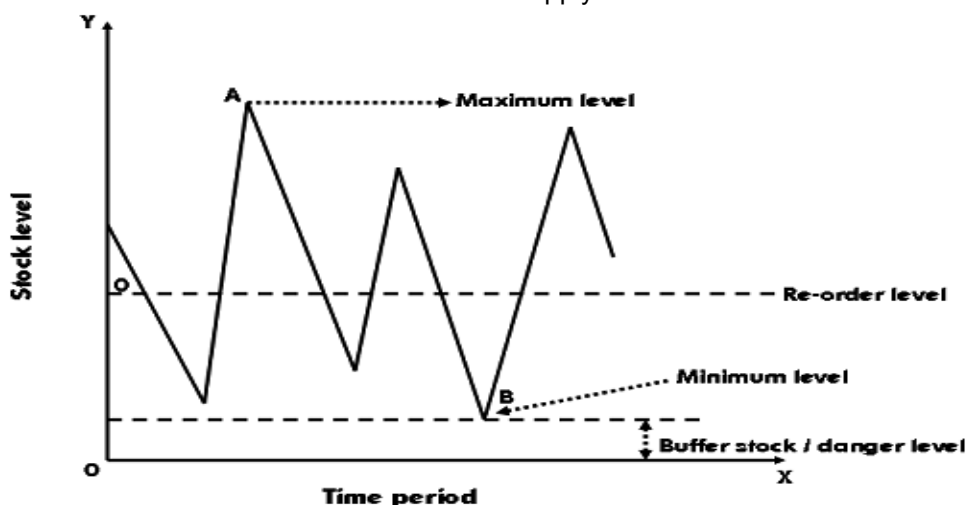
#### Definition

**Re-order level** is that predetermined quantity of inventory that when reached initiates a reorder in a perpetual inventory control system.

The calculation of the re-order level is based on certain assumptions:

- a) The material requirements are pre-defined.
- b) In a time interval, the rate of issue of the material is fixed.

A graphical representation of the inventory levels and the time intervals in which the materials need to be re-ordered will explain the situations where the re-order levels apply.



The X-axis measures the time period and the Y-axis measures the level of inventory. The lines depicting the levels of inventory are straight line slopes indicating that the inventory levels go down gradually at a fixed rate. Re-order levels can be calculated only when the demand rate for material is fixed, as given in the assumptions.

As seen in the graph, point A shows that the maximum inventory level, point O, is the re-order level, and point B is the minimum inventory level. The lead time starts from the time when the inventory reaches the re-order level and ends when it reaches the minimum level of inventory.

The re-order level is the level when a fresh order for inventory should be placed for replenishment. By doing so, inventory gets replenished before it reaches the minimum level. We will study the minimum level at a later stage.

Formula for reorder level:

$$\text{Reorder level} = \text{Maximum usage} \times \text{Maximum lead time}$$

The above formula has been devised so as to suggest that reorder should be given at a level of inventory that would be sufficient enough to avoid a stock-out situation. Even if replenishment of inventory takes maximum possible time and the inventory has been issued to production at the maximum rate during the time period, stock-out will not occur.

OR

$$\text{Reorder level} = \text{Minimum level} + (\text{Average usage} \times \text{Average lead time})$$

 **Example**

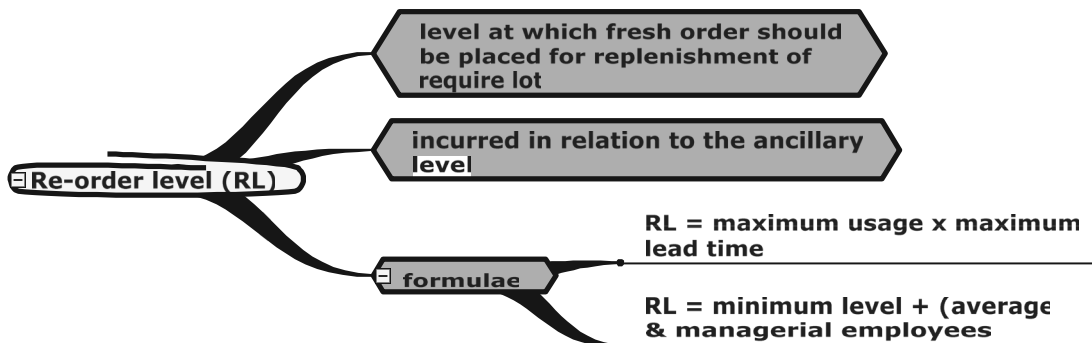
Thames Plc manufactures floating tubes for swimming. They require plastic for manufacturing these tubes. A proper material management system is in place at Thames Plc. The maximum usage of plastic sheets is 75 sheets per week, and the re-order period is 4 to 6 weeks. Calculate the re-order level.

**Answer**

Maximum usage = 75 sheets of plastic  
 Maximum lead time = 6 weeks  
 Using the formula:  
 Re-order level = Maximum usage x Maximum lead-time  
 = 75 sheets x 6 weeks  
 = **450 sheets**

Arithmetically, calculating the reorder level requires other figures e.g. maximum reorder period, maximum usage of inventory in units, minimum level of inventory, average rate of consumption of inventory and average lead time. Hence we will try to understand the meaning of the other terminologies.

**SUMMARY**



4.2 Minimum level



**Definition**

**Minimum level** of inventory is a predetermined quantity of inventory after which any issues of material are from the buffer inventory, if the usage rate is above average.

The above level of inventory is a level where the management needs to take care that the level does not reach a stock out stage.

The formula used for its calculation is as follows:

$$\text{Minimum inventory level} = \text{Reorder level} - (\text{Average usage} \times \text{Average lead time})$$

This minimum level indicates the lowest levels of inventory balance, which must be maintained at all times, so that production is not adversely affected due to non-availability of inventory. Any fall in the level of inventory below this point will hamper production and hence profits.

$$\text{Average delivery period (lead-time) for each item} = \frac{\text{Maximum period} + \text{Minimum period}}{2}$$



**Example**

If in the above example of Thames Plc, the normal / average usage of material is given as 50 sheets of plastic per week, the minimum level of inventory can be calculated as follows.

**Answer**

$$\text{Minimum level} = \text{Reorder level} - (\text{Average usage} \times \text{Average lead-time})$$

We have the reorder level value, but the average lead time needs to be computed. The delivery time is given as 4 to 6 weeks. Thus the minimum period is 4 weeks, whereas the maximum period is 6 weeks.

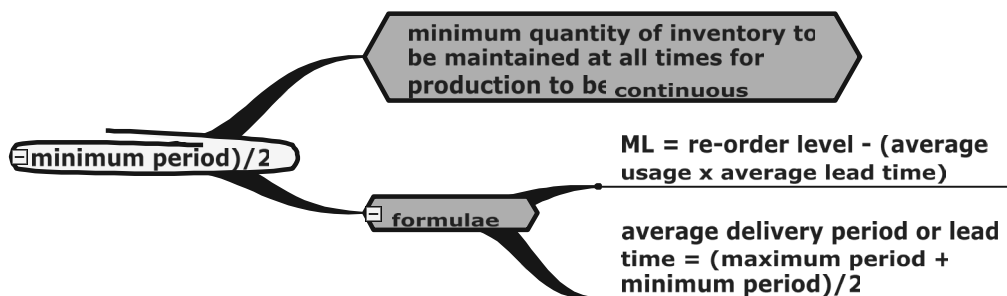
$$\begin{aligned} \text{Average lead time} &= \frac{\text{Maximum period} + \text{Minimum period}}{2} \\ &= \frac{(4 + 6)}{2} = 5 \text{ weeks} \end{aligned}$$

Therefore,

$$\begin{aligned} \text{Minimum inventory level} &= \text{Reorder level} - (\text{Average usage} \times \text{Average lead time}) \\ &= 450 - (50 \times 5) \\ &= \mathbf{200 \text{ sheets}} \end{aligned}$$

This indicates that Thames Plc needs to keep a minimum inventory of 200 sheets to avoid stock-outs / problems with production. By the time these 200 sheets are used, the new inventory should be received.

**SUMMARY**



### 4.3 Maximum Level



#### Definition

**Maximum level** is the level that indicates the maximum quantity of inventory held at any time.

Once this level is reached, it is an indication that the inventory will soon reach a level where it will be overstocked, and cash is unnecessarily tied up in inventory and warehousing. This is the **maximum capacity** of the inventory storage. Important factors to consider for the calculation of the maximum level are:

1. Information about its reorder level.
2. Maximum rate of consumption of material and maximum delivery period.
3. Minimum consumption and minimum delivery period for each inventory.
4. Economic order quantity (EOQ).
5. Availability of funds, storage space, nature of items and their price.
6. In case of imported material, due to its irregular supply, the maximum level should be high.

The mathematical formula used for its determination is as follows:

$$\text{Maximum inventory level} = \text{Reorder level} + \text{Reorder quantity} - (\text{Minimum usage} \times \text{Minimum lead time})$$



#### Example

Stride Plc received a contract to supply 1000 tennis balls to one of London's largest tennis training centres. It needs to know what maximum level of inventory it should hold, so as not to overstock any of the material. The reorder quantity for Stride Plc is 186 units. The delivery period of the material is 2 to 3 weeks. The minimum usage of material is given as 25 units and the maximum usage is 60 units.

#### Answer

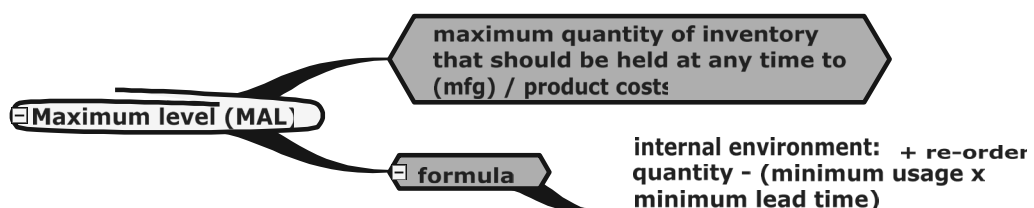
For the maximum level of inventory calculation we need to know the reorder level.

$$\begin{aligned} \text{Reorder level} &= (\text{Maximum usage} \times \text{Maximum lead time}) \\ &= 60 \times 3 \\ &= 180 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Maximum level} &= \text{Reorder level} + \text{Reorder quantity} - (\text{Minimum usage} \times \text{Minimum lead time}) \\ &= 180 + 186 - (25 \times 2) \\ &= \mathbf{316 \text{ units}} \end{aligned}$$

Stride plc should hold, at the most, **316 units** of inventory, in order to avoid overstocking the material and locking the money up in the inventory.

### SUMMARY



### 4.4 Average level

As the name suggests, the average inventory means, the average of the minimum and maximum levels of inventory.

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The average level of inventory is determined by using the following formula:

$$\text{Average inventory level} = \frac{\text{Maximum level} + \text{Minimum level}}{2}$$

OR

$$\text{Average inventory level} = \text{Minimum level} + 1/2 \text{ Reorder quantity}$$



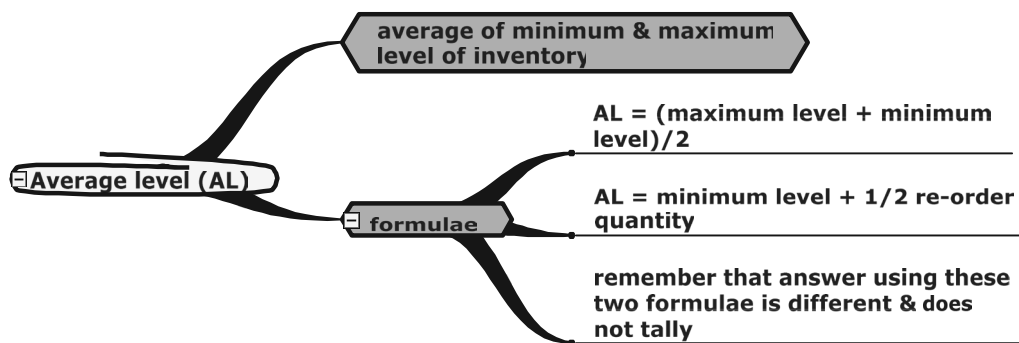
### Example

In the above example of Thames plc we calculated the minimum level to be 200 sheets. In this case, if the reorder quantity is given as 102 sheets the average level of inventory will be calculated as:

$$\begin{aligned} \text{Average inventory level} &= \text{Minimum level} + 1/2 \text{ Reorder quantity} \\ &= 200 + 1/2 (102) \\ &= 251 \text{ sheets.} \end{aligned}$$

Thames plc has an average inventory level of 251 sheets. This will give Thames an idea of the average amount of money locked up in inventory.

### SUMMARY



### 4.5 Danger level



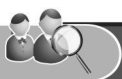
#### Definition

**Danger level** is the volume of inventory at the minimum level, and is a trigger for an immediate action of purchase to avoid any stock out situation.

The formula for the danger level is given below:

$$\text{Danger level} = \text{Average consumption} \times \text{Lead time for emergency purchases}$$

At the danger level, the inventory levels are so alarmingly low that immediate or emergency purchases need to be made so as not to break the continuity of production.



### Example

Precaution Plc manufactures saline solution. It has faced huge losses in the past due to material shortages of packing bottles. It has recently received a big order to supply 15,000 saline bottles to Polo hospital. It now wants to develop and maintain an accurate system of inventory. Its first priority is to know the danger level of inventory before it starts production, so that the production does not come to an unexpected halt in the first stage.

They have newly appointed you as a qualified accountant to take care of the situation. The average consumption of inventory is 1,500 bottles per month and the lead time for emergency purchases as given by him is 4 days. Calculate the danger level of inventory.

**Continued on the next page**

**Answer**

Average consumption **per day** is required for calculating the danger level as the lead time for emergency purchases is given in **days**.

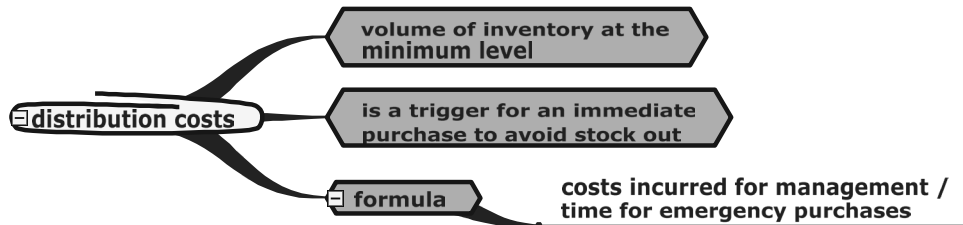
Average consumption = 1,500 bottles per month

Therefore average consumption per day =  $1500 / 30$  days per month  
 = 50 bottle per day

Danger level = Average consumption x Lead time for emergency purchases  
 = 50 bottles x 4 days = 200 bottles

When the level of inventory reaches 200 bottles, Precaution Plc needs to make emergency purchases in order to avoid a stock-out. Care needs to be taken to ensure that the inventory is replenished well before it reaches this level.

**SUMMARY**



 **Example**

A company uses three raw materials; cotton, nylon and cotton blend for making clothes. The following data applies to it:

Raw material	Usage per unit of product (Kg)	Re-order quantity (Kg)	Price per Kg	Delivery period (in weeks)			Reorder level (Kg)	Minimum level (Kg)
				Min.	Avg.	Max		
Cotton	10	10,000	0.10	1	2	3	8,000	
Nylon	4	5,000	0.30	3	4	5	4,750	
Cotton blend	6	10,000	0.15	2	3	4		2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. What would be the following quantities?

- (a) Minimum inventory level of Cotton
- (b) Maximum inventory level of Nylon
- (c) Reorder level of Cotton blend
- (d) Average inventory level of Cotton

**Answer**

In the above problem the minimum, maximum and average use of material is not given. These have to be calculated from the given data.

We have the maximum, minimum and average production volumes given in units. We also have the per unit consumption of material. The maximum use can be calculated as:

Maximum use = Maximum production in units x units of material required per product

Maximum usage for material Cotton =  $225 \times 10 = 2,250$  kilograms

Maximum usage for material Nylon =  $225 \times 4 = 900$  kilograms

Maximum usage for material Cotton blend =  $225 \times 6 = 1,350$  kilograms



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Minimum usage = Minimum production in units x units of material required per product

Minimum usage for material Cotton =  $175 \times 10 = 1,750$  kilograms

Minimum usage for material Nylon =  $175 \times 4 = 700$  kilograms

Minimum usage for material Cotton blend =  $175 \times 6 = 1,050$  kilograms

Average usage = Average production in units x units of material required per product

Average usage for material Cotton =  $200 \times 10 = 2,000$  kilograms

Average usage for material Nylon =  $200 \times 4 = 800$  kilograms

Average usage for material Cotton blend =  $200 \times 6 = 1,200$  kilograms

Calculation of the various inventory levels using the above calculated data:

(a) Minimum inventory level of Cotton = Reorder level – (Average usage x Average lead time)  
=  $8,000 - (2,000 \times 2)$   
= **4,000 kilograms**

(b) Maximum inventory level of Nylon = Reorder level + Reorder quantity – (Minimum usage x Minimum lead time)  
=  $4,750 + 5,000 - (700 \times 3)$   
= **7,650 kilograms**

(c) Reorder level of Cotton blend = Maximum usage x Maximum lead time  
=  $1,350 \times 4$   
= **5,400 kilograms**

**OR**

Reorder level of Cotton blend = Minimum level + (Average usage x Average lead time)  
=  $2,000 + (1,200 \times 3)$   
=  $2,000 + 3,600 =$  **5,600 kilograms**

(d) Average inventory level of Cotton = Minimum level +  $\frac{1}{2}$  Reorder quantity  
=  $4,000 + \frac{1}{2} \times 10,000$   
=  $4,000 + 5,000$   
= **9,000 kilograms**

**OR**

Average Inventory level of Cotton =  $\frac{\text{Maximum level} + \text{Minimum level (WN 1)}}{2}$   
=  $\frac{(16,250 + 4,000)}{2} =$  **10,125 kilograms**

### Working note 1

Maximum level of Cotton = Reorder level + Reorder quantity - (Minimum usage x Minimum lead time)  
=  $8,000 + 10,000 - (1,750 \times 1)$   
= **16,250 kilograms**

Average inventory level of cotton comes to two different figures by applying two different formulae.

---



**Test Yourself 6**

In Excellent Plc, two components of raw material i.e. plastic and xygon, a chemical, are used for production. The details of the use are given below:

Normal usage	50 units per week of each
Maximum usage	75 units per week of each
Minimum usage	25 units per week of each
Reorder quantity	plastic: 300 units; xygon: 500 units
Reorder period	plastic: 4 to 6 weeks xygon: 2 to 4 week

Calculate the following for each component:

- (a) Reordering level
- (b) Minimum level
- (c) Maximum level
- (d) Average inventory level

**4.6 EOQ**

There are two types of costs which are associated with inventory; the cost of making a purchase and the cost of keeping the goods in inventory. These are known as the ordering costs and the carrying costs respectively.

The cost of ordering and holding inventory can be distinguished as follows:

**Diagram 4: Ordering and carrying costs of inventory**



When an organisation follows a system of ordering fixed amounts of inventory, the order size is vital. This is because the size of the order affects the ordering as well as the carrying costs.

When the order size is large, the number of orders required to be placed in a year will reduce, and hence the ordering cost will also reduce. However, in this case the holding costs will increase, as the quantities to be held at the same time increase. When the order size decreases, the holding costs will decrease but the number of orders per annum increases, thereby increasing the ordering costs.

In this situation, it is vital to arrive at an optimal order size that minimises the total ordering and holding costs of inventory.

Large order (fewer number of orders) —————> High carrying cost —————> Lowered ordering cost  
 Small order (more number of orders) —————> High ordering cost —————> Lowered carrying cost



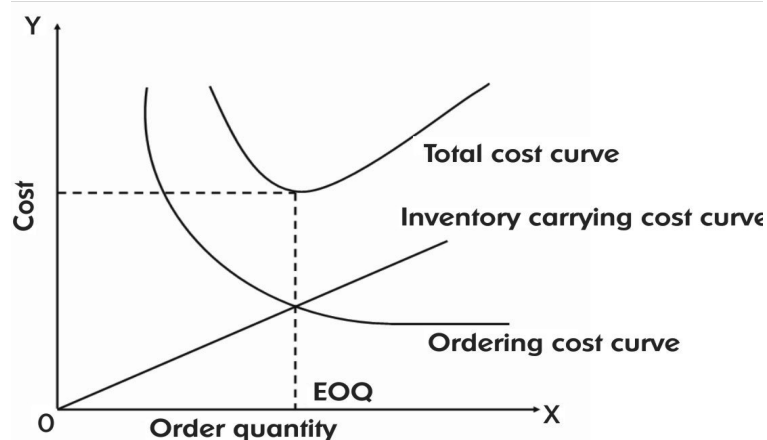
**Definition**

The **optimal re-order quantity** or the **economic order quantity (EOQ)** is a size of order for which the total of the ordering and carrying costs is at the lowest possible.

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Economic order quantity can be understood with the help of a graph:

Ordering quantity is measured on the X - axis and cost on the Y - axis.



The graph shows the total cost curve, the carrying (holding) cost curve and the ordering cost curve. In the above graph, the total cost starts high when the ordering cost is initially high and the holding cost is low. When the ordering cost is low and the holding cost is high the total cost is on a rising trend. This happens when one cost is minimised the other cost rises, and vice versa.

However, there is a point where the total cost curve is at its minimum level. If a straight line is drawn from this point passing through the ordering cost line as well as the holding cost line, it passes through the intersection point of these two lines. It implies that the **total cost** is at its **minimum** when ordering and holding costs are equal. This is an important observation based on which the formula for the Economic Ordering Quantity (EOQ) can be derived.

When deriving the EOQ, there are some assumptions underlying it without which the formula would not hold true.

1. The annual demand is certain and known.
2. The time required for the receipt of material (known as lead time) ordered is certain.
3. There is no situation of stock outs.
4. The entire material ordered is received in a single batch.
5. The per unit costs of material does not change.
6. The costs are always known with precision.

$$EOQ = \sqrt{\frac{2 \times D \times C_0}{C_h}}$$

Where,

$C_0$  = cost of ordering per order / consignment from supplier

$C_h$  = cost of holding per unit of inventory per annum / time period

$D$  = total demand during the period

The underlying data for the calculation of EOQ has to remain the **same throughout the period** for which the calculations are made.

The average inventory is taken to calculate the annual holding cost as one does not hold units equal to the optimal re-order quantity at all times. We might hold inventories greater than this quantity or less than this quantity. In order to calculate the annual holding cost we multiply the holding cost per unit per annum with the average level of inventory. This average level is arrived at by dividing the EOQ by 2.



### Example

Calculate the economic order quantity from the following information. Also state the number of orders to be placed in a year and explain briefly the amounts you have calculated.

Consumption of material per annum	10,000 Kilograms
Order placing cost per order	Tshs50,000
Cost per kilogram of raw material	Tshs2,000
Storage cost	8% of material cost

### Answer

$$\begin{aligned}
 \text{EOQ} &= \sqrt{\frac{2DC_o}{C_h}} \\
 &= \sqrt{\frac{2 \times 10,000 \times 50,000}{2,000 \times 0.08}} \\
 &= \sqrt{\frac{1,000,000}{0.16}} \\
 &= \sqrt{62,50,000} \\
 &= \mathbf{2,500 \text{ kilograms}}
 \end{aligned}$$

$$\begin{aligned}
 \text{No. of orders to be placed in a year} &= \text{Consumption of material per annum} / \text{EOQ} \\
 &= 10,000 / 2,500 \\
 &= \mathbf{4 \text{ orders per year}}
 \end{aligned}$$

4 orders need to be placed per year with an order size of 2,500 kilograms to keep the ordering and the holding costs at the minimum level.

The above question has shown how to calculate the optimal re-order quantities. Another example will be helpful for further understanding.



### Example

Tubes Plc manufactures picture tubes for televisions' Details of their operation during 20X8 are as follows:

Normal weekly usage	100 tubes
Ordering cost	Tshs50,000 per order
Inventory holding cost	20% per annum
Cost of tubes	Tshs300,000 per tube

Calculate the optimal re-order quantity.

### Answer

The EOQ calculation requires the annual use in units, ordering cost per order and the carrying cost per unit per annum. These will be calculated as follows:

$$\begin{aligned}
 \text{Annual use (A)} &= \text{Weekly usage} \times \text{number of weeks in a year} \\
 &= 100 \text{ tubes} \times 52 \text{ weeks} \\
 &= 5,200 \text{ tubes}
 \end{aligned}$$

$$\text{Ordering cost per order (O)} = \text{Tshs50,000 per order (given)}$$

The carrying cost is given in the question as a percentage of the cost of tubes.  
 Cost of one tube = Tshs300,000

$$\begin{aligned}
 \text{Carrying cost per tube per annum (C)} &= \text{Tshs300,000} \times 20\% \\
 &= \text{Tshs60,000 per tube per annum}
 \end{aligned}$$

**Continued on the next page**

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$$\text{Therefore EOQ} = \sqrt{\frac{2DC_o}{C_h}} = \sqrt{\frac{2 \times 5,200 \times 50,000}{60,000}}$$

$$= \sqrt{\frac{520,000}{60}}$$

$$= \sqrt{8,666.67}$$

$$= 93.09$$

= 93 tubes approximately

The optimal re-order quantity is 93 tubes.



### Tip

It was discussed above that the ordering and carrying costs are equal at EOQ. Let us verify it.

In the above question the EOQ is calculated as 93 tubes approximately. For the purpose of the calculation we will take the absolute figures without rounding them off. The EOQ will then be 93.09.

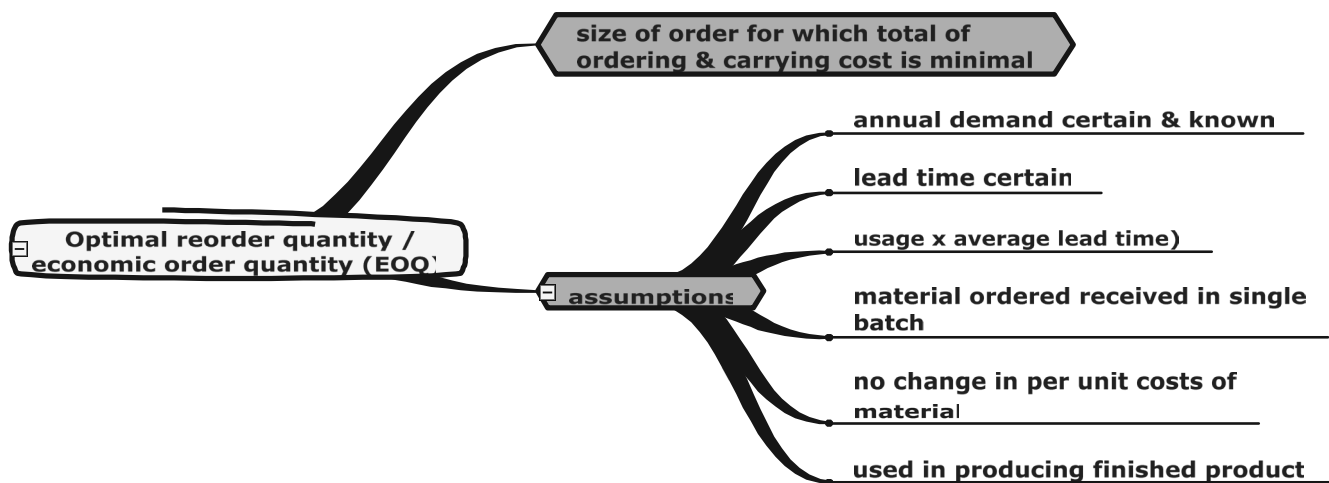
$$\begin{aligned} \text{Annual ordering cost} &= \frac{\text{Ordering cost per order} \times \text{Annual usage}}{\text{EOQ}} \\ &= (\text{Tshs}50,000 \times 5,200) / 93.09 \\ &= \text{Tshs}2,792,996.025 \text{ i.e. } \mathbf{\text{Tshs}2.79 \text{ million approx.}} \end{aligned}$$

Holding cost of tubes per annum = Holding cost of tubes per tube per annum x Average tubes held at all times

$$\begin{aligned} \text{The holding cost per order will therefore be} &= \frac{\text{EOQ} \times \text{holding cost per tube per annum}}{2} \\ &= (93.09 \times \text{Tshs}60,000) / 2 \\ &= \text{Tshs}27,92,700 \text{ i.e. } \mathbf{\text{Tshs}2.79 \text{ million approx.}} \end{aligned}$$

Hence it can be seen from the above that the **ordering and the holding costs are equal at EOQ.**

### SUMMARY





**Example**

Bearings Plc committed to supply 24,000 bearings per annum to Motor plc. It is estimated that it costs Tshs100 as inventory holding cost per bearing per month, and that the set-up cost per run of bearing manufacture is Tshs324,000.

**Required:**

Calculate the optimum run size for Bearings Plc.

The above model of EOQ assumes that the unit price of materials remains the same throughout the year. However, there may be situations where the unit price of materials changes when the supplier offers discounts in price. Vendors / suppliers offer different levels of quantity discounts for different volumes of materials ordered.

If discounts apply, the formula for EOQ as derived earlier, will not hold true. The EOQ will have to be arrived at by computing the total cost (total of the ordering and the holding cost) at various levels of material ordered.



**Example**

A firm is able to obtain quantity discounts on its orders of material as follows:

Price per ton (Tshs'000)	Tonnes
8.0	Less than 500
7.9	500 and less than 1500
7.8	1500 and less than 3000
7.7	3000 and less than 5000
7.6	5,000 and over

The annual demand for the material is 5,000 tonnes.  
 Inventory holding costs are 15% of material cost per annum.  
 The delivery cost per order is Tshs7,000.

**Required:**

Calculate the best quantity to order.

**Answer**

(Amounts in Tshs'000)

Ordering quantity (tonnes)	Price per ton	Purchasing cost of 5,000 tonnes	Ordering cost	Inventory carrying cost	Total cost
		5000 x price per ton	(5000/ordering quantity) x 7	(Ordering quantity/2) x purchase price per ton x 15%	
100	8.00	40,000.00	350.00	60.00	40,410.00
<b>500</b>	7.90	39,500.00	70.00	296.25	<b>39,866.25</b>
1,500	7.80	39,000.00	23.33	877.50	39,900.83
3,000	7.70	38,500.00	11.67	1,732.50	40,244.17
5,000	7.60	38,000.00	7.00	2,850.00	40,857.00

Lowest cost

Using a tabular form, the total cost per annum for different values of the ordering quantity is 500 tonnes.

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### Example

What will be the most economical order size, if 5% discount can be received from supplier for minimum order of 2,000 units?

Monthly consumption	150 units
Purchase price	Tshs10,000 per unit
Ordering costs	Tshs50,000
Holding costs	20%
Discount from supplier, if order is minimum of 2,000 units	5%

D = annual demand = 150 units x 12 months = 1,800 units

Co = ordering costs = Tshs50,000

Ch = holding costs = Tshs10,000 x 20% = Tshs2,000

$$EOQ = \sqrt{\frac{2DC_o}{C_h}}$$

$$= \sqrt{\frac{2 \times 1,800 \times 50,000}{2,000}}$$

$$= \mathbf{300 \text{ units}}$$

	1,800 units Tshs'000	2,000 units Tshs'000
Purchase cost (W1)	18,000	19,000
Holding costs (W2)	300	2,000
Ordering costs (W3)	300	45
<b>Total annual costs</b>	<b>18,600</b>	<b>21,045</b>
<b>Cost per unit</b>	<b>10.33</b>	<b>10.52</b>

From the above table of calculations, we can see that the most economical order size is **1,800 units**. It is advisable to order 1,800 units at a time, as the cost per unit is comparatively low with this order quantity.

**Alternatively, total annual cost can be calculated using the following formula:**

$$\text{Total annual cost} = P + C_o \times \frac{D}{Q} + C_h \times \frac{Q}{2}$$

Where,

P = purchase cost

D = demand per annum

Q = reorder quantity

Co = ordering cost

Ch = holding cost

$$\text{Total annual cost} = P + C_o \times \frac{D}{Q} + C_h \times \frac{Q}{2}$$

$$= (\text{Tshs}10,000 \times 1,800 \text{ units}) + \text{Tshs}50,000 \times \frac{1,800 \text{ units}}{300 \text{ units}} + \text{Tshs}2,000 \times \frac{300 \text{ units}}{2}$$

$$= \text{Tshs}18,000,000 \text{ units} + \text{Tshs}300,000 + \text{Tshs}300,000$$

$$= \text{Tshs}18,600,000$$

**Continued on the next page**

**Workings**

**W1**

Purchase cost = Units x Purchase price per unit  
 1,800 units x Tshs10,000 = Tshs18,000,000  
 (2,000 units x Tshs10,000) – 5% discount = Tshs19,000,000

**W2**

Holding costs = Average inventory x Holding cost per unit  
 (300/2) x Tshs2,000 = Tshs300,000 (Average inventory = EOQ/2)  
 (2,000/2) x Tshs2 = Tshs2,000,000 (Average inventory = Order quantity/2)

**W3**

Ordering costs = Number of orders x Ordering costs per order  
 (1,800/300) x Tshs50,000 = Tshs300,000 (Number of orders = Annual demand/EOQ)  
 (1,800/2,000) x Tshs50,000 = Tshs45,000 (Number of orders = Annual demand/Order quantity)

In the cases where discounts apply, the optimal re-order quantity will have to be calculated as above by computing the **total costs at each order size** taking into consideration the discounts offered. The case where the total cost is the least will be the optimal re-order quantity for material orders.



**Test Yourself 8**

Star Plc manufactures ice-cream. The following is a schedule showing discounts offered by the supplier of a special flavouring agent to Star Plc.

Quantity (litres)	Price per litre in Tshs'000
150–250	25
250-500	24
500-750	23
750-1,000	20
1,000 and above	18

The annual demand is 1000 litres. The ordering cost per order is Tshs150,000 and the carrying cost per annum is 20% of the material cost. Calculate the 'Economic Order Quantity'.

**Required:**

Calculate the order size at which the ordering and holding cost is the least.

When the supply of the inventory of raw materials is gradual instead of in batches, the previous model of EOQ will not hold true for the calculation of the order size. A different model of EOQ is used to calculate the optimal re-order quantities. This model also has the same assumptions that hold true for EOQ with the only difference that the supply is gradual. This inventory model is also called the '**production order model**' since this model is best suited to inventories of finished goods being produced and kept in stores until these are despatched for sale.

The production and usage rates of the raw materials can have three possible relationships in this case:

- (a) The rate of production is more than the rate of usage – This is a case of shortages, and as per the assumptions of EOQ model, shortages or stock outs are not allowed.
- (b) The rate of production is equal to the rate of usage – it signifies that whatever items of inventory come in the store, they go out immediately.
- (c) The rate of production is less than the rate of usage – in this case, if the supply of inventory is constant then it will lead to overstocking of material.



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The formula for the optimal reorder quantity under this method is given as – (Economic batch quantity)

$$EBQ = \sqrt{\frac{2C_oD}{C_h(1-D/R)}}$$

Where, D – Annual demand or requirement of material  
C<sub>o</sub> – Set up cost per order  
C<sub>h</sub> – Carrying cost per unit per annum  
D – Rate of production per time period  
R - Rate of usage per time period



### Example

Natural Plc produces organic dung cakes for use as manure by farmers. The details of the annual requirement of the ingredients of dung cake and the set up and holding costs are given. Calculate the optimal reorder quantity.

Annual requirement of the ingredients = 3,600 kilograms  
Rate of demand = 15 dung cakes / shift  
Number of working shifts = 480 shifts  
Cost of the cake mix = Tshs15,000 per kilogram  
Inventory holding cost per annum = 18% of the value of the raw material  
Set up cost per order = Tshs60,000

### Answer

The annual requirement is given as 3,600 kilograms. Hence A = 3,600 kilograms.

The rate of production will therefore be 3,600 kilograms per annum. The rate of production or usage can be either per shift or per annum.

Per shift rate of demand is given as 15 dung cakes per shift and number of shifts are 480. Therefore the rate of usage will be = 480 shifts x 15 cakes per shift = 7,200 kilograms.

The rate of usage, therefore, is 7,200 kilograms.

The holding cost is 18% of the value of the raw material = Tshs15,000 x 18% = Tshs2,700

The set-up cost per order is Tshs60.

The formula for the optimal reorder quantity is given as –

$$EBQ = \sqrt{\frac{2C_oD}{C_h(1-D/R)}}$$

Substituting all the values in the formula we have:

$$\begin{aligned} EBQ &= \sqrt{\frac{2 \times 3,600 \times \text{Tshs}60,000}{\text{Tshs}2,700 \left(1 - \frac{3,600}{7,200}\right)}} \\ &= \sqrt{\frac{432,000,000}{\text{Tshs}2,700(1-0.5)}} \\ &= \sqrt{\frac{432,000}{1.35}} \\ &= 565.68 = 566 \text{ kilograms} \end{aligned}$$

**The optimal reorder quantity will be 566 kilograms.**



**Test Yourself 9**

Hexter Company needs component M, which is made in-house, for one of its products. The annual requirement of component M is 3,000 units, and 300 units of M are made per week. Hexter’s annual working weeks are 50. The cost of making one unit of M is Tshs20,000, and each time a batch of component M is made, Hexter Company has to spend Tshs500,000 towards setting up of machinery. The cost of holding one unit of component M is Tshs2,000.

**Required:**

Calculate the Economic Batch Quantity (EBQ) to the nearest whole digit.

**5. Calculate closing stock and average cost.**

**[Learning Outcome e]**

Balances in the material inventory account signify the value of inventory held at any point of time. The valuation of the closing balance depends upon the method adopted for the issue of material.

The following methods are widely used for the valuation of inventory

1. First in first out (FIFO)
2. Last in first out (LIFO)
3. Average methods (Weighted average method)



**Tip**

Although there are several methods of pricing issues of material and **inventory valuation**, the following TWO methods are accepted for the purpose of external reporting in financial accounting and are mostly used by the industry.

- First in first out method
- Weighted average method

**5.1 First in first out method (FIFO)**

This is a very simple method of pricing the issues of material. According to this method, the unit price of the material issued is recorded at the unit price of the batch that is purchased first, till it gets exhausted and any further issues are recorded at the price of the batch purchased next. Here, issues mean material going out of the stores, it can either be issued for production or sale.

FIFO is suitable where perishable goods are concerned and where transactions are limited. When this method is followed the value of the balance / closing inventory of material at the end of the period is equal to the cost of the batch of materials that is purchased last, and hence closest to the market value of the material. This presents a very realistic value of the materials in inventory.



**Example**

The transactions during January for Neha Co were as follows:

Basic Data

Purchase

Date	Receipts		Issues	Balance
	Units	Rate per unit	Units	Units
		Tshs'000		
1st	600	3.5		600
6th			300	300
8th	750	3.8		1050
12th			450	600
15th	300	3.4		900
28th			750	150

**Continued on the next page**

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On the basis of the above, issues will be priced as:

Date of issue	Units issued	Rate (Tshs'000)	Total value Tshs'000	Reasons
6 <sup>th</sup>	300	3.5	1,050	Issued at this rate since the units received first were priced at this rate. The FIFO method assumes that the lots purchased first should be issued first for accounting purposes.
12 <sup>th</sup>	300	3.5	1,050	
	150	3.8	570	
	450		1,620	
28 <sup>th</sup>	600	3.8	2,280	
	150	3.4	510	
	750		2,790	

Inventory register under FIFO method will be maintained as follows:

(Amounts in Tshs'000)

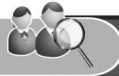
Date	Receipt			Issues			Balance / closing inventory		
	Units	Rate per unit	Amount	Units	Rate per unit	Amount	Units	Rate per unit	Amount
1 <sup>st</sup>	600	3.50	2,100				600	3.50	2,100
6 <sup>th</sup>				300	3.50	1,050	300	3.50	1,050
8 <sup>th</sup>	750	3.80	2,850				300	3.50	1,050
							750	3.80	2,850
12 <sup>th</sup>				300	3.50	1,050			
				150	3.80	570	600	3.80	2,280
15 <sup>th</sup>	300	3.40	1,020				600	3.80	2,280
							300	3.40	1,020
28 <sup>th</sup>				600	3.80	2,280			
				150	3.40	510	150	3.40	510

The amount of closing inventory 150 units will be valued at the rate of **Tshs3,400** per unit.

### 5.2 Last in first out method (LIFO)

LIFO method assumes that the latest item in, is the first item out. Under LIFO method, the objective is to charge the cost of current purchases to work in process or other operating expenses and to leave the oldest costs in the inventory.

Here, the current costs of materials are matched with the current selling prices. This matching of costs and revenues is the essence of the disagreement for this method. Another limitation of this method is the amount of closing inventory would not appear in the statement of financial position (SFP) at its current cost.



**Example**

Continuing the previous example

Inventory register under LIFO method will be maintained as follows:

(Amounts in Tshs'000)

Date	Receipt			Issues			Balance / closing inventory		
	Units	Rate per unit	Amount	Units	Rate per unit	Amount	Units	Rate per unit	Amount
1st	600	3.50	2,100				600	3.50	2,100
6th				300	3.50	1,050	300	3.50	1,050
8th	750	3.80	2,850				300	3.50	1,050
							750	3.80	2,850
12th				450	3.80	1,710	300	3.50	1,050
							300	3.80	1,140
15th	300	3.40	1,020				300	3.50	1,050
							300	3.80	1,140
							300	3.40	1,020
28th				300	3.40	1,020			
				300	3.80	1,140			
				150	3.50	525	150	3.50	525

The amount of closing inventory 150 units will be valued at the rate of **Tshs3,500** per unit.

**5.3 Weighted average method**

**1. Cumulative weighted average pricing**

This method uses the total cost of each batch purchased to calculate the weighted average price for any issue of material. The unit issue price of material is calculated by adding up the total purchase costs of each batch and dividing it by the total volume of material purchased till the date of issue.

Unit issue price of material = $\frac{\text{Sum of prices of all the batches of materials purchased till date of issue}}{\text{Total quantity of material in store}}$
---

This method of pricing material issues is more realistic as compared to the FIFO method, as it does not cause the issue price to fluctuate due to variations in the price of the different batches purchased. Here the price is averaged out to present a more or less stable issue price. The closing balance in this case is also valued at the weighted average price.



**Example**

Taking the above example, calculate the value of issues using the weighted average method.

**Answer**

According to the Weighted Average Method, issues will be priced as follows:

(Amounts in Tshs'000)

Date of issue	Units issued	Calculations	Rate
6th	300		3.5
12th	450	$300 \times 3.5 + 750 \times 3.8$	3.71
		$300 + 750$	
28th	750	$600 \times 3.71 + 300 \times 3.4$	3.61
		$600 + 300$	

Continued on the next page

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Inventory register under weighted average method will be maintained as follows:

(Amounts in Tshs'000)

Date	Receipt			Issues			Balance / closing inventory		
	Units	Rate per unit	Amount	Units	Rate per unit	Amount	Units	Rate per unit	Amount
1 <sup>st</sup>	600	3.50	2,100				600	3.50	2,100
6 <sup>th</sup>				300	3.50	1,050	300	3.50	1,050
8 <sup>th</sup>	750	3.80	2,850				1,050	3.71	3,900
12 <sup>th</sup>				450	3.71	1,670	600	3.71	2,230
15 <sup>th</sup>	300	3.40	1,020				900	3.61	3,250
28 <sup>th</sup>				750	3.61	2,708	150	3.61	542

The amount of closing inventory 150 units will be valued at the rate of **Tshs3,610** per unit.

**2. Periodic weighted average pricing**

This method of inventory is opposite to perpetual inventory system. Here, "purchases" account is updated continuously; however, "inventory" account is updated on a periodic basis, at the end of each accounting period (e.g., weekly, monthly, quarterly, etc.)

Under this method, an average price is calculated at the end of the period. Here, pricing is based on the total purchases of the specific period.

Periodic weighted average price = $\frac{(\text{Opening inventory} \times \text{Cost of Opening inventory}) + (\text{Purchased units} \times \text{Cost of purchase})}{\text{Opening inventory (units)} + \text{Purchased units}}$
---



**Example**

**Continuing the previous example**

(Amounts in Tshs'000)

Periodic weighted average price

$$= \frac{(\text{Opening inventory} \times \text{Cost of Opening inventory}) + (\text{Purchased units} \times \text{Cost of purchase})}{\text{Opening inventory (units)} + \text{Purchased units}}$$

$$= \frac{(600 \times 3.50) + (750 \times 3.80) + (300 \times 3.40)}{600 + 750 + 300}$$

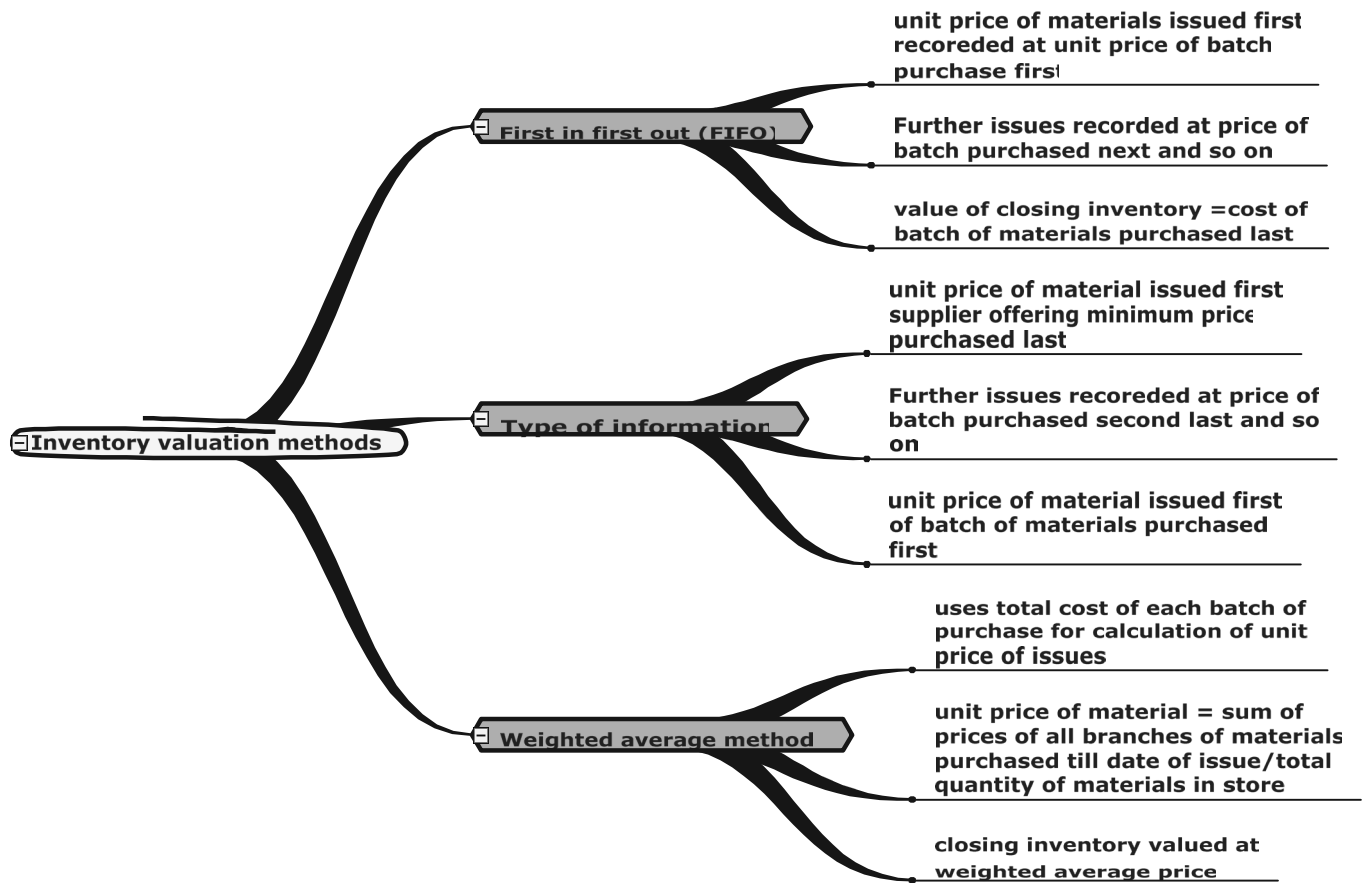
$$= 3.62$$

The amount of closing inventory 150 units will be valued at the rate of **Tshs3,620** per unit (i.e. Tshs543,000)

And, costs of goods sold would be (300 units + 450 units + 750 units) is Tshs5,430,000

This method takes into account the quantities for pricing; however it is not suitable for job costing. Because each job needs to be priced at each stage of completion and this method values the inventory at the end of specific period.

**SUMMARY**



**6. Distinguish between centralised and decentralised stores. [Learning Outcome f]**

Efficient and well equipped stores are a pre-requisite of an effective inventory management system. An efficient store is one which ensures that the inventory is secured from deterioration, pilferage, leakage, theft, etc. and also ensures that there is proper synchronisation between purchase (receipt) of inventory and their subsequent issue to the production area.

There are two primary types of stores, the centralised stores and the decentralised stores. The difference between the two types of stores can be understood by going through the meaning, advantages and disadvantages of the store types.

**6.1 Centralised stores**

In the centralised stores arrangement, all grades of materials and other supplies required by an entire organisation is received by and issued from a single stores department. This type of arrangement is feasible in case the entire production takes place at a single location in the organisation or the different units of the organisation are located very close to each other. Centralised stores are economical and help to retain control.

**Advantages of centralised stores**

Following are some of the advantages of having centralised stores:

- As all items of material are located in a single area, it becomes easy to supervise and control the movement of inventory.
- In case of a single, centralised store, a company tends to hold less amount of inventory overall because the inventory of all departments are held in a single place. This ultimately results in less capital being tied in stores.
- Central stores help to identify slow moving items of inventory. Such stores also prevent inventory items from becoming obsolete as less amount of inventory of each item is held in these stores.
- Clerical and cost of other paper work is significantly reduced in case of a centralised store.
- Stocktaking becomes easier in this type of an arrangement. Concise reports of material purchase, issues and purchase returns can be made easily.

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### Disadvantages of centralised stores

Centralised stores have certain disadvantages as well, some of which are discussed below:

A centralised store may not be convenient in case of an organisation whose production units are not located in close proximity.

Internal transportation cost relating to movement of material may go up as the central store may not be located close to a unit.

Production units may face a delay in receiving their raw material in case the units are not located near to the central store. This may even cause temporary stoppage of work in the concerned departments.

### 6.2 Decentralised stores

In the decentralised stores arrangement, each department / production unit has independent stores. These stores can cater to the exact nature of material required by individual units of an organisation.

#### Advantages of decentralised stores

Following are some of the advantages of having decentralised stores:

Decentralised stores are flexible in nature and can be tailored to the requirements of individual units.

Delay in acquiring and issue of materials is avoided as each unit makes its own purchases and issues. This also reduces the dangers of production getting held up due to non-availability of raw materials.

In case some units of an organisation use specific specialised materials, decentralised stores are a better option than centralised stores.

Internal transport costs relating to movement of raw materials is minimised as the stores are located in close proximity to the departments.

#### Disadvantages of decentralised stores

Following are some of the disadvantages of having decentralised stores:

Organisation wide consolidated stock-taking becomes difficult as material inventory is held at numerous locations.

Cost of clerical services and paper work go up as numerous stores need to be administered and monitored. As more space is required for decentralised stores, such an arrangement may not be feasible for an organisation of small means.

Control over material inventory gets diluted due to multiple stores.

### 6.3 Summary of differences between centralised and decentralised stores

The following table summarises the differences between centralised and decentralised stores (as per the discussion above).

Centralised stores	Decentralised stores
Materials and other supplies required by an entire organisation is received by and issued from a single point (store).	Materials and other supplies required by the various departments of an organisation are received and issued by stores belonging to the individual departments.
Easy to supervise and control the movement of inventory since inventory is centrally held in the organisation.	More manpower is required for supervision as the number of stores are high. Moreover, due to decentralisation, there is dilution of control.
As all inventories are held at a single location, the overall amount of inventory held is comparatively low.	Since individual department's inventory is held separately, the amount of total inventory held by the organisation is high.
Administration cost is low.	Administration cost is high.
Not a flexible arrangement and difficult to store inventory as per specific requirements of individual departments.	Flexible arrangement can be tailored to suit the requirements of individual departments.
Internal transportation cost relating to movement of materials is high as the materials need to be transported to various departments which may be located at a distance from the centralised store.	Internal transportation cost relating to movement of materials is comparatively lower as the departments are located in close proximity to the decentralised stores.



### Test Yourself 10

Which of the following statements correctly describes a centralised store?

- A In a centralised store arrangement, all materials required by organisation is received by and issued from a single stores department.
- B In a centralised store arrangement, specific material requirement of various departments can be easily met.
- C In a centralised store arrangement, all materials required by organisation is received by and issued from numerous stores department.
- D In a centralised store arrangement, internal transportation cost relating to movement of materials is very low.

### 7. Describe the main features of JIT production and purchasing.

[Learning Outcome g]

Recent technological advancements in production systems have had a great impact on manufacturing and standard costs. No distinction between units purchased and units used is necessary in calculating variances for direct materials for firms that maintain a minimal inventory or firms that use a **Just-in-time system**.



### Definition

Just in Time (JIT) is a technique of production employed to reduce waste and increase efficiency by holding as little inventory as possible.

Firms adopting the JIT system will be maintaining very less amount of inventory of raw materials, work in progress and finished goods. Thus, the quantity of raw materials purchased in a period is almost the same as, if not exactly equal to, the amount used during the period.



### Example

Ramco Plc follows a just-in-time system. The JIT inventory management system discourages holding any inventory and rather prescribes to purchase materials 'just in time'. Accordingly, for the company, in a given period the total purchase of materials should be equal to the total consumption of materials.

This technique originated in Japan. It was pioneered in a Toyota plant in 1970. This philosophy regards inventories as a "poor excuse for bad planning"! It lays a lot of emphasis on the elimination of waste i.e. any activity performed which does not add value to the product.

Just-in-time prevents holding up funds in inventory and reduces carrying costs. In JIT, items are procured as and when required i.e. 'just in time'. Inventory levels are minimised (sometimes to zero) by manufacturing the exact quantities required by customers for the exact time needed. This leads to a reduction in storage space and costs. Although it cannot be used in times of high demand, JIT helps organisations to achieve high quality, low prices and provides the following benefits:

- It reduces the set up time in the factory.
- It reduces the carrying costs of the inventory.
- Highly skilled employees can be engaged in more challenging tasks.
- The reduction in costs may lead to reductions in the prices charged to the ultimate customers.

In order to make the JIT technique work, the following points are necessary:

1. Reliable suppliers in terms of delivery times, quality and quantity of materials.
2. Accurate production planning taking into account defects and wastage. Businesses will aim for total quality management (TQM) i.e. the elimination of waste and defects.
3. Factory layout should be such that there is minimum movement and handling of material. Work centres should be adjacent to each other to allow for quick and easy flow of work between centres. This should help in reducing queues of work in progress.
4. Minimal finished goods stock should be held. Production by order only. This serves to eliminate holding costs for finished goods.
5. Suppliers are connected to the network and have up-to-date information on the plans of the company.





**Example**

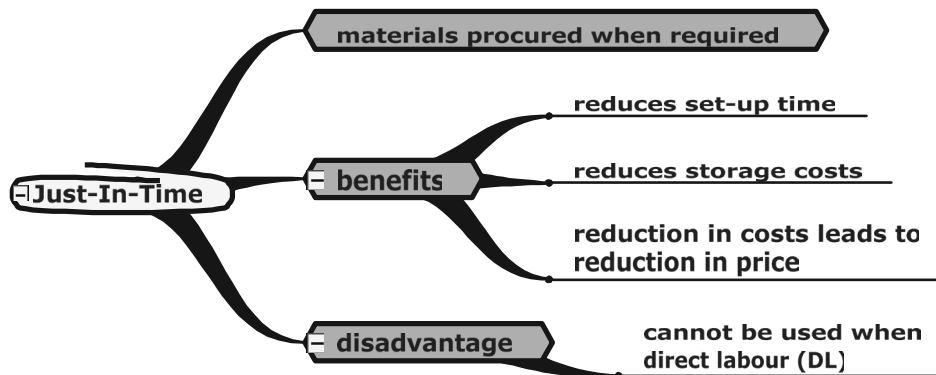
Belco, a company manufacturing automobiles, uses the JIT technique. Its supplier, Mecco, is connected to Belco's server. Common software is installed in both companies.

Mecco is informed on a daily basis of Belco's requirements and plans its production accordingly. It formally confirms the material requirement and commences production so as to deliver the goods just in time.

Comparing JIT with traditional method of production

Just-in-time production	Traditional production
Reduces inventory	Increases inventory to protect against process problems
Reduces lead time	Increases lead time as a buffer against uncertainty
Reduces set-up time	Disregards set-up time as an improvement priority
Emphasises product-oriented layout	Emphasises process-oriented layout
Emphasises team-oriented employee involvement	Emphasises work of individuals following manager instructions
Emphasises demand pull production.	Emphasises production push production
Emphasises zero defects	Tolerates defects
Emphasises supplier partners	Treats suppliers as "arm's length," independent entries

**SUMMARY**



**Test Yourself 11**

Which of the following is not an advantage of the JIT system?

- A Carrying cost reduced
- B Transport cost reduced
- C Highly skilled workers can work on more challenging jobs rather than maintenance of material
- D Can be used at all times for all types of materials

**8. State the general role of stock valuation for financial accounting purposes.**  
**[Learning Outcome h]**

**8.1 Role of stock valuation for financial accounting purposes**

Valuation of material inventory (stock) is needed for the following purposes:

- ascertaining the cost of a product (costing)
- calculating the cost of sales, and thus, profits in the Statement Of Comprehensive Income(SOCI) (financial accounting)
- construction of the Statement Of Financial Position (SOFP) in which material inventory appears as a current asset (financial accounting)

The point to be kept in mind while computing the value of stock from the angle of financial accounting is that the stock should be valued at the lower of:

- cost of acquisition
- net realisable value

**Valuation of material inventory (stock) and SOFP:** the stock is recorded in the SOFP as on the date the SOFP is drawn up. The value of stock affects the aggregate values of current assets, net current assets and net assets.

The method of computation of the value of stock and the technique followed in doing so (FIFO, LIFO or weighted average method) will determine the value of stock that would be stated in the SOFP. The primary challenge faced in the valuation of stock is that stock is acquired by a company during different periods of time at different sets of prices. So, the question arises is that, which value should be taken into consideration?

**Valuation of material inventory (stock) and SOCI:** the value of stock is a part of the cost of goods sold which is reflected in the SOCI.

**Tip**

Cost of goods sold = Opening inventory (stock) + Purchases – Closing inventory (stock)

Here too the challenge faced during valuation of stock relates to the method and technique of valuation, since the amount stated would affect an organisation’s reported profit

**Example**

Ben and Co have computed its gross margin and have presented the details in the table below. The company has valued its closing inventory using two different methods of stock valuation (under the headings of Scenario1 and Scenario 2). Note that the values of the stocks are Tshs22,000 million and Tshs 25,000 million under the two scenarios. Due to the difference in the stock figures, the gross margins reported are different.

	Scenario 1		Scenario 2	
	Tshs million	Tshs million	Tshs million	Tshs million
<b>Sales Revenue</b>		<b>60,000</b>		<b>60,000</b>
<b>Less: Cost of goods sold</b>				
Opening inventory (stock)	20,000		20,000	
<b>Add: Purchases</b>	40,000		40,000	
<b>Less: Closing inventory (stock)</b>	(22,000)	<b>(38,000)</b>	(25,000)	<b>(35,000)</b>
<b>Gross Margin</b>		<b>22,000</b>		<b>25,000</b>

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### 8.2 Methods of stock valuation

The methods of stock valuation have been covered in detail in Learning Outcome 5 of this Study Guide.

The method (FIFO, LIFO or weighted average method) used for stock valuation determines the reported figure of closing stock, and thus its appropriateness to be included in the financial statements. Moreover, the value of the stock would have an impact on the reported profit / loss figures and current assets.

- 1. FIFO:** as already established earlier in this Study Guide, under FIFO, the closing stock value is determined based on the most recent purchase price of the stock. Such a valuation is accepted by tax authorities as the closing stock is valued very close to the current price prevailing in the market. The reported figure is very appropriate for the SOFP too.
- 2. LIFO:** under this method, the closing stock value is determined based on the values of the earliest purchases made by an organisation. Thus, the figures of closing stock reported cannot be included in the SOFP as such a valuation is not accepted by tax authorities.
- 3. Weighted average method:** under this method, closing balance is valued at the weighted average price. Valuation of stock is thus, close to the current price prevailing in the market. This method helps in smoothing out the net profit earned by a firm over a number of accounting years as the purchase price of materials is evened out.



### Test Yourself 12

Closing inventory (stock) of raw material appears as a \_\_\_\_\_ in the SOFP.

Which of the following can be filled in the blank above?

- A Current liability
- B Cost of goods sold
- C Non current asset
- D Current asset

### Answers to Test Yourself

#### Answer to TY 1

- For jewellery, the raw materials involved would be the precious metal and the precious stones – if used – that would go into making the item of jewellery.
- The raw material for this kind of product would be two things; firstly the vast amount of information collected from various sources and the opinions of experts that are considered in the making of the book. Secondly, the paper that is used to print the books is also considered as raw material.
- The bricks, cement, steel, wood and other ingredients that go into constructing a building would form the basic raw material in this case.

#### Answer to TY 2

The correct option is **A**.

The purchase order is issued only when there is a formal purchase requisition from the department requiring the material. They cannot issue purchase orders of their own since it can lead to overstocking of material. The stores and the accounts department are not authorised to ask the purchase department to give purchase orders.

#### Answer to TY 3

The correct option is **A**.

The main responsibility of a purchasing department is to procure all the goods or services that the organisation will require in the quickest time, and at the lowest price, without compromising on quality. Hence the supplier offering the highest quality and lowest price of goods or services is selected.

**Answer to TY 4**

The correct option is **A**.

Internal control involves the system of divided responsibilities and cross checking amongst different employees / departments. Hence a distinction is made between the functions of receiving and storing, so that each acts as a check on the other.

**Answer to TY 5**

The correct option is **D**.

The perpetual inventory system ensures that any discrepancies or losses are sorted immediately when they occur. The inventory count is done once a year under the periodic system of inventory counts. Production needs to be stopped under such conditions to verify the entire inventory once a year. Maintenance of inventory records is extremely important within the whole inventory control system.

**Answer to TY 6**

Answer

**(a) Reorder level** = Maximum usage x Maximum lead time

Reorder level for component plastic = 75 units x 6 = **450 units**

Reorder level for component xygon = 75 units x 4 = **300 units**

**(b) Minimum level** = Reorder level – (Average usage x Average lead time)

Minimum level for component plastic = 450 units – (50 units x 5) = **200 units**

Minimum level for component xygon = 300 units – (50 units x 3) = **150 units**

**Note:** Average usage here refers to the normal usage given.

**Working note**

$$\text{Average lead time} = \frac{\text{Maximum period} + \text{Minimum period}}{2}$$

$$\text{Average lead time for component plastic} = \frac{(6 + 4)}{2} = 5 \text{ weeks}$$

$$\text{Average lead time for component xygon} = \frac{(2 + 4)}{2} = 3 \text{ weeks}$$

**(c) Maximum level** = Reorder level + Reorder quantity - (Minimum usage x Minimum lead time)

Maximum level for component plastic = 450 units + 300 units – (25 units x 4) = **650 units**

Maximum level for component xygon = 300 units + 500 units – (25 units X 2) = **750 units**

**(d) Average inventory level** =  $\frac{\text{Maximum level} + \text{Minimum level}}{2}$

$$\text{Average inventory level for component plastic} = \frac{650 \text{ units} + 200 \text{ units}}{2} = \mathbf{425 \text{ units}}$$

$$\text{Average inventory level for component xygon} = \frac{750 \text{ units} + 150 \text{ units}}{2} = \mathbf{450 \text{ units}}$$

**Answer to TY 7**

The calculation of the EOQ will require us to calculate the carrying cost per unit per annum.

The carrying cost is given as Tshs100 per bearing per month. Hence the carrying cost per bearing per annum will be calculated as = Tshs100 x 12 months = Tshs1,200

**134: Accounting for Materials, Labour and Overheads**

$$\begin{aligned}
 \text{Optimum production run size (EOQ)} &= \sqrt{\frac{2DC_o}{C_h}} \\
 &= \sqrt{\frac{2 \times 24,000 \times 324,000}{1,200}} \\
 &= \sqrt{12,960,000} \\
 &= 3,600 \text{ bearings}
 \end{aligned}$$

**Answer to TY 8**

Ordering quantity (tonnes)	Price per litre (Tshs'000)	Purchasing cost of 1,000 litres (Tshs'000)	Ordering cost (Tshs'000)	Inventory carrying cost (Tshs'000)	Total cost (Tshs'000)
		1000 x price per litre	(1000/ordering quantity) x 150	(Ordering quantity/2) x purchase price per litre x 20%	
150	25	25,000	1,000	375	26,375
250	24	24,000	600	600	25,200
500	23	23,000	300	1,150	24,450
750	20	20,000	200	1,500	21,700
<b>1,000</b>	<b>18</b>	<b>18,000</b>	<b>150</b>	<b>1,800</b>	<b>19,950</b>

From the above table of calculations we can see that the most economical order size is **1,000 litres**. So we will order on lots of 1,000 litres.

**Answer to TY 9**

The given information is

- D = 3,000 units
- R = 300 x 50 = 15,000 units
- Set up cost: C<sub>o</sub> = Tshs500,000
- Holding cost per unit per annum = C<sub>h</sub> = Tshs2,000

$$\begin{aligned}
 \text{EBQ} &= \sqrt{\frac{2C_oD}{C_h(1-D/R)}} \\
 &= \sqrt{\frac{2 \times 500,000 \times 3000}{2,000(1-(3000/15000))}} \\
 &= 1369 \text{ units.}
 \end{aligned}$$

**Answer to TY 10**

The correct answer is **A**.

In a centralised store arrangement, all materials required by organisation is received by and issued from a single stores department.

**Answer to TY 11**

The correct option is **B**.

As all of the other options are clearly advantages of JIT. JIT materials would have to be transported more frequently to the factory premises, as a result, increasing transport costs.

**Answer to TY 12**

The correct answer is **D**.

Closing stock is a current (short term) asset.

### Self Examination Questions

#### Question 1

\_\_\_\_\_ is an intermediate stage between purchase of raw material and to the finished product ready for sale.

- A By product
- B Final output
- C Work in progress (WIP)
- D Indirect material

#### Question 2

Which of the following statements correctly describes a decentralised store?

- A In a decentralised store arrangement, all materials required by organisation is received by and issued from a single stores department.
- B In a decentralised store arrangement, specific material requirement of various departments cannot be met.
- C In a decentralised store arrangement, all materials required by organisation is received by and issued from numerous stores department.
- D In a decentralised store arrangement, internal transportation cost relating to movement of materials is very high.

#### Question 3

Why is it difficult to compute the value of closing stock?

#### Question 4

Which of the following documents is prepared when materials have to be returned to suppliers after they have been received in the factory?

- A Purchase requisition
- B Material inward note
- C Purchase order
- D Material outward note

#### Question 5

A proper recording and control over the material cost is essential for ensuring:

- A Judicious purchase of materials.
- B Avoiding overstocking of materials.
- C Uninterrupted production process.
- D All of the above.

#### Question 6

A purchase order is a written request to supply certain specified materials at specified rates and within a specified period:

- A True
- B False

#### Question 7

Who signs the goods receiving note or a material inward note?

- A General manager
- B Goods inspection department
- C Supplier
- D Managing director

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### Question 8

Minimum inventory level + (Average consumption x Average delivery period) is equal to:

- A Danger level
- B Maximum level
- C Economic quantity
- D Reorder level

### Question 9

\_\_\_\_\_ is the level, at which an immediate purchase needs to be made to avoid a stock-out situation.

- A Minimum level
- B Danger level
- C Optimum level
- D Constant level

### Question 10

Symphony Industries wants to purchase oil tins. The annual use is 5,000 tins. Each order costs Tshs250,000. The cost of carrying inventory is Tshs20,000.

#### Required:

- (a) Calculate EOQ
- (b) If purchase cost per oil tin is Tshs100,000; what will be the total annual cost?

### Question 11

The monthly use of Libra Ltd is 400 units. The purchase price per unit is Tshs15,000. Holding cost and ordering cost are 10% of the price, and are Tshs100,000 respectively. The total inventory cost for the current year is Tshs75 million including purchase cost, holding cost and ordering cost.

#### Required:

If EOQ is used, in comparison to the current ordering policy, how much amount would be saved will be (in Tshs)?

### Question 12

Cheese Ltd is a manufacturer of dairy products. The company wants to install an appropriate system to value inventory. While the company does not want to use LIFO as a basis for valuing inventory, as it deals in highly perishable goods the other two options are weighted average method and FIFO.

During the month of April 20X8, the company has incurred the following transactions relating to the movement in raw materials:

1 April 20X8	Opening balance of raw material 50 units at Tshs25,000
7 April 20X8	Raw materials received 100 units at Tshs25,000
10 April 20X8	Raw materials issued to production department 125 units
15 April 20X8	Material received 35 units at Tshs23,000
18 April 20X8	Material issued to production department 50 units
25 April 20X8	Material received 30 units at Tshs26,000
29 April 20X8	Material issued 20 units

#### Required:

As their accountant, prepare the stores ledger of Cheese Ltd using the following methods:

- (a) FIFO method and
- (b) Weighted average method

### Answers to Self Examination Questions

#### Answer to SEQ 1

The correct answer is **C**.

In case of WIP, the work on the raw material is not completed to classify the material into finished goods.

#### Answer to SEQ 2

The correct answer is **C**.

In a decentralised store arrangement, all materials required by organisation is received by and issued from numerous stores department.

#### Answer to SEQ 3

It is difficult to compute the value of closing stock of material because material is acquired by a company during different periods of time at different sets of prices.

#### Answer to SEQ 4

The correct option is **D**.

The material outward return note is prepared when the material is returned once it has been received. A purchase requisition is prepared when the production department is in need of material. There is no such document termed as 'material inward note'. A purchase order is prepared only when purchases are to be made.

#### Answer to SEQ 5

The correct option is **D**.

The recording and control over material leads to a judicious purchase of material, it avoids overstocking of material, as well as an uninterrupted production process, due to a continuous supply of material.

#### Answer to SEQ 6

The correct option is **A**.

After selecting the appropriate supplier, the purchase manager or officer proceeds to issue the formal purchase order to the supplier. It is a written request to supply certain specified material as specified in the order, at the rates agreed between the parties.

#### Answer to SEQ 7

The correct option is **B**.

The person in charge of the inspection department, which is generally attached to the receiving department for the material, signs the GRN. The supplier is responsible for supplying the material. The general manager, or the managing director, is the head of the company concerned with larger matters, and not the receipt of material.

#### Answer to SEQ 8

The correct option is **D**.

The formula for the reorder level is:

Reorder level= Minimum level + (Average usage x Average lead time)

#### Answer to SEQ 9

The correct option is **B**.

The danger level is the volume of inventory at the minimum level, and is a trigger for an immediate action of purchase to avoid a stock out situation.



### 138: Accounting for Materials, Labour and Overheads

#### Answer to SEQ 10

(a) EOQ

Here, D = annual demand = 5,000 units  
C<sub>o</sub> = ordering costs = Tshs250,000  
C<sub>h</sub> = holding costs = Tshs20,000

$$\text{Optimum purchase order size (EOQ)} = \sqrt{\frac{2DC_o}{C_h}}$$
$$= \sqrt{\frac{2 \times 5,000 \times 250,000}{20,000}}$$

$$= \sqrt{125,000}$$

**= 353.55 tins**

**= 354 tins**

$$(b) \text{ Total annual cost} = P + C_o \times \frac{D}{Q} + C_h \times \frac{Q}{2}$$

$$= (\text{Tshs}100,000 \times 5,000 \text{ tins}) + \text{Tshs}250,000 \times \frac{5,000 \text{ tins}}{354 \text{ tins}} + \text{Tshs}20,000 \times \frac{354 \text{ tins}}{2}$$

$$= \text{Tshs}500,000,000 + \text{Tshs}3,531,073 + \text{Tshs}3,540,000$$

**= Tshs507,071,073**

#### Answer to SEQ 11

$$\text{EOQ} = \sqrt{\frac{2C_oD}{C_h}}$$
$$= \sqrt{\frac{2 \times 100,000 \times 4,800}{15,000}}$$

**= 800 units**

	<b>Tshs'000</b>
Purchase costs (4,800 units x 15)	72,000
Order costs (4,800/800 x 100)	600
Holding costs (800/2 x 15 x 10%)	600
Total costs	73,200
<b>Less: Original inventory costs</b>	<b>75,000</b>
<b>Savings</b>	<b>1,800</b>



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### Workings

#### W1 15/4/20X8

$$= \frac{(25 \times 25) + (35 \times 23)}{25 + 35}$$

$$= 23.8$$

#### W2 25/4/20X8

$$= \frac{(10 \times 23.8) + (30 \times 26)}{10 + 30}$$

$$= 25.4$$

## STUDY GUIDE B2: LABOUR COSTS AND ITS ACCOUNTING

### Get Through Intro

Organisations cannot exist and operate without human resources. The very origin of any organisation is a human mind, and this is the prime resource which runs it. Although mechanisation can take care of many aspects, it is futile if not coupled with manual efforts. The most important feature of this resource is that the output it can give can be constantly improved upon and increased with motivation and good incentives.

Labour cost is a significant expense e.g. in a software development company, around 60% of the outflow is on salaries of employees. In some manufacturing companies the cost may be around 10% of the total cost of production. That is still a sizeable part of the total cost of production.

This Study Guide deals with labour costs and their classification into direct and indirect costs. The different remuneration methods are also discussed.

An accountant must understand the special features of labour cost as this is one of the major elements of cost. This will help when you are preparing management reports and also help you in the exam!

### Learning Outcomes

- a) Define labour.
- b) Analyse and classify labour costs.
- c) Apply recruitment procedure.
- d) Compute remuneration by using various remuneration methods:
  - i. Time work (daily rate) and overtime
  - ii. Payment by results (Piece rate)
  - iii. Group bonks
  - iv. Profit sharing
  - v. Co-Partnership
  - vi. Incentive schemes: straight piece rates, Differential piece rates, Halsey, Halsey-weir, Rowan schemes
- e) Describe the factors for consideration on labour remuneration methods:
  - i. Efficiency in production
  - ii. Effect on workers
  - iii. Incidence of overhead
  - iv. Labour turnover
- f) Prepare Payroll and account for wages incurred in an organisation.
- g) Explain the advantages and disadvantages of:
  - i. Time rates
  - ii. Piece rates
  - iii. Bonus or premium system
- h) Charge labour costs to production.
- i) Analyse Payroll records and statements.
- j) Measure Labour Efficiency, Labour Turnover and labour utilization.
- k) Measure idle time.

**142: Accounting for Materials, Labour and Overheads**

**1. Define labour. Analyse and classify labour costs. [Learning Outcomes a and b]**

Labour cost includes the wages paid to the workers in addition to the expenditure incurred by an organisation on labour welfare, training cost, cost incurred on social security aspects, etc.

Labour costs are recorded separately as direct and indirect labour costs. The basis of the classification of labour costs as direct and indirect is:

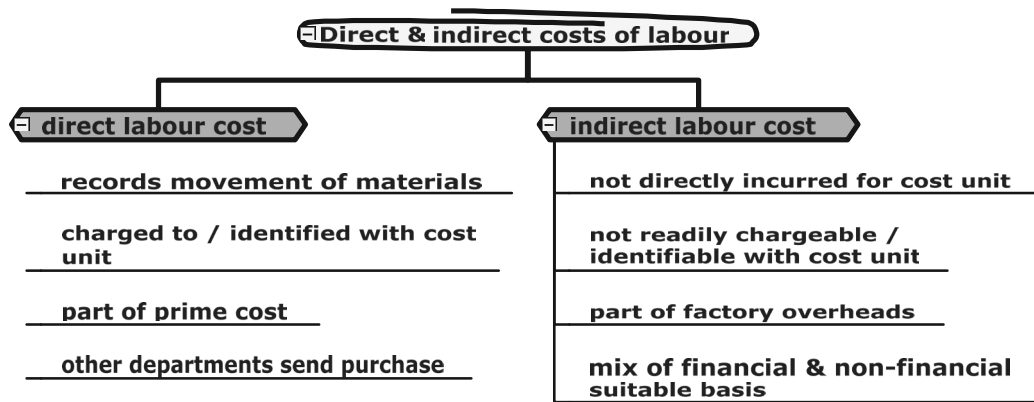
Labour costs **directly identifiable** with the production of products, rendering of services or completion of jobs are **direct labour costs**.

Labour costs that are **not readily identifiable** with the production of products, rendering of services or completion of jobs are **indirect labour costs**.

The following table distinguishes between direct and indirect labour costs

	<b>Direct labour cost</b>	<b>Indirect labour cost</b>
<b>Definition</b>	Any labour cost that is specifically incurred for or can be readily charged to or identified with a product or a service is a direct labour cost.	Any labour cost which is not directly incurred or cannot be readily chargeable or identifiable with a product or service is an indirect labour cost.
<b>Allocation, apportionment or absorption</b>	It is directly charged to:  specific job or contract work or any other cost object For example, in a clothes factory, the cost object would be a unit of clothing produced	It is not directly charged to a product / service or to a job. Instead, this cost is assigned to a product / service or to a job on a suitable basis, such as no. of machine set-ups, no. of labour hours, no. of inspections, etc.
<b>Examples</b>	Labour costs for cutting wood to make a table.  Labour cost for a call centre operator taking calls from clients.	Labour cost incurred for packing and dispatching the tables for sale. Although these workers are not directly involved in the production of the tables, they provide essential support services.  Computer technicians in a call centre do not provide a direct service to clients, but they are important in the operation
	<b>Direct labour cost</b>	<b>Indirect labour cost</b>
<b>Direct or indirect is a relative term</b>	Labour that is direct in one industry may be indirect in another industry, due to different methods or process of work. Example of direct labour is a courier boy working in a courier agency whose main job is sending and receiving couriers.  It mainly includes basic pay of direct workers.	Labour that is indirect in one industry may be direct in another industry, due to different methods or process of work.  Example of an indirect labour is a courier boy (who delivers and receives courier documents) in a 'credit processing division' of a bank (as he is not involved in any direct banking work).  It also includes bonus payments, idle time payment, sick leave payment, contribution to employers' national insurance fund, etc.  It also includes overtime premium. However, overtime premium paid for jobs done at special request of customers is a direct labour cost.
<b>Place in the cost sheet</b>	Direct labour is a part of prime cost. <b>Prime cost</b> consists of direct material, direct labour and direct expenses that are necessary for making a product.	Indirect labour is a part of factory overheads and eventually becomes a part of "cost of production".

**SUMMARY**



**Test Yourself 1**

Direct labour cost:

- A Is the effort of employees who transform direct materials into a finished product and is physically traceable to the finished goods or services
- B Is allocated to the product using a suitable base
- C Does not alter the construction of the product but generally contributes to such work
- D Forms part of factory overhead

**2. Apply recruitment procedure.**

[Learning Outcome c]

**Recruitment** and **selection** are very important functions to an organisation. They represent the processes through which an organisation can acquire the **talent** (sufficient numbers of people with the necessary skills) to ensure that the organisation meets its objectives.

Recruitment and selection involves **hiring the right people** to perform the **current and upcoming activities** and **functions** an organisation requires.

**2.1 Recruiting**

The requirement level of recruiting and selecting of a business will vary from organisation to organisation and be dependent upon the following factors:

- The **size** of the organisation;
- The **turnover** of the organisation (percentage of employees that leave every year) and
- The **growth rate** of the organisation.

**Hiring the wrong people** leads to the following consequences for an organisation:

- Lower productivity and morale;**
- Greater staff turnover** and
- Increased costs** because of increased recruiting and selecting needs.

However, the right or **effective recruitment and selection** strategy will result in an organisation ending up with employees that have the necessary **skills, knowledge and expertise** to help in **meeting its long-term objectives**. As stated before, the purpose of recruitment and selection is to find a match between a person and a position. In other words, it is to find a person with the **knowledge, expertise** and **skill sets** needed to do a **particular job**.



**Example**

DanCo requires a marketing manager to oversee the launch of a new product. They have identified John as a suitable candidate because he has a degree in marketing and 8 years of experience in marketing and promotions.

## 144: Accounting for Materials, Labour and Overheads

The **recruitment process** is an organised process from **finding the candidates** (internally or externally) to **arranging and conducting the interviews**.

Here the organisation has to estimate the number of candidates it can draw to fill these positions from both **internal** and **external sources**.

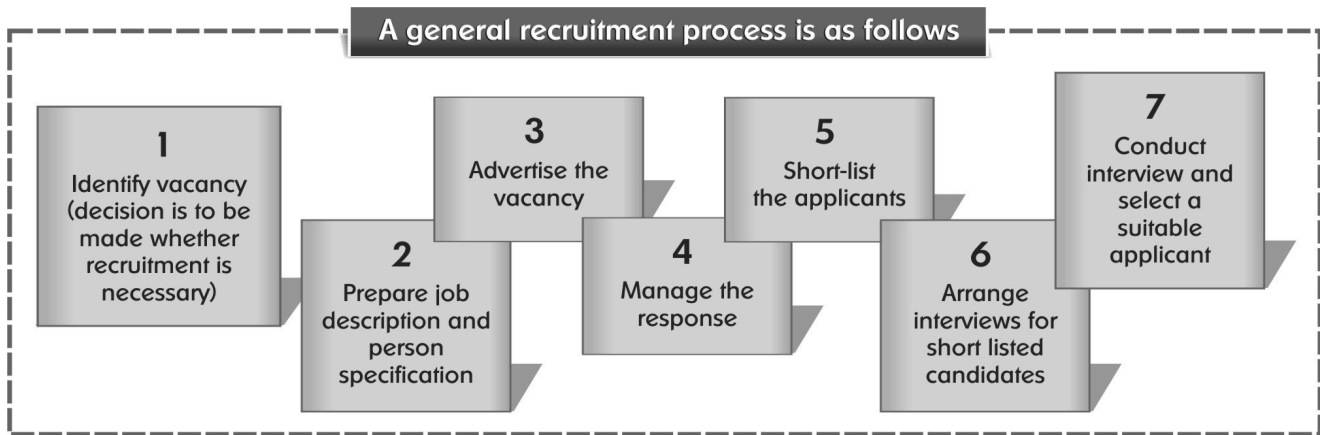
Most organisations begin by looking at **internal sources** to fill a vacant position. This is because existing employees are “**known**” quantities to an organisation. The organisation knows their **strengths** and **weaknesses** and the employee in turn knows the **culture** and organisation’s **way of doing things**.

However looking at **external sources** provides an organisation with a significantly larger pool of potential candidates.

**Methods** organisations use to recruit from external or outside sources include:

- (a) **Advertising** their vacant positions;
- (b) Using **employment and recruiting agencies**;
- (c) **Visiting colleges** and **universities** and
- (d) Asking for **referrals from employees, customers, suppliers**.

**Diagram 1: General recruitment process**



If recruitment is carried out effectively, an organisation should have more candidates than jobs. This leads the organisation into the **selection** stage.

### 2.2 Selecting

At the end of this stage, the organisation will be in a position to select the candidate it wants to fill the vacant position.

There are two main parts to the selection stage: **testing** and **interviewing**. Through a combination of these, organisations identify the candidate they feel are most suitable. **Testing** acts as a way to filter or narrow down the number of candidates (candidates are given a test, only the ones who score above a certain percentage can progress to the next round of the selection process). After the test, the candidates are interviewed individually, before the final decision is made.

There are four main **types of tests** used by organisations:

**Intelligence** tests  
**Personality** tests  
**Competence** tests and  
**Psychometric** tests.

1. **Intelligence tests:** assess **the intellectual abilities** of an individual. They are used to measure a range of abilities such as a candidate’s **English skills and quantitative aptitude skills**.
2. **Personality tests:** are used to determine whether a candidate has the **right personality for the job**. They attempt to measure basic aspects of a person’s personality such as his introversion, stability and motivation.



**Example**

A person with a highly introverted personality (does not like interacting with others) would be unsuitable for a sales and marketing job.

- 3. **Competence testing:** assesses the level of subject **knowledge and expertise** a candidate has. They also attempt to assess the candidate's ability to apply that knowledge in various situations.



**Example**

End of year school examinations are a form of competency testing. These exams determine whether students have learnt the subject matter taught to them over the course of the year, and also whether they are able to apply what they have learnt.

- 4. **Psychometric tests:** are used to measure certain **psychological aspects** of the candidate. They assess the candidate's **personality, ability and motivation levels**. These tests help to determine the psychological differences that exist between different candidates.

There are three main types of psychometric tests:

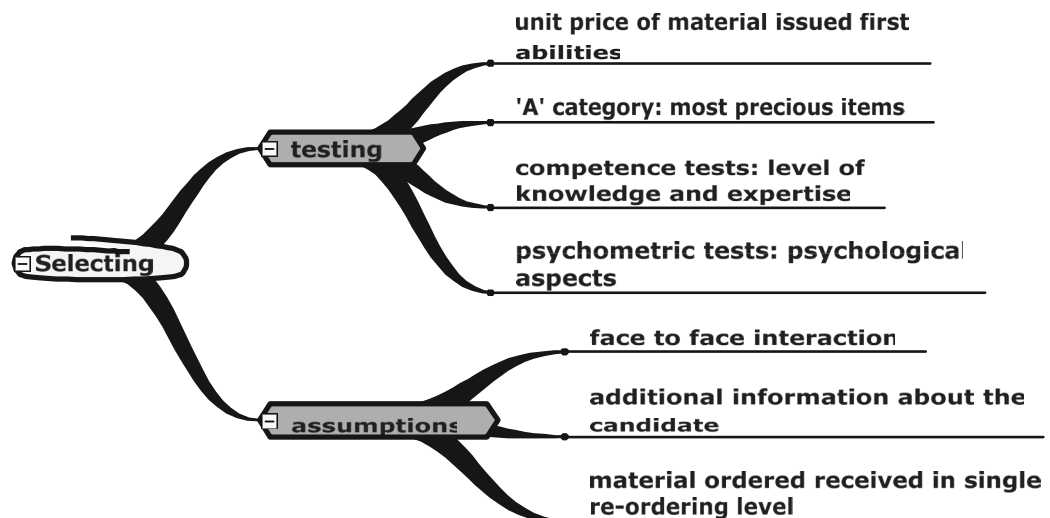
- (a) **Ability testing:** these tests measure the **potential** of a candidate (e.g. potential to learn new skills)
- (b) **Aptitude testing:** these tests are **job related** and are used to measure a candidate's **aptitude** for a particular job and
- (c) **Personality testing:** these tests attempt to **assess** how a candidate would **behave / react** in **different situations**.

However one of the most important tools in the selecting stage is **interviewing**. An interview is the process by which an organisation can gain additional information on a candidate. It involves a candidate meeting with one or more people from the organisation.

Interviews are important because they allow the organisation to learn much more about the individual than what is written down on her resume or application form. In addition, they also give the candidate the **opportunity to learn** more about the job he is applying for.

After the interview and selection process, a formal appointment letter describing the roles and responsibilities is sent to the candidate.

**SUMMARY**



**Test Yourself 2**

List the methods used by organisations to recruit from external sources.



**3. Compute remuneration by using various remuneration methods:**

- i. Time work (daily rate) and overtime
- ii. Payment by results (Piece rate)
- iii. Group bonks
- iv. Profit sharing
- v. Co-Partnership
- vi. Incentive schemes: straight piece rates, Differential piece rates, Halsey, Halsey-weir, Rowan schemes

**Explain the advantages and disadvantages of:**

- i. Time rates
- ii. Piece rates
- iii. Bonus or premium system

[Learning Outcomes d and g]

**3.1 Time-based systems of remuneration**

Under the time-based system, the basis for the calculation of wages is “time”. This system disregards the number of units produced by a worker for calculating the wages paid. This wage rate of a worker may be determined on an hourly, daily, weekly or monthly basis.

In industries where the products are produced by groups of workers, the contribution of each of the workers in producing the product cannot be measured. Again, in a highly automated system of production, the contribution of each worker in the production is not distinguishable. In such cases, a time-based system is preferred to a piecework system e.g. in the construction industry, workers are paid on a time basis. The logic here is that the work of an individual employee is not measurable.



**Example**

In the case of infrastructure projects such as the construction of highways, dam’s etc. quality of work is especially important. Detailed supervision is carried out and supervisors know what constitutes a “fair day’s work”. Knowledge of labour cost per unit is not required.

Workers are paid on the basis of the **time they spend on work**. Rates of wages per hour, per day, week or month are fixed in advance, taking into account the factors prevalent (i.e. hazards associated) in that industry, e.g. the wages of the workers in an ammunition factory are set at a high rate since they work in high risk conditions. The formula for calculation of wages under the time-based systems is:

$$\text{Wages} = \text{Hours worked} \times \text{Wage rate per hour}$$



**Example**

Roger works for 8 hours a day and the wage rate per hour is Tshs6,000. His daily wages under the time based system will be calculated as:

$$8 \text{ hours} \times \text{Tshs}6,000 = \text{Tshs}48,000 \text{ per day}$$

Time-based systems of wage payment are applicable mainly to indirect workers, supervisors and managerial staff. Direct labour is generally paid wages based on productivity i.e. the piecework-based remuneration systems.

Various **advantages** of time-based systems are:

- (a) A time system is simple and very easy to understand.
- (b) It is easy to compute as wages are fixed and regular.
- (c) It is easily acceptable to all as it guarantees the minimum time wages.
- (d) The wages are not based on productivity (i.e. number of units produced). The quality in production matters more than the quantity.
- (e) The system is beneficial for trainees and beginners.
- (f) This system is accepted by trade unions.

The **disadvantages** of simple time-based systems are:

- (a) There is no scope for an incentive to produce more under the system, as only the time wages are paid.
- (b) It is an expensive system of wage payment as any overtime is paid at a higher rate.
- (c) The wages under the system are paid according to the time spent and not according to the productivity levels achieved. As a result, setting standards for production can be difficult under this system of wage payment.
- (d) This system does not consider any difference between an efficient and an inefficient worker, which can demotivate efficient workers.
- (e) Specific standards for performance evaluation and promotions cannot be set easily
- (f) Workers tend to work slowly as they are guaranteed the minimum time wages.

The above discussions are confined to a simple time rate system. The various other types of remuneration schemes developed, based on a time rate system, are the high wage rate system, measured day work system and the differential time rate system. The differential system is explained below in brief.

**Differential time rate system**

This system of payment is similar to the differential piece rate system. The worker is paid the basic time wage up to a certain level of efficiency. Based on the efficiency level, the hourly rate rises above this rate. An illustrative table, showing bonus rates at different efficiency levels, is given below.

Efficiency level	Earning / hour
Up to 75% of normal output	Tshs9,000
More than 75% up to 100% of normal output	Tshs10,000
Above 100% up to 130% of normal output	Tshs11,000

The levels of efficiency and the wage rates are set by the companies, taking into account the industry trend, the working conditions and the nature of the job.

 **Example**

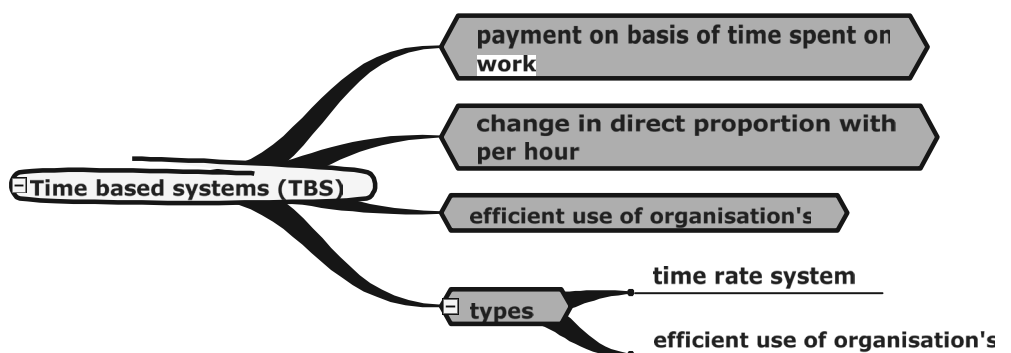
The normal standard output per week of 40 hours is 80 units. Tory produces 100 units in a week. Calculate his wages under the differential time wages system if the company’s policy is to pay a fixed time rate of Tshs9,000 per hour if the normal output level is achieved and Tshs11,000 per hour if the output is above 100% of the normal output.

Tory produces 100 units, which is more than 100% of the normal output (i.e. 100% of 80 = 80 units). His efficiency is = number of units produced by him / normal output x 100  
 = 100 / 80 x 100 = 125%.

As a result, he will be paid at the higher wage rate of Tshs11,000 since according to the policy of the company anyone who produces above 100% of normal output will be paid a higher wage.

The wages for Tory for the week will be calculated as = Tshs11,000 x 40 hours = Tshs440,000

**SUMMARY**





**Test Yourself 3**

Henna produces 110 units in a standard week of 40 hours. The normal weekly output is 90 units.

**Required:**

Calculate Henna’s wages for the week if the company has the following wage rules:

Efficiency level	Earning / hour
Up to 75% of normal output	Tshs10,000
More than 75% up to 100% of normal output	Tshs11,000
Above 100% up to 130% of normal output	Tshs12,000



**Test Yourself 4**

A time-based system of remuneration focuses on quality rather than quantity of output.

- A True
- B False

**3.2 Piecework systems**

Piecework systems pay employees based on the number of units they produce. The output level is measured by calculating the number of acceptable completed units produced by a worker.

$Wages = \text{Number of units produced} \times \text{Piece rate per unit}$
---



**Example**

A worker is promised a wage of Tshs2,000 for each unit produced. If he produces 50 units he will earn Tshs2,000 x 50 units = Tshs100,000. If he produces 100 units he will get Tshs2,000 x 100 units = Tshs200,000.

Simple piecework systems of wage payment do not guarantee minimum time wages to workers, but pay them only on the basis of the number of units produced. However, modified piecework systems guarantee the minimum wages to workers in order to protect them from any loss of earnings.

In this system, an effort is made to link the payment to be made to the worker with the **total amount of work done** by him. Under these methods, a worker gets a higher wage for higher productivity.

These schemes induce workers to improve upon their productivity.

The employee benefits as his wages increase with increased productivity. The employer benefits from the fact that the overall cost per unit decreases as the productivity of the workers increases.



**Example**

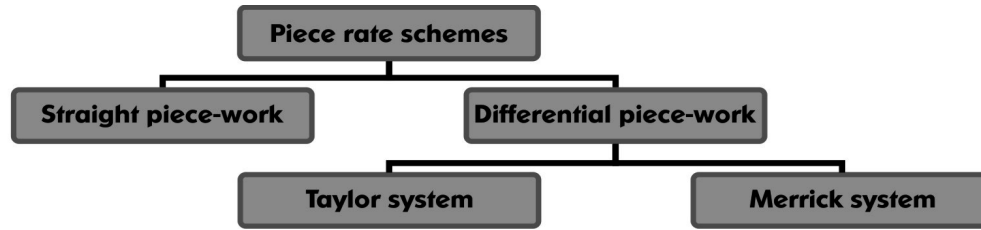
Vandy is paid Tshs2,000 per unit of output. She works for a standard 40 hours per week. The production overhead cost incurred is Tshs1,000 per direct labour hour. The following table makes it clear how the per unit cost decreases as the productivity of the labour increases.

Units produced by Vandy	Total wages (Tshs2,000 x number of units produced)	Production overhead cost	Total conversion cost	Cost per unit (Total cost / number of units produced)
80	160,000	40,000	200,000	200,000 / 80 = Tshs2,500
100	200,000	40,000	240,000	240,000 / 100 = Tshs2,400
120	240,000	40,000	280,000	280,000 / 120 = Tshs2,333.33

As seen from the table above, the total cost per unit decreases as the worker produces more units. This is because although the piecework system pays the labour according to the number of units produced, the rest of the costs are time related and hence remain the same irrespective of the number of units produced.

The different methods of wage calculations under the piecework system include the **straight piecework** and the **differential piecework**. The popular systems of wage payments under the differential piecework are the Taylor system and the Merrick system.

Diagram 2: Piece rate schemes



**1. Straight piecework**

This is the most common type of incentive plan. A straight piecework system pays a workman for the **number of items / units produced**.

The formula used is as follows:

$\text{Wages} = \text{Number of units produced} \times \text{Piece rate per unit}$
--

**2. Differential piecework system**

This system gives the workers a chance to earn a bonus / incentive as their productivity increases.

**Example**

The standard normal output is fixed at 100 units per week with a normal wage rate of Tshs2,000 per unit. If the worker produces anything beyond this he gets paid Tshs3,000 for the additional units above 100. If the worker produces 150 units he gets = Tshs2,000 x 100 units + 50 x Tshs3,000 = Tshs350,000

As you can see, the worker earned an incentive for producing a higher number of units.

The incentive can also be paid at an increased rate per unit for the entire number of units produced when the output exceeds a specified limit.

Two of the sub-divisions of this system of wage payment are the Taylor differential rate system and the Merrick system.

**3. Taylor differential rate system**

The **Taylor differential rate system** is based upon **two or more fixed piece rates**. One piece rate is paid to workers whose production is lower than the minimum prescribed production level and a higher rate is paid per piece to workers who produce a greater number of units than the prescribed level.

**4. Merrick differential**

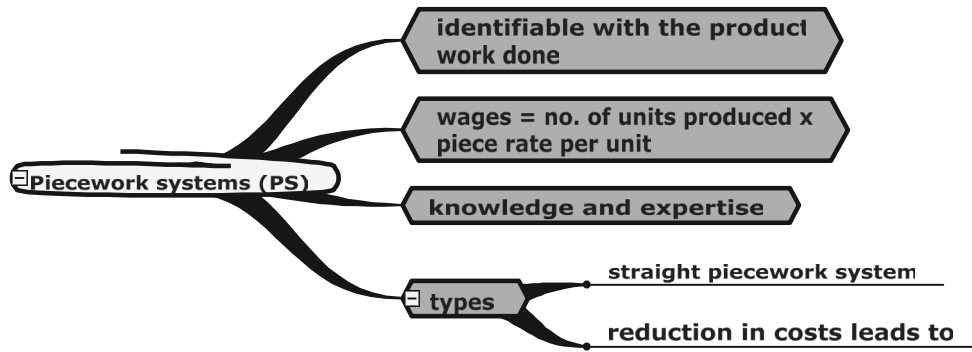
The **Merrick differential or multiple piece rate system** provides for three differential rates as follows:

Wage rates under the **Merrick differential piece rate system**

Up to 83 <sup>1</sup> / <sub>3</sub> % (83.33%) of efficiency	Normal piece rate applicable
Above 83 <sup>1</sup> / <sub>3</sub> % but up to 100%	10% above normal piece rate
Above 100%	20% above normal piece rate

However, these systems of wage payment are not popular any more since wages are now paid according to the mutual agreement between the employer and the employee. The conditions for minimum wages as applicable to any country are taken care of in any agreement in order to protect the interests of the worker.

**SUMMARY**



**Test Yourself 5**

The piecework system of remuneration links the payment to be made to the worker with the:

- A Time spent on work
- B Total amount of work done
- C Time saved
- D Skill set of workers



**Test Yourself 6**

The normal weekly output is fixed at 80 units per week. The wage rate is fixed as normal piece rate for an efficiency level of 75%. Above this each additional unit produced will be paid above the normal rate. The normal piece rate is Tshs2,000 per piece and the piece rate for additional units above 75% accuracy is Tshs3,000 per piece.

**Required:**

Calculate the wages for Andrew if he produces 70 units in the week.

Various **advantages** of piece-based systems are:

- (a) There is an incentive to produce more under the system, as only the productive wages are paid.
- (b) It is comparatively less expensive than the other systems of wage payment as the amount of overtime will be very less and either no or very little overtime wages would be paid at a higher rate.
- (c) The wages under the system are paid according to the quantity produced and not the time spent on the project. As a result, setting standards for production can be easy and simple under this system of wage payment.
- (d) Workers tend to work hurriedly to earn more as they are not guaranteed the minimum time wages.
- (e) Under this system, the amount of idle time can be minimised.
- (f) This system simplifies the direct correlation between efficiency and payments.

The **disadvantages** of piece time-based system are:

- (a) This system is a little complicated to understand and calculate wages.
- (b) It is not easily acceptable to all as it has no guarantee of the minimum time wages.
- (c) The wages are based on worker's productivity (i.e. number of units produced). There are enough chances of hampers in the quality in production matters more than the quantity.
- (d) The system is only beneficial for experts and experienced staff, but not very useful for trainees or beginners.
- (e) Idle time caused due to operational reasons adversely affects the wages e.g. time lost due to delay in receiving materials.

### 3.3 Combination of time and piece rate

Both the time rate system and the piecework system have deficiencies. Time rate systems do not motivate the worker to put in his best efforts. Under the pure piecework system there is no minimum wage guaranteed to the worker. While efficient workers are strongly motivated to improve their performance, slow workers and beginners are thoroughly discouraged. These deficiencies are overcome by adopting schemes that are a combination of time rate and piecework systems. Under these systems of wage payments the workers are generally guaranteed minimum time wages for the hours worked and an additional amount is paid if the worker exceeds the minimum standard output.



#### Example

One of the systems under this type is the Gantt task and bonus system. The remuneration under this method is computed as follows:

Output	Payment
If output is below standard	Time rate (guaranteed)
Output at standard	Bonus of 20% (usually) of time rate
Output above standard	120% of ordinary piece rate

There are many similar schemes of wage payment. However, most of them are not in use in the industry anymore as they involve cumbersome calculations.

### 3.4 Individual and group incentive schemes

#### Group incentive schemes are often referred to as group bonks

Incentive plans are mainly implemented so as to encourage the workers to work more efficiently. These plans are either applied to a group of workers or to individuals. Under the group incentive schemes the total incentives earned by the group is divided amongst the individual members of the group. The individual incentive schemes pay incentives separately to each worker depending upon the quality of his work.

#### The fundamentals of a good incentive wage system are given below:

- The workmen should be rewarded generously for increased production.
- The calculation of incentives should be simple and easy to grasp even for a layman.
- Performance standards should be established on the basis of careful studies. The working conditions and a reasonable amount of time and effort required to complete the jobs should be taken into consideration.
- There should be a clear system for inspecting, counting and recording the output of the individual and the results should be posted daily so that employees know what they have produced. This will enable them to compute or estimate their earnings and this increases the incentive effect.
- A high reward should be paid for performance above standards. This will boost morale and improve productivity.
- Incentive plans should also cover indirect workers as they are the people responsible for the smooth running of the operations.

#### 1. High wage system

This is an individual incentive scheme **based on the time rate systems**. Under this system, a high wage rate is fixed which is **higher than the average rate** of the industry.

This system facilitates recruitment of efficient and skilled workers who can be induced to produce a high standard of output. The most useful feature of this system is that **no overtime is allowed** to workers. Any overtime being done in some exceptional cases will remain unpaid.



### Example

Industries employing skilled workers generally set a high wage rate. If the normal rate of pay per hour is Tshs9,000 then under the high wage system the worker is paid Tshs12,000 per hour.

Software companies generally give higher payments, as well as better raises in salary, compared to any other industry. This is because they hire the services of experts in the IT industry and, being highly educated, these professionals are comparatively more responsible towards their work.

Awareness is created amongst the workers to meet their daily production standards. Setting standards of work involves setting deadlines for the completion of the given task within the specified time constraints. A high wage rate is suitable when the work can be easily measured. A worker's productivity is generally higher when he is paid a high hourly wage.

The **advantages** of this system are:

- As the wage rate is higher than the average wage rate of the industry, it is easier to retain the workers for a longer period of time
- Labour cost per unit is reduced as workers are induced to produce more
- Less supervision** is required since the workers remain motivated
- Attracts a higher number of workers since wage rates are high
- The system benefits both the employer and the employee. The employer benefits from the low cost per unit of output and the employee benefits from the higher wage he receives

The major disadvantage of this system is: high wage rate increases productivity in the initial stages and thereafter the workers are not so concerned with their productivity. This leads to labour problems, loss of productivity and eventually, loss of profits.



### Example

Mark produces 80 units when he gets Tshs9,000 per hour and 100 units when he gets Tshs10,000 per hour. The week consists of the standard 40 hours. The overhead cost is assigned as Tshs3,000 per hour. The hourly rate in the first case will be Tshs9,000 + Tshs3,000 = Tshs12,000 and in the second case: Tshs10,000 + Tshs3,000 = Tshs13,000.

The conversion cost per unit in both the cases will be calculated as:

$$\text{Under normal wage rate} = \frac{40 \text{ hours} \times \text{Tshs}12,000}{80 \text{ units}} = \text{Tshs}6,000$$

$$\text{Under high wage rate} = \frac{40 \text{ hours} \times \text{Tshs}13,000}{100 \text{ units}} = \text{Tshs}5,200$$

The wage rate per unit declines as productivity increases under the high wage rate method.

## 2. Individual incentive plans

Individual incentive plans reward employees individually according to their performance. The incentive is calculated separately for each worker and is given over and above their basic wages. Emerson's efficiency bonus, the Bedeaux point's scheme and the accelerated premium scheme are some of the schemes which offer individual incentives. These schemes offer increased wages as productivity rises above normal.

As productivity increases, wage rates also increase. The accelerated premium plan offers a greater increase in the wage rate as efficiency increases. The individual bonus can be different for each worker. It is a very effective factor in motivating the workers to increase their efficiency. An example of an incentive based on the piece rate systems is given below.



**Example**

A factory worker works 8 hours a day. The standard output is 100 units per hour and the normal wage rate is Tshs5,000 per hour. The company has introduced the following differentials in the matter of wage payments:

- 80% of piece rate when below standard.
- 125% of piece rate when at or above standard.

**Calculate:**

- (a) Normal piece rate
- (b) Below standard piece rate
- (c) Piece rate to be used at or above standard

**Answer**

(a) Normal piece rate = Total wages per hour / Total output per hour  
 = 5,000 / 100  
 = Tshs50 per unit

(b) Below standard piece rate = Normal piece rate x 80%  
 = Tshs50 x 80%  
 = Tshs40 per unit

(c) Piece rate to be used at or above standard = Normal piece rate x 125%  
 = Tshs50 x 125%  
 = Tshs62.50 per unit

**3. Group bonus system**

Sometimes it is more beneficial to apply an incentive plan to a group instead of an individual employee. The group bonus system is especially applicable when the **workers act as a team**.

The main advantages of the group bonus system are summarised below:

- It develops co-operation amongst the groups of workers.
- It considerably reduces the clerical labour involved in computing the bonus.
- It reduces the amount of bonus.



**Example**

The following cost information is given about a factory:

Standard production	80 units per week
No. of workers in the group	20
Actual production	110 units

For every 25% increase in production a bonus of Tshs100,000 will be shared pro-rata by the 20 members of the group.

Calculate the bonus payable to each member of the group.

**Answer**

Production	Units
Actual	110
Standard	80
Extra	30

Production efficiency ratio = Actual production / Standard production x100  
 = 110 / 80 x 100  
 = 137.50%



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Therefore increase in production = 37.50%

For a 25% increase in production, the bonus will be Tshs100,000

For a 37.50% increase in production, the bonus will be =  $(37.50 \times 100,000) / 25 = \text{Tshs}150,000$

Each member of the team will get a bonus of  $\text{Tshs}150,000 / 20 = \text{Tshs}7,500$

There are several different group incentive schemes. One scheme is the **Priestman's production bonus scheme** that rewards those groups which exceed standard production.



### Example

The standard production in a spare parts manufacturing unit is 18,200 for 26 working days for a team of 12 workers working on the shop floor. The normal wage rate is Tshs15,000 per hour for 8 hours a day. The production for the month consisting of 24 actual working days is 23,000 units.

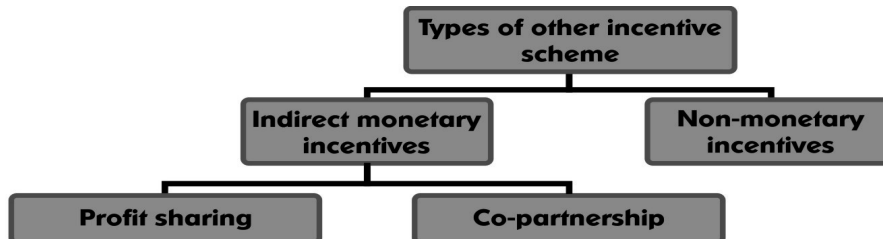
In the above case the standard production per day will be calculated as:  $18,200 \text{ units} / 26 \text{ working days} = 700 \text{ units per day}$ . Therefore the standard production for the 24 working days will be:  $24 \times 700 \text{ units per day} = 16,800 \text{ units}$ . The actual production in 24 days is 23,000 units. The excess production above standard =  $23,000 \text{ units} - 16,800 \text{ units} = 6,200 \text{ units}$ .

Therefore, according to the Priestman's production bonus scheme, the group of workers who have achieved this production will be given a group bonus of 25% of the aggregate earnings.

There are many more schemes of group incentives. The "**cost efficiency bonus**" scheme pays a bonus only if savings are achieved in labour costs. Yet another group incentive scheme offers a bonus to employees as a percentage of the value added by the manufacturer. Value added is arrived at by deducting the material cost from the total cost of production.

#### 4. Other incentive schemes

Diagram 3: Other incentive schemes



##### (a) Indirect monetary incentives

###### i. Profit sharing plan

Under the scheme of profit sharing, workers get a **share of the profits** of the organisation in addition to their normal wages. The profit may be distributed to workers either in cash or as deferred payments or as a combination of both. Profit sharing bonus schemes offer an advantage to the organisation because the organisation only pays the amount that it has earned during a particular year to production as well as non-production workers. Hence the liability is dependent on the amounts actually earned.

There are two major disadvantages to this scheme:

The organisation may make losses or make poor profits resulting in a lower share in spite of its efforts. This might be due to reasons that are outside the employees' control. Organisations have to wait until profits are declared.

**ii. Co-partnership**

The profit share may also be given in the form of **shares of the organisation**. This happens in the case of co-partnership. Under this scheme, employees become co-partners of the business. The employees hence have a share in the capital and as a result are entitled to profits.

**Premium bonus plans**

The following are the examples of premium bonus plans:

- Halsey plan
- Rowan plan



**Tip**

Halsey plan and Rowan plan are time based incentive schemes.

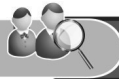
**Halsey plan:** according to this plan, based on the time and motion study, standard time and work are being decided.

Here,

A worker who takes less time than the average required time gets bonus for the time saved together with time based wages.

A worker who takes more time than the average required time or who takes average required time gets time based wages.

The bonus (premium amount) would be 50% of the saved time wages.



**Example**

Normal hours required for completing a particular job is 15 whereas a worker meets the target in 12 hours. Wage rate per hour is Tshs8,000.

Total wages under Halsey plan would be as follows:

$$\begin{aligned}
 & (\text{Actual time taken} \times \text{Wage rate per hour}) + 50\% (\text{Time saved} \times \text{Wage rate per hour}) \\
 &= (12 \text{ hours} \times \text{Tshs}8,000) + 50\% (3 \text{ hours} \times \text{Tshs}8,000) \\
 &= \text{Tshs}96,000 + \text{Tshs}12,000 \\
 &= \text{Tshs}108,000
 \end{aligned}$$

**Rowan plan:** under this plan, a worker gets minimum guaranteed wages as time based system. Here, bonus or premium is paid proportionately for the time saved and actual time taken.



**Example**

Standard hours of completing a particular job are 12 hours. A worker met the target in 10 hours. Assuming wage rate per hour Tshs10,000, total wages under Rowan plan would be as follows:

$  \begin{aligned}  & (\text{Actual time taken} \times \text{Wage rate per hour}) + \left( \frac{\text{Time saved}}{\text{Standard time}} \times \text{Actual time taken} \times \text{Wage rate per hour} \right) \\  &= (10 \text{ hours} \times \text{Tshs}10,000) + \left( \frac{2 \text{ hours}}{12 \text{ hours}} \times 10 \text{ hours} \times \text{Tshs}10,000 \right) \\  &= \text{Tshs}100,000 + \text{Tshs}16,666.67 \\  &= \text{Tshs}116,666.67  \end{aligned}  $
--

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The **advantages** of bonus or premium systems are:

- (a) To earn the extra amount, employees tend to work more. It proves as a two-way benefit since more quantity is produced for an organisation and more wages are earned by the employees.
- (b) The bonus / premium methods are easy to understand.
- (c) Mostly, bonus systems emphasize on saving time. This leads to the benefit of reducing labour cost.
- (d) Bonus system guarantees minimum time wages and additional wages for efficiency. Here, quality can be maintained along with an increase in quantity.

The **disadvantages** of bonus or premium systems are:

- (a) Cooperation among the employees is usually absent.
- (b) It is very difficult to establish the standard for bonus.
- (c) Sometimes, it may create frustration among the efficient workers who are engaged in the same type of work as inefficient workers, because of the difference in their wages.

### 3.5 Overtime wages

The Minimum Wages Act applicable to a country specifies the minimum hourly wages that are payable to a worker. Apart from the wages paid for normal time, the employer might be required to **pay for the overtime work done** by the employees. Any wages paid in addition to the normal wages payable for the work done beyond normal hours of work is termed overtime premium.



#### Tip

**Overtime premium** is generally treated as an **indirect labour charge**, unless overtime has occurred on the specific request of the customer.

Overtime wages are generally paid **at a higher rate** than the normal wages. These wages are however not a part of the minimum wages payable by law. These are either paid at double the normal wage rate or at any rate that is higher than the normal rate.

Overtime pay = Basic pay + Overtime premium



#### Example

Overwork Plc needs to fulfil an order for which it will have to resort to working overtime for two weeks. The normal hourly wage rate is Tshs10,000 and the management has agreed to pay any overtime work at Tshs18,000 per hour. A normal working day consists of 8 hours and there are 5 working days in a week. The working hours recorded for three workers, A, B and C is given below:

Worker	Hours worked in two weeks
A	120
B	160
C	100

Calculate the overtime wages and overtime premium for these workers.

#### Answer

Calculation of overtime hours for each worker

Normal hours per week for each for 2 weeks = 8 hours per day x 5 days per week x 2 weeks  
= 80 hours

Overtime hours = Actual hours worked – Normal hours

For, A = 120 – 80 = 40 hours

B = 160 – 80 = 80 hours

C = 100 – 80 = 20 hours

**Continued on the next page**

**Calculation of overtime wages and overtime premium**

Worker	Hours worked	Normal hours	Overtime hours	Basic pay (Normal hours x Tshs10,000)	Overtime premium (Overtime hours x Tshs18,000)	Overtime wages (Basic pay + Overtime premium)
A	12	80	40	800,000	720,000	1,520,000
B	0	80	80	800,000	1,440,000	2,240,000
C	16	80	20	800,000	360,000	1,160,000
	<b>38</b>	<b>24</b>	<b>14</b>	<b>2,400,00</b>	<b>2,520,000</b>	<b>4,920,000</b>

This expense is generally treated as an **overhead expense**. However, if the overtime is done for a particular job or process then the cost is charged as an overhead of that particular job or process. Any overtime caused by abnormal conditions such as a flood, earthquake or any other natural catastrophe is charged as an expense directly in the profit and loss account.

**4. Describe the factors for consideration on labour remuneration methods:**

- i. Efficiency in production**
- ii. Effect on workers**
- iii. Incidence of overhead**
- iv. Labour turnover**

**[Learning Outcome e]**

In the previous Learning Outcomes we studied various labour remuneration methods like time based, piece based, combination of time based and piece based, etc. Prior to determining the labour remuneration method, any organisation must need to consider the factors impacting the organisation. They are discussed below:

**1. Efficiency in production and incidence (occurrence) of overhead**

To increase the production efficiency it is advisable to establish piece based remuneration method. The philosophy behind this method is in order to earn more; workers would tend to work more! This factor serves as a motivation for employees to work hard and enhance productivity.

Here, an organisation is paying for the work done. Low efficient employees will be paid only once their job is done. Under time based method, both efficient and less efficient employees are paid standard rate per hour regardless of their productivity. This limitation is overcome by piece rate method.

However, the flip side is workers may increase the amount of waste. To produce more, they may compromise with the quality. Here, an organisation need to know how much cost effective it is. Another challenge is payroll computations.

The piece rate pay method requires additional effort from the payroll department, as the productivity levels vary frequently. It applies to each employee as s/he will likely differ at times on the quantity produced. In this case also an organisation needs a record of the hours worked by the employees. Typically, each employee's pay must still calculate to at least minimum wage, though production levels are lower.

**2. Effect on workers and labour turnover**

Labour remuneration method does not only affects organisation but also have an impact on workers / employees. If organisation is blindly focusing on productivity, they may lose employee morale. Trained and skilled employees may look for other opportunities and leave the organisation.

This impacts labour turnover rate of the organisation. To retain employees and to keep up their motivation level, it is advisable to have time based remuneration system.

At least here they have some guarantee of minimum wages. High labour turnover in any organisation will affect the efficiency of the workers and its overall profitability since it increases the cost of recruitment, training, administration, etc.

On the other hand even efficient workers work under stress to earn more where remuneration is based on piece rate. It is ideal to have combination of time and piece rate based remuneration method to deal with these issues.



**Test Yourself 7**

Which of the following factors affects the labour turnover rate of the organisation?

- A Blind focus on productivity
- B Piece rate remuneration system
- C Flexible work environment
- D Group bonks system

**5. Prepare Payroll and account for wages incurred in an organisation.  
Charge labour costs to production.**

**[Learning Outcomes f and h]**

**5.1 Journal and ledger entries to record labour cost**

The labour account refers to the account used to record the **entries for wages**. The 'Wages Control account' is the labour account used for these purposes. The entries are first charged to this account and then reallocated to the work in progress and overheads accounts. The journal entries are as follows:

	Transaction	Accounting Entry
1.	Total salary and wages paid	Dr Wages control account Cr Cash / bank account Being salary and wages paid to workers
2.	Direct labour cost charged to production	Dr Work in progress account Cr Wages control account Being direct labour cost charged to products
3.	Indirect labour cost charged to production	Dr Production Overhead control account Cr Wages control account Being indirect labour cost charged to products

**Explanation of these entries**

**Transaction 1**

All the expenses of salaries and wages (direct + indirect) are first debited to the 'wages control account' and the corresponding credit is made to the 'cash and bank account'. The expenses are recognised and debited to the wages control account.

**Transaction 2**

The cost of the direct labour hours consumed for production is transferred to the 'work in progress account' and credited to the 'wages control account'. These expenses are actually charged to the 'work in progress account'.

**Transaction 3**

The cost of the indirect labour hours worked for different departments e.g. production, selling, distribution etc. is absorbed on a suitable basis. The indirect cost calculated is then charged to the 'production overhead control account'.

These entries are for wages paid and charged to the work in progress and overhead control a/c. The following are the extracts of the ledger accounts. The extracts are incomplete accounts highlighting only the journal entries explained above. The figures included in these accounts are illustrative.

Dr		Wages control account				Cr
Date		Tshs'000	Date		Tshs'000	
	Bank	1,000		Work in progress	750	
				Overhead control	250	

Dr		Work in progress account				Cr
Date		Tshs'000	Date		Tshs'000	
	Wages control	750				

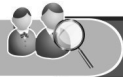
Dr		Overhead control account		Cr	
Date		Tshs'000	Date		Tshs'000
	Wages control	250			



**Tip**

The above journal entries can be summarised as follows:

Debit wages control account in the following situations	Credit wages control account in the following situations
Labour cost incurred (both direct and indirect)	Labour cost involved in production (direct labour to WIP)
	Cost of indirect labour (e.g. overtime premium, shift premium, sick leave pay, bonus, idle time payment)



**Example**

The following transactions took place in Smith & Co during the month of June 20X8.

		Tshs'000
(a)	Wages paid (40% indirect) in cash	49,000
(b)	Manufacturing expenses incurred in cash	41,800
(c)	Manufacturing overheads charged to production	41,000

You are required to make the journal entries for the above transactions presuming that the integrated system of accounting is followed by Smith & Co.

**Answer**

**Smith & Co**  
**(Integral accounting system journal)**

		Tshs'000	Tshs'000
(a)	Dr Wages control a/c Cr Cash Being the entry for direct and indirect wages paid	49,000	49,000
	Dr Work-in-progress a/c Dr Production overhead a/c Cr Wages control a/c Being direct and indirect wages allocated 60% being direct and 40% indirect	29,400 19,600	49,000
(b)	Dr Production overhead a/c Cr Cash Being the production overhead incurred	41,800	41,800
(c)	Dr Work-in-progress a/c Cr Production overhead a/c Being the overheads charged to production	41,000	41,000



**Test Yourself 7**

The balance of the wages control account:

- A Increases day by day
- B Eventually gets nullified
- C Decreases day by day
- D Remains the same throughout the activity period



### Test Yourself 8

What is the indirect labour cost is ultimately charged to?

- A Work-in-progress account
- B Wages control account
- C General ledger account
- D Overhead control account

---

## 5.2 Other methods of accounting for labour costs

Apart from the above methods of accounting for labour costs, costs are also recorded in **time cards, time sheets, job cards** etc.

The **methods used to relate input labour costs** to work done are:

### 1. Direct charging of direct labour cost

Direct labour cost is charged directly to the product, process or job. It is charged for the work done on an hourly basis or per unit basis. On an hourly basis, the cost per unit is calculated based on the number of labour hours consumed by the product. On a per unit basis, the cost is charged at the rate applicable.



### Example

A software firm is working for its client to develop debugging software called "Fighter". 10 employees worked for 8 hours a day for 25 days for the "Fighter" project. The labour hour rate is given as Tshs20,000. The total direct labour cost will be  $10 \text{ (employees)} \times 8 \text{ (hours a day)} \times 25 \text{ (days)} \times \text{Tshs}20,000 = \text{Tshs}40,000,000$ .

The whole of this Tshs40,000,000 will be charged directly to the project since it consumed 2,000 man hours (8 hours x 25 days x 10 employees) at the rate of Tshs20,000 / hour.

---

### 2. Allocation and apportionment of indirect costs on a suitable basis

Any indirect labour cost is added to factory overheads and suitably absorbed / apportioned to the product, process or job.

Generally, indirect labour cost is caused by the direct labour hours that are put into any activity e.g. as production increases, supervision (indirect labour) costs also increase along with direct labour cost. Therefore, generally, the indirect labour cost is assigned to the output **as a percentage of direct labour hours** consumed.



### Example

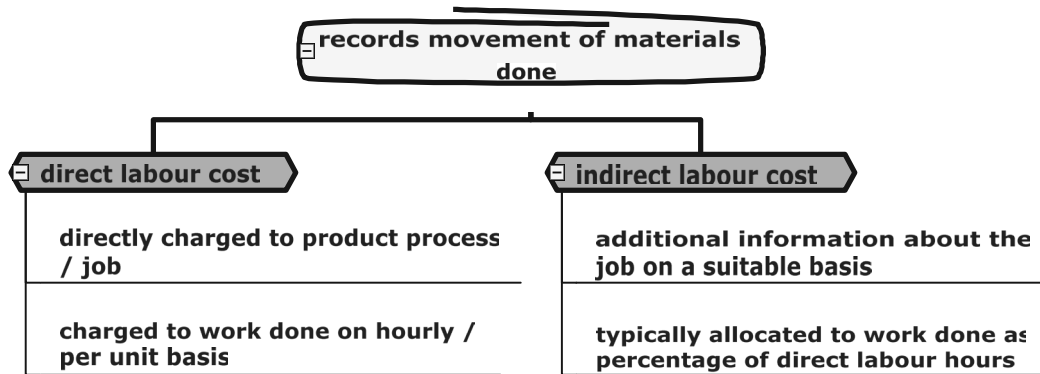
In an umbrella manufacturing company the direct labour hour rate is Tshs12,000. The indirect labour rate is 35% of the direct labour hour rate. The indirect labour rate will therefore be  $\text{Tshs}12,000 \times 35\% = \text{Tshs}4,200$ .

Direct labour here consists of people who manufacture umbrellas, whereas indirect labour would be involved in the packing and transportation of these to the retailer for sale. As the number of hours worked by direct labour increases and more umbrellas are produced, indirect labour would also have to put in more hours of work. This clarifies that indirect labour is caused by direct labour.

---

The procedure of allocation and apportionment of indirect labour costs is exactly the same as any other overheads.

**SUMMARY**



**Test Yourself 9**

What is the method of charging indirect labour cost?

- A Charging it to the product directly
- B Allocation and absorption on a suitable basis
- C Direct allocation to the product and service
- D None of the above

**3. Payroll**

A person is paid a salary or wages in return for services rendered by him to the entity during the course of his employment. The salary, wages or remuneration arise under a contract of service.



**Definition**

The payroll of a company is a list of company's employees and a record of the monetary compensation paid to them in exchange for their services

The total compensation and monetary benefits are agreed between the company and employee at the time of appointment of the employee. The employer takes into consideration all the applicable laws and practices (e.g. minimum wage, working time, etc). The aggregate salary / wages, known as the gross pay, is a cost to the company. There are some statutory deductions from the gross pay such as withholding taxes and contributions to various pension funds. Employees receive a net salary after these deductions are made from the gross pay.

The general format for the computation of salaries is reproduced below, although it differs from company to company for various levels of employees.

**General format of computation of salary**

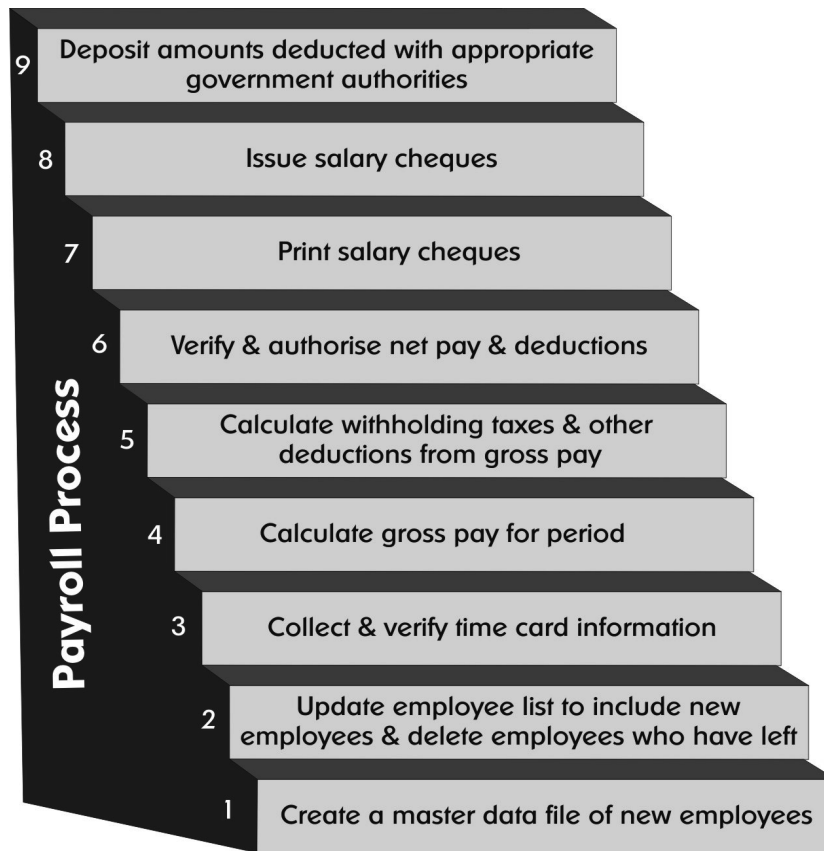
	<b>Amount</b>	<b>Amount</b>
	Tshs'000	Tshs'000
Basic salary		XX
Add: Commission, overtime, allowances etc		XX
<b>Gross salary</b>		<b>XXX</b>
Less: Deductions		
withholding taxes	XX	
contribution to pension funds, etc.	XX	(XX)
<b>Net salary</b>		<b>XXX</b>



## 162: Accounting for Materials, Labour and Overheads

The payroll department of the organisation looks after the entire payroll process, as shown in the diagram below.

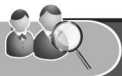
Diagram 4: Payroll process



Before understanding the calculation of gross wages, it is important to know the meaning of gross wages and net wages.

### 5.3 Gross wages

Gross wages for individuals are the total income prior to any deductions earned in a year. It is the gross earnings or total taxable income before any appropriate deductions or adjustments.



#### Example

Jennifer, who earned a total of Tshs50 million for the recently completed financial year, made Tshs5 millions of contributions to a government-sponsored savings plan. Because her contributions reduce her taxable earnings, Jennifer is allowed to base her tax calculations of **taxable earnings** of Tshs45 million, while her **actual gross wages** for the year are Tshs50 million.

It also includes overtime pays, commissions, bonus, vacation pay, pension contributions, medical benefits and other earnings. However, it should be before any deductions.

### 5.4 Net wages

Net wages is the amount received by the employee after subtracting total deductions from gross wages.

Net wages = Gross wages - Total deductions  
Total deductions = Taxes + Other deductions

The employers must deduct following deductions from gross wages before paying net wages to employees.

- PAYE (income tax)
- Employee's State Benefit Contributions
- Other deductions

## 5.5 Taxes / PAYE

**PAYE** stands for **Pay As You Earn**. An employer deducts income tax from his employees' wages / salaries throughout the year and sends it to the tax authorities. E.g. in UK, the tax year starts on 6 April of one year and ends on 5 April in the next. This system of collecting income tax is known as PAYE.

PAYE is a way of spreading income tax over the tax year. The employer generally deducts tax from weekly or monthly earnings and pays it over to the tax office. The employer is effectively acting as a collector of taxes on behalf of the tax authorities

## 5.6 State benefit contributions

Benefit contributions are obligatory deductions from the gross salary of employees, which is used to **fund the welfare of the state and to pay state benefits** such as state pensions, unemployment benefits etc. They are contributed by both employer and employees. However, both of them generally pay a different rate. These payments by the employer are not connected to the employee's pay package, but in fact are additional costs to the company.

## 5.7 Other deductions from wages

### 1. Trade union subscriptions

Employees in an organisation are usually part of trade unions. They work towards the interests of its members, by proposing better working conditions, rise in salary etc. These unions are supported by the contributions of its members. Hence, the employees have deductions from their salary for the union they belong to.

### 2. Payroll saving

Companies often deduct a certain percentage of the salary of their employees on account of 'payroll saving'. This again is a voluntary deduction from the monthly remuneration of the employees. Under a payroll saving programme, the employees instruct the company to withhold a certain amount of their salary, which is deposited into their savings account. This helps the employees to save a part of their salary, as these funds are not readily available for use. They can hence utilise the funds to purchase various treasury instruments, bonds among others.

### 3. Pension contributions

Most companies have a pension contribution plan. This plan is another form of deduction from the salary of the employees. This specified contribution is deducted from the salary of the employees and deposited into the employees' pension plan. The employees receive benefits on their retirement. Often, both the employees and the employers contribute to these funds. The amount of contribution made by each may vary. The payroll department has to keep a track of the amount that needs to be deducted from each employee's salary.

### 4. Payroll giving

Payroll giving is a non-taxable voluntary deduction from the salary. The money deducted is forwarded to charitable organisations. In a payroll giving scheme, the employee can decide on a certain percentage of their salary that he would like to be given for charitable causes. Furthermore, he can also select the charitable organisation for making donations to.

The payroll department needs to ensure that the correct amount is deducted from each person's salary and hence is forwarded to their chosen charitable organisation. In some cases, an employer might also deduct a certain amount as its administration charges.



### Example

Monica is an employee in a publishing company. Her company runs a 'payroll giving' plan. Her annual gross salary is Tshs5.4 million. She has enrolled in the payroll giving plan, and agreed to contribute 5% of her gross salary. Her taxable gross salary will be:

$$\begin{aligned}
 &= \text{Tshs}5,400,000 - (5\% \times 5,400,000) \\
 &= \text{Tshs}5,400,000 - \text{Tshs}270,000 \\
 &= \text{Tshs}5,130,000
 \end{aligned}$$

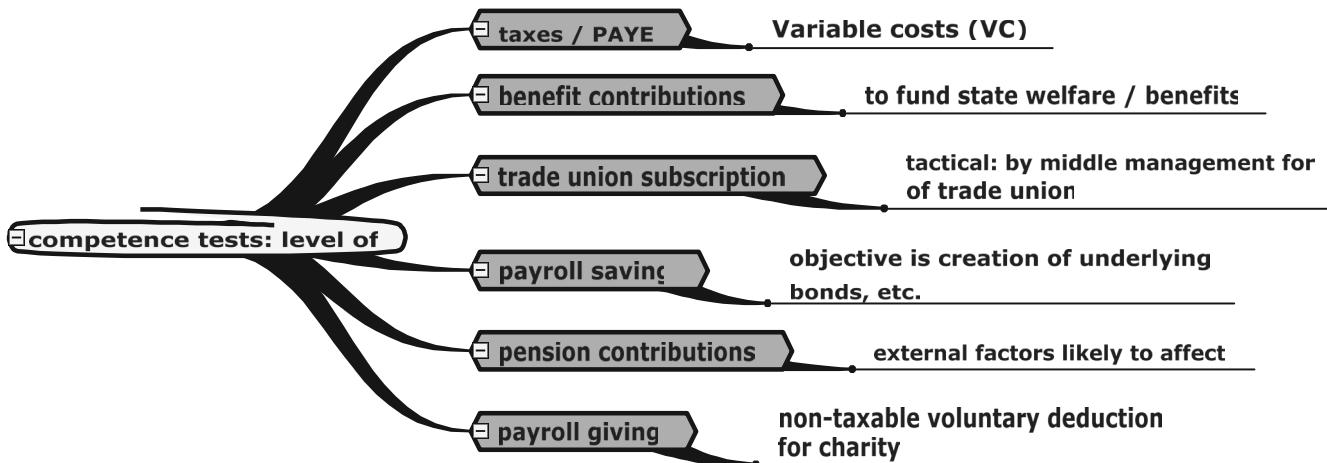

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**Test Yourself 10**

Jacob is paid an hourly rate of Tshs8 million for a 40 hour per week. Overtime wages are twice than the regular pay. Jacob has worked for 43 hours in a week. The income tax to be deducted for the week is 35% and the employer’s Benefit Contribution is 10%. Calculate his net pay.

**SUMMARY**



**5.8 Payment methods for wages**

The following methods are generally used for the payment of salaries and wages:

- Cash payment
- Cheque payment
- Automated payment

In a **cash payment**, the amount of salary, net of deductions, is paid in cash and an acknowledgement is taken from the employee. The cash payment method is generally followed by small entities which have a small number of employees. The internal controls in the cash payment method need to be robust as there is always a high risk of misappropriation or fraud when dealing in cash.

Entities with a large number of employees generally do not follow this method as the physical disbursement of cash is time-consuming and it is difficult to maintain adequate controls. Also, security issues play a key role because if cash is not collected by an employee on time, then it needs to be kept in the safe. A coinage analysis contains details about the total amount of money to be paid to each employee in specified currency denominations. This is a tedious task and hence is avoided as a mode of payment by large organisations.

In the **cheque payment** method, the net salary is paid by cheque to each employee. The employee needs to present this at the bank and get his pay in cash. Payment by cheque is a better mode of payment than cash. This is because the security constraints, time taken for processing, and chances of fraud are less. This method is more common in bigger organisations which have a large number of employees. However, as the number of employees increases, this method also becomes time-consuming, as it takes time to fill in a separate cheque for each employee. It is difficult to maintain internal controls.

The third method of paying salaries is **automated payment**. The majority of companies these days use this method of payment. Under this method, the entity opens a salary account in a bank and all the employees are asked to open salary accounts with the same bank. At the end of the payment period, the company needs to provide the name of the employee, amount to be paid, its account number and the employee’s account number.

In this way, it transfers the salaries electronically directly to the employees’ salary accounts. This method is extremely efficient, quick and convenient. The amount of time required by the bank to conduct this operation varies among different banks and the number of employees in the organisation. If the entity has an online banking facility, then it can transfer the net salary to the employees’ accounts internally.

**6. Analyse payroll records and statements.****[Learning Outcome i]**

Apart from the above methods of accounting for labour costs, costs are also recorded in **time cards, time sheets, job cards** etc. Depending on the unit of measurement used by organisations, different recording methods are followed. Time sheets for workers are paid on the basis of hours worked, and piecework tickets for workers are paid on the basis of piecework. There are usually several departments from which data for labour costs can be obtained. Common departments from which data can be obtained include:

- Personnel department
- Production planning
- Time keeping
- Cost accounting

These departments are responsible for various tasks. The **personnel department** is a full-fledged department **handling all the details of the workers and employees of the organisation**. The numerous tasks it handles include:

- The engagement, transfer and discharge of employees
- Remuneration schemes to be offered to employees of different departments
- Maintenance of personal records of employees such as their employment record, and personal details such as addresses, telephone numbers, investment details, promotions in past jobs etc
- Maintenance of records for leave structure, leave record, remuneration details, time records e.g. overtime, shift details etc.
- Issue of reports to management regarding employees' performance, time keeping, overtime, leave, sickness, disciplinary actions taken, turnover etc.

The **production planning department** is generally responsible for scheduling work, maintaining schedules of work by monitoring any jobs running behind time, and issuing job orders to various departments. The **timekeeping department** is usually responsible for **recording and maintaining time records**. These records help in payroll preparation and also act as primary reference documents. They help in the analysis and determination of labour productivity and, therefore, cost control. There are various ways in which time can be recorded. This can be done by:

- Measuring the time each worker spends in the factory; or
- Measuring the time each worker spends on a job

The analysis of labour cost can be effectively done by linking up different pieces of information from different sources. Organisations have to develop a series of codes that analyse the following:

- Employee number
- Department
- Pay rate
- Job / batch number
- Client number

**1. Time card****(a) Time sheets**

The timekeeping department is usually responsible for recording and maintaining the time records of employees. These time sheets help in payroll preparation in a time-based system of remuneration, and also act as primary reference documents. Timesheets can also help the organisation to understand the productivity levels of the organisation, by calculating the time taken by each employee for the completion of certain tasks. There are various ways in which time can be recorded. This can be done by:

- measuring the time each worker spends in the factory; or
- measuring the time each worker spends on a job.

**(b) Clock card**

Employees in an organisation are usually given a timecard. The timecard needs to be inserted into the automated clock card machines, when the employees enter or leave the organisation premises. A clock card machine is an automated time machine that helps to keep a track of the number of hours an employee has worked in the organisation. Additionally, at the end of the month it helps to generate an automated timesheet, which gives the record of hours and thus facilitates the calculation of payroll.

**166: Accounting for Materials, Labour and Overheads**

**Specimen of time sheet / time card**

Attendance sheet																															
Name: ----- Age -----				Designation ----- Department: -----								Employee reference number:-----										Leave entitlement:----- Leaves availed -----									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																															
Mar																															
Apr																															
May																															
Jun																															
Jul																															
Aug																															
Sep																															
Oct																															
Nov																															
Dec																															
A: absent days																	SL: privilege leave														
L: leave days																	PL: paid leave														
S: sick leave																	LM: late mark														
M: maternity leave																	OT: over time														
UL: unpaid leave																															

The above specimen of timecard is used as **attendance sheet** for employees. Attendance sheet is prepared for each employee for the whole year. It is used for maintaining records of arrival time, departure time, and recess time.

**2. Job card (sheet)**

For correct analysis and recording of direct labour, the detailed analysis of time spent has to be made by the organisation. Job cards are prepared by employees for each job which contain the details of time spent on each job. Job cards also carry instructions for the operators regarding how that job should be carried out. Such records reduce the possibility of errors and save time in manual record keeping.

**Specimen format of Job card (sheet)**

Name of the company											
Description -----						Job cost sheet no.-----					
Customer's no. -----						Job no.-----					
Reference no. -----						Quantity -----					
						Date of commencement of job -----					
						Date of finishing -----					
						Date of delivery -----					
Materials				Labour				Overhead			
Date	Dept.	Material requisition no.	Amount \$	Date	Dept.	Time account no.	Amount \$	Date	Dept.	Rate \$	Amount \$
<b>Total</b>				<b>Total</b>				<b>Total</b>			
Summary											
Cost			Estimated	Actual	Variance	For the job					
Direct material						Units produced -----					
Direct wages						Cost per unit -----					
Production Overheads						Remarks -----					
Production cost											
Administration overhead						Prepared by -----					
Selling and distribution overhead											
Cost of sales						Checked by -----					
Profit / loss											
Selling price											

**3. Operation card**

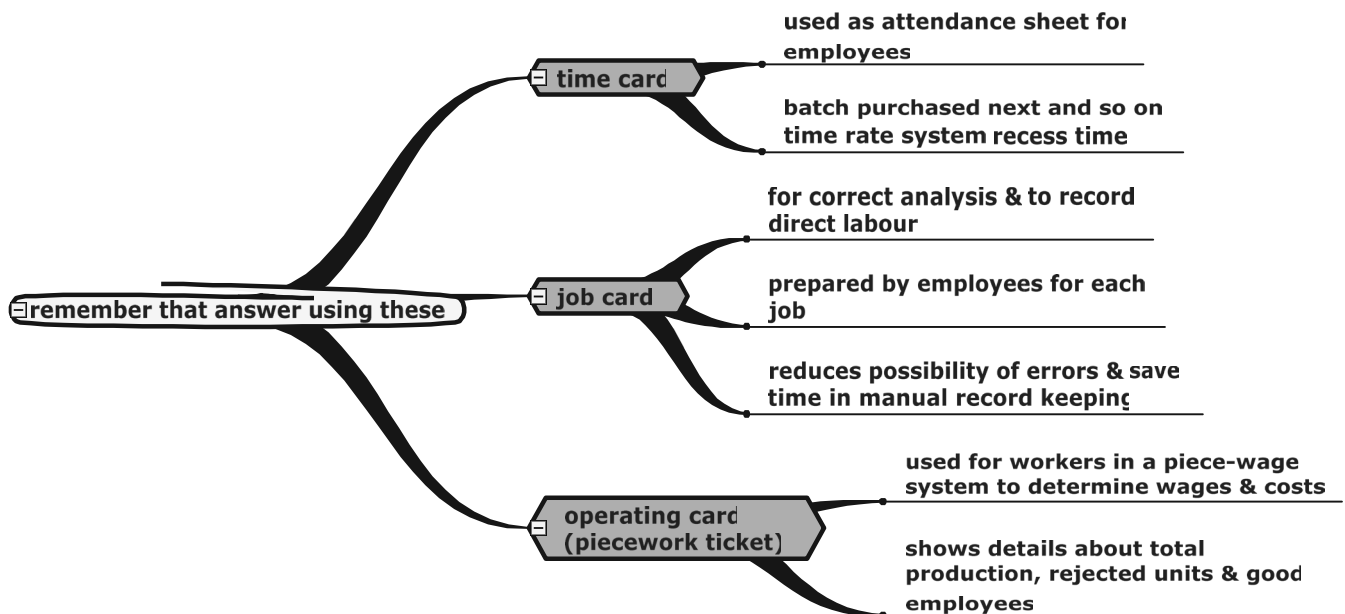
An operation card is also known as a piecework ticket. It is used for workers in a piece-wage system to determine their wages and costs of work. Pieceworkers are paid only on the basis of signed operation cards.

An operation card shows details about total production, rejected units and good production. Wages are only paid for good production.

**Specimen of an operation card**

Operation card				
Employee's name:-----			Total batch quantity:-----	
Clock No:-----			In time:-----	
Week No:-----			Out time:-----	
Date:-----				
Component No:-----				
Job order No:-----				
Operation:-----				
Work instructions:-----				
No of units produced	No of units rejected	Good production units	Rate	Amount in \$
Inspector: -----			Operative:-----	
Foreman: -----			Date:-----	
Signature: -----				

**SUMMARY**



**Test Yourself 11**

- (i) The personnel department maintains the personal records of employees.
- (ii) The production department handles transfers and discharge of employees.
- (iii) The production planning department is responsible for work schedules.
- (iv) The production department is not responsible for issuing job orders to various departments.

Which of the above statements is / are true?

- A (i), (ii) and (iv) are correct
- B Only (i) and (iii) are correct
- C All of the above are correct
- D None of the above is correct

**7. Measure labour efficiency, labour turnover and labour utilization.**

[Learning Outcome j]

**7.1 Labour productivity / efficiency**

Labour productivity needs to be measured in every organisation in order to know if there is an efficient utilisation of the available labour resources. The biggest measure of labour efficiency is the reduction in unit costs of production due to an increase in productivity. This happens when a higher number of units are manufactured in the same number of hours.



**Example**

Stacey worked for 8 hours a day and manufactured 50 units of output in the first month of her job. After a month, her productivity increased and now she is able to produce 60 units in an 8 hour day.

In the various labour plans discussed above, many of the incentive plans deal with a situation in which a worker is paid an extra amount for increased productivity. **Emerson’s efficiency scheme** and the **Gantt task bonus scheme** are examples of such systems of wage payments that reward productivity.

The standard costing system uses the system of standard production per hour / standard time period whereby a standard rate of production is calculated and the productivity of workers is compared with this standard to measure their efficiency. The management makes an effort to reduce the overall cost of production, while at the same time increasing the productivity and quality of output produced. Labour management is important at such times in order to help the organisation achieve these targets.



**Example**

Tiger works a 40 hour week. He earns wages of Tshs15,000 per hour and the production overheads amount to Tshs250,000 per week. Tiger’s weekly production is as follows:

- Week 1            200 units
- Week 2            280 units with an overtime of 20 hours paid @Tshs18,000 per extra hour

Measure the variation in the cost per unit for the two weeks.

**Answer**

	<b>Week 1 (Tshs’000)</b>	<b>Week 2 (Tshs’000)</b>
Labour cost	600 (Tshs15 x 40)	960 (Tshs15 x 40 + Tshs18 x 20)
Production overheads	250	250
Total costs	850	1,210
Number of units	200	280
Unit cost (total costs / number of units)	4.25	4.32

The above example makes it clear that an increase in production coupled with an increase in hours of work does not reduce costs. In the above case, if Tiger’s productivity had increased, costs would have reduced. If Tiger had produced 280 units in the same number of hours without the organisation having to bear the overtime wage charges, costs would have reduced.

In that case, unit costs would have been

$$= \frac{\text{Tshs}600,000 + \text{Tshs}250,000}{280 \text{ units}} = \text{Tshs}3,035.7 \text{ per unit}$$

Although this shows a phenomenal fall in unit cost, a reasonable reduction may be achieved through proper training of labour and providing workers with better tools to work with.

Automation of work processes is generally seen as one of the ways to increase human productivity. In this case, machinery also contributes to productivity and so performance can be judged wrongly at times.



**Example**

Wonderland Plc is a company producing fans. The following shows statistics for two years of a certain project.

	20X7	20X8
Fans produced (per week)	1,800	2,400
Labour hours (per week)	360	240

Additional information:

In the year 20X7, nine workers were working on the project.

In the year 20X8, six workers were working on the project. Moreover, a machine was also used during the same year, for 60 hours per week.

Show the effect on labour productivity.

**Answer**

Labour productivity = Production units / Labour hours

For the year 20X7

Labour productivity = 1,800 fans / 360hours  
= 5 fans per labour hour

For the year 20X8

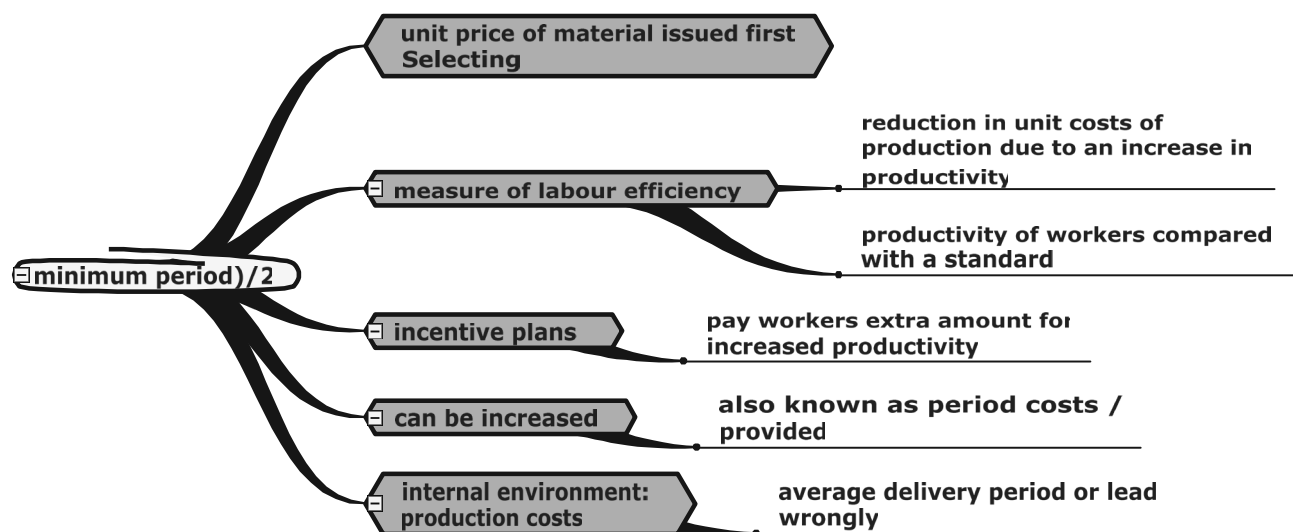
Labour productivity = 2,400 fans / 240hours  
= 10 fans per labour hour

Labour productivity is doubled because of the machine. Due to an increase in labour productivity, employees might expect higher wages.

In such cases, machine productivity should also be considered while measuring performance.

Productivity is, therefore, of immense importance in any organisation since it is a means for reducing cost. Therefore, organisations should aim to increase production along with an increase in productivity. Increase in productivity alone could also reduce costs.

**SUMMARY**



**7.2 Labour utilisation ratios**

Any organisation runs according to the budget set for it for the period. The budget is a financial statement prepared for a specified future period outlining the resource requirement as well as utilisation. Similarly the statement also specifies the standards for labour hours required for a particular job and the output expected to be produced from the hours put in.



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Different labour ratios help us **compare the actual performance** at the end of the budget period **with the budgeted standard performance** expected. The three types of labour ratios used for this purpose are:

$$\text{Labour efficiency (productivity) ratio} = \frac{\text{Standard hours of actual output}}{\text{Actual hours worked}} \times 100$$

$$\text{Labour capacity ratio} = \frac{\text{Actual hours worked}}{\text{Budgeted hours of input}} \times 100$$

$$\text{Production volume (activity) ratio} = \frac{\text{Standard hours of actual output}}{\text{Budgeted hours of output}} \times 100$$



### Example

Tinfin Plc had budgeted 50,000 hours to produce a specified output level. Suppose the standard hours required for the actual output are calculated as 40,000 hours. The actual hours worked are only 35,000 hours. Let us calculate the various ratios based on the above data.

$$\begin{aligned} \text{Labour efficiency ratio} &= \frac{\text{Standard hours of actual output}}{\text{Actual hours worked}} \times 100 \\ &= \frac{40,000}{35,000} \times 100 \\ &= 114.28\% \end{aligned}$$

Therefore it can be deduced that the labour worked at an efficiency level of 114.28%, which is a good ratio.

$$\begin{aligned} \text{Labour capacity ratio} &= \frac{\text{Actual hours worked}}{\text{Budgeted hours of output}} \times 100 \\ &= \frac{35,000}{50,000} \times 100 \\ &= 70\% \end{aligned}$$

This ratio signifies the percentage of time the employees are engaged in work as compared to the total budgeted hours. In this case, compared to 50,000 budgeted hours, the employees worked for only 35,000 hours, reflecting a capacity ratio of 70%.

$$\begin{aligned} \text{Production volume ratio} &= \frac{\text{Standard hours of actual output}}{\text{Budgeted hours of output}} \times 100 \\ &= \frac{40,000}{50,000} \times 100 \\ &= 80\% \end{aligned}$$

The budgeted hours for the output were 50,000 hours whereas the standard hours required for the actual output were only 40,000 hours. As a result, only 80% of the planned production volume was produced in the period. Production volume ratio signifies the percentage of output actually produced in comparison to what was planned in the budget.



### Test Yourself 12

Which ratio signifies the percentage of time the employees are engaged in work as compared to the total budgeted hours?

- A Labour turnover ratio
- B Labour efficiency ratio
- C Labour capacity ratio
- D Production volume ratio

### 7.3 Meaning and calculation of labour turnover



#### Definition

**Labour turnover** is the phenomenon of individuals joining an organisation and separating from that organisation over a particular period. **Labour turnover** is the rate at which workers leave an organisation. This turnover rate should be kept as low as possible.

Workers leaving and being replaced as well as newly-recruited workers form a part of labour turnover. New workers being recruited signifies expansion of business and hence is not usually a major concern for organisations. However, people joining then leaving soon after for whatever reason is a major cause of worry.

There are considerable disputes amongst authors regarding the factors that should be taken into consideration in calculation of labour turnover. The following three methods are widely used and accepted:

#### Separation method

$$\text{Labour turnover} = \frac{\text{No. of separations}}{\text{Average number of workers}} \times 100$$

#### Replacement method

$$\text{Labour turnover} = \frac{\text{No. of replacements}}{\text{Average number of workers}} \times 100$$

#### Flux method

$$\text{Labour turnover} = \frac{\text{No. of separations} + \text{No. of replacement} + \text{No. of recruitments}}{\text{Average number of workers}} \times 100$$



#### Example

The cost accountant of A1 Plc wants to know the labour turnover ratios under different methods, as the year has seen major movements of workers joining and leaving the organisation. The average number of workers on roll during the year is 250. 30 were replaced and 32 workers left the organisation for personal reasons. During the period, 20 employees were recruited.

#### Answer

The labour turnover can be calculated as:

#### Separation method

$$\begin{aligned} \text{Labour turnover} &= \frac{\text{No. of separations}}{\text{Average number of workers}} \times 100 \\ &= \frac{32}{250} \times 100 \\ &= 12.8\% \end{aligned}$$

#### Replacement method

$$\begin{aligned} \text{Labour turnover} &= \frac{\text{No. of replacements}}{\text{Average number of workers}} \times 100 \\ &= \frac{30}{250} \times 100 \\ &= 12\% \end{aligned}$$

Continued on the next page

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### Flux method

$$\begin{aligned}\text{Labour turnover} &= \frac{\text{No. of separations} + \text{No. of replacement} + \text{No. of recruitments}}{\text{Average number of workers}} \times 100 \\ &= \frac{32 + 30 + 20}{250} \times 100 \\ &= 32.8\%\end{aligned}$$

The rate is at an alarming 32% which means that management needs to take immediate corrective action!

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### 7.4 Causes of labour turnover

Labour turnover is an issue of major concern for organisations as it costs them a lot. However, it is an inevitable part of a business. There may be various causes for this. These can be broadly classified as below:

#### 1. Unavoidable causes

These refer to circumstances where it becomes necessary for management to ask its employees to leave the job or the employee has his / her own personal reasons to leave the job. The causes for this can be:

- Death, retirement
- Family problems and responsibilities
- The business has moved to a location where the employee cannot move
- Any disability acquired by a worker which makes him unable to perform his duties properly
- Retirement at an early age for health or other reasons
- Retrenchment due to seasonal business or other unavoidable causes
- Certain domestic responsibilities and problems
- Better prospects in other jobs
- Marriage, pregnancy
- Inefficiency, negligence or dereliction
- Pilferage, theft, dishonesty
- Criminal prosecution

#### 2. Avoidable causes

As the name suggests these are the reasons which management can eliminate by taking corrective action on a timely basis. The main causes in this category are:

- Lack of job satisfaction and poor working conditions
- No scope for further development due to lack of training facilities and on the job training
- Pay scales not in line with industry standards
- Relationship with colleagues or management is strained
- No scope for recreation and no medical benefits provided

All these avoidable causes can be eliminated almost totally by taking proper action. Open discussions with employees about their expectations from the job can help retain employees for a longer period.

### 7.5 Costs of labour turnover

A **high labour turnover** means a **high cost to the organisation**. The various costs associated with labour turnover are given below:

#### (a) Preventive costs

These costs are the costs incurred **to reduce the labour turnover**. They are spent on schemes which induce the employees to be in the organisation for a longer period. These costs include:

- Retirement benefit schemes such as pension schemes
- Welfare schemes for betterment of employees such as providing playschools for children of employees, low cost and subsidised canteens etc.
- Medical services / benefits
- Personal administration cost towards relationship-building

**(b) Replacement costs**

These are the costs which **arise due to high labour turnover**. They are incurred for recruiting and training labour. These costs are the loss arising due to wastages and low productivity of new labour force. These costs include:

- Extra cost incurred for training new employees when trained employees leave the organisation
- Profits lost due to new and untrained workers
- Costs incurred by the personnel department when recruitments are on the rise
- The cost of the break down of machines and tools when new workers are using them.
- The cost of greater scraps and waste generated as well as accidents caused due to new / partly-trained workers.



**Example**

Boomerang Plc is in the following position at the year end:

	<b>Tshs'000</b>
Sales	4,500,000
Variable cost	
Direct material	2,500,000
Direct labour	500,000
overheads	500,000
Fixed costs	450,000
Profit	550,000

The cost accountant of the company has studied the above profit position and has come to the conclusion that the profits were lower this year due to labour turnover. The total of the direct labour hours recorded was 91,000. Out of this:

Hours of permanent labour force	89,000
Trainees	2,000

Since the trainees were new, only half of the hours put in by them were productive. 5,000 hours were lost due to replacements.

Calculate the profit that is lost due to loss of production caused by labour turnover.

**Answer**

**(a) Calculation of productive labour hours:**

Productive hours of permanent workers	89,000
Productive hours of trainees	<u>1,000</u>
Total productive hours	90,000

The trainees were productive only for half of the hours put in; therefore productive hours will be  $2,000 / 2 = 1,000$  hours

The sales are given as Tshs4,500 million. Therefore the sales per productive direct labour hour will be  $Tshs4,500 \text{ million} / 90,000 \text{ hours} = Tshs50,000 \text{ per hour}$

**(b) Calculation of loss of potential sales due to lost hours:**

Lost hours	
For replacement	5,000
Trainees	<u>1,000</u>
Total hours lost	6,000

Loss of sales due to lost hours = Sales per direct labour hour x lost hours  
 =  $Tshs50,000 \times 6,000 \text{ hours}$   
 = Tshs300 million

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Therefore if the labour turnover had not occurred the sales would have been:  
 Tshs4,500 million + Tshs300 million = Tshs4,800 million

To calculate the lost profit due to the lost hours we will have to calculate the costs that would have been incurred for the lost hours in the same way we calculated the sales for the lost hours.

The direct labour cost for the lost hours will be calculated only for the hours lost due to replacement as these are the only hours which are lost in totality. The hours of trainees are actually spent in activity although the productivity is only 50%.

### Workings

#### W1 Cost of direct labour hours for hours lost

= (Total cost for actual hours / Actual hours recorded) x hours lost due to replacement  
 = (Tshs500 million / 91,000) x 5,000  
 = Tshs27,472,527 (rounded off)

#### W2 Material and variable overhead cost for lost hours

= (Total cost of material and overheads / Amount of total sales) x Amount of sales lost  
 = (Tshs3,000 million / Tshs4,500 million) x Tshs300 million  
 = Tshs200,000,000

Calculation of profit lost due to labour turnover:

		Tshs
A	Sales if labour turnover had not been there (Tshs4,500,000,000 + Tshs300,000,000)	4,800,000,000
B	<b>Less:</b> Direct labour cost	
	Existing                    500,000,000	
	Additional                27,472,527	527,472,527
C	Direct material and overhead cost	
	Existing                    3,000,000,000	
	Additional                200,000,000	3,200,000,000
	<b>Less:</b>	
D	Fixed cost (fixed cost will remain the same throughout the period)	450,000,000
E	Profit (A - B - C - D)	622,527,473
F	Actual profit	550,000,000
G	Profit lost (E - F)	72,527,473

Hence the labour turnover has reduced the profits by Tshs72,527,473. Labour turnover therefore needs to be reduced to the lowest possible level.

### SUMMARY



**8. Measure idle time.****[Learning Outcome k]****8.1 Idle time**

Idle time is a routine phenomenon experienced by almost all organisations.

**Definition**

Idle time payment represents wages paid for the unproductive time caused due **unavoidable circumstances** such as machine breakdowns, material shortage, poor production scheduling, time taken for lunch and coffee breaks, time taken for shifting from one task to another, etc.

Idle time is categorised as:

Normal idle time  
Abnormal idle time

- 1. Normal idle time:** refers to the wastage of productive time due to normal routine tasks such as time taken by an employee to reach his/her desk from the main gate, time spent in scheduling work, time spent in normal chatting, etc. This type of idle time is unavoidable. However, organisations make an attempt to keep it minimal.
- 2. Abnormal idle time:** refers to the wastage of productive time due to administrative causes such as electricity failure, poor quality material, poor planning, time lost due to strikes, time lost due to delay in getting materials, instructions or other resources, lack of coordination, etc. This type of idle time can be avoided. Since most of the reasons for idle time are controllable using better management techniques and closer supervision, management always tries to reduce this time as far as possible.

**Tip**

Abnormal idle time payment is usually not included in the production costs since it can be avoided and the actual production cost can be correctly calculated. This amount is separately shown in the costing profit or loss statement.

Reduction in idle time can be done by employing proper maintenance staff who will constantly monitor the working of machines and also undertake repairs when required. A proper scheduling of work will also help avoid a situation where there is a lack of work for the employees.

Idle time ratio is also useful to control the idle time.

$$\text{Idle time ratio} = \frac{\text{Idle hours}}{\text{Total hours}} \times 100$$

**Example**

Henry works for 2,400 hours per annum, out of which 400 hours are non-productive and treated as a normal idle time. Let us calculate the idle time ratio based on the formula given above.

$$\text{Idle time ratio} = \frac{\text{Idle hours}}{\text{Total hours}} \times 100 = \frac{400}{2,400} \times 100 = 16.67\%$$

If an employee's idle time goes beyond the predetermined standard; that time is referred to as abnormal idle time and s/he will not be paid for that.

**Test Yourself 13**

An employer will have to pay employees for idle time. State whether it is true or false, and give reasons to support your answer.

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### Answers to Test Yourself

#### Answer to TY 1

The correct option is **A**.

Direct labour cost is physically traceable to the finished product or service and hence directly charged to that product or service. It forms part of the prime cost. The overhead costs which are general in nature and spent across all the departments are allocated using a suitable basis.

Indirect labour cost does not alter the construction, conformation or composition of the product but it contributes to such work and to the completion of the product. It forms part of factory overhead.

#### Answer to TY 2

- (a) **Advertising** their vacant positions;
- (b) Using **employment and recruiting agencies**;
- (c) **Visiting colleges and universities** and
- (d) Asking for **referrals from employees, customers, suppliers**.

#### Answer to TY 3

The output produced by Henna is 110 units, which is above normal. The efficiency level of Henna is  $110 / 90 \times 100 = 122.22\%$ . She is therefore entitled to a Tshs12,000 hourly rate according to the company rules.

The wages of Henna will be calculated as  
(Time rate x hours per week) = (Tshs12,000 x 40 hours per week) = **Tshs480,000**

#### Answer to TY 4

The correct option is **A**.

Under a time-based system workmen are paid on the basis of time spent on the work and not on the basis of their output. Workers are not worried about the volume of output and hence they focus on quality.

#### Answer to TY 5

The correct option is **B**.

The basis for payment of wages to a worker under the piecework system is the number of units produced by him. It induces the workers to increase production. The more a worker produces, the higher the wages he receives.

#### Answer to TY 6

The output of Andrew is 70 units. This output is  $(70 / 80 \times 100) = 87.5\%$  of the normal output. 75% of the normal output is 60 units. The output above 75% is  $70 - 60 = 10$  units.

Therefore he will get wages:  
= Output up to 75% efficiency level x Normal wages + Output above 75% x Additional rate  
=  $60 \times \text{Tshs}2,000 + 10 \times \text{Tshs}3,000$   
= **Tshs150,000**

#### Answer to TY 7

The correct option is **A**.

If an organisation is blindly focusing on productivity, it may lose employee morale. Trained and skilled employees may look for other opportunities and leave the organisation.

All other factors are motivational factors.

**Answer to TY 8**

The correct option is **B**.

The wages control a/c is just a temporary account. Eventually the balance of the account is nullified. The balance in the account is transferred to other accounts and this means that it cannot go on increasing day by day. The balance in the account does decrease but the appropriate answer is that it gets nullified.

The balance in the account cannot remain the same throughout the activity period as it is constantly charged with wages incurred and reduces as they are transferred to other accounts.

**Answer to TY 9**

The correct option is **D**.

The cost of indirect labour hours worked for different departments say production, selling, distribution etc. is absorbed on a suitable basis.

The indirect cost calculated this way is then charged to the overhead control a/c and the wages control a/c gets nullified. Direct labour is charged to the work in progress account.

**Answer to TY 10**

The correct option is **B**.

The indirect labour cost is allocated to output on some suitable basis such as a percentage of the direct labour hours. Only direct and traceable costs are charged directly to the products.

Direct allocation is applied to departments and not to products and therefore this option is wrong.

**Answer to TY 11**

Gross earnings = Regular pay + Overtime pay  
 = (40 hours x Tshs8,000,000) + (3 hours x Tshs8,000,000 x 2 times)  
 = Tshs320,000,000 + Tshs48,000,000  
 = **Tshs368,000,000**

Net earnings = Gross earnings – (PAYE + Employee’s national insurance contributions)  
 = Tshs368,000,000 – (Tshs128,800,000 + Tshs36,800,000)  
 = Tshs368,000,000 - Tshs165,600,000  
 = **Tshs202,400,000**

**Answer to TY 12**

The correct option is **B**.

The personnel department maintains personal records of employees and the production planning department handles tasks related to job orders and work schedules.

**Answer to TY 13**

The correct option is **C**.

The labour capacity ratio signifies the percentage of time the employees are engaged in work compared to the total number of hours budgeted for them. The formula for it is:

$$\text{Labour capacity} = \frac{\text{Actual hours worked}}{\text{Budgeted hours of input}} \times 100$$

**Answer to TY 14**

Employers will have to pay employees for the idle / unproductive time if it is caused due to **unavoidable circumstances**.



## 178: Accounting for Materials, Labour and Overheads

### Self Examination Questions

#### Question 1

The wages of a worker looking after the maintenance of a machine is an example of:

- A Machine cost
- B Indirect labour cost
- C Labour maintenance cost
- D Direct labour cost

#### Question 2

Direct labour cost is allocated and apportioned to the product, process or job on some suitable basis.

- A True
- B False

#### Question 3

All the expenses of salaries and wages (direct + indirect) are first debited to the:

- A Work in progress a/c
- B General ledger adjustment a/c
- C Wages control a/c
- D Cash/bank a/c

#### Question 4

Idle time can be raised by:

- (i) Machine breakdown
- (ii) Time spent by employees due to scarce materials
- (iii) Working below the agreed productivity level
- (iv) Waiting for completion of previous procedure

- A Only (i) is true
- B All options are correct
- C None of the above are correct
- D (i), (iii) and (iv) are correct

#### Question 5

Diana worked for 40 hours during the week. She produced 40 articles in that week. The wage rate per article is Tshs1,000. She earned Tshs40,000 at the end of the week. What is her remuneration method?

- A Time-based system
- B Individual incentive scheme
- C Individual bonus scheme
- D Piecework system

#### Question 6

The system of combination of time and piece rate has the same deficiencies as those of a time-based system and piecework system.

- A True
- B False

#### Question 7

Performance standards should be established on the basis of careful studies for implementation of individual incentive schemes.

- A True
- B False

**Question 8**

Plaza Plc has 50 workers in its production department. The standard wage per hour is Tshs10,000. The company has a piecework system of remuneration. It operates for 20 days per month. There are eight working hours per day. Overtime pay is 50% more than original pay. The company has a spare capacity of 20%. If Plaza Plc employed an additional 20 labourers on a temporary basis (with a view to utilising spare capacity), its wage expenses would:

- A Increase because of extra labour
- B Increase because of utilisation of spare capacity
- C Increase proportionally
- D Affect overtime pay

**Question 9**

Sharon Plc operates a piecework system of remuneration, and guarantees its employees 90% of a time-based rate of pay. For nine working hours per day, the pay is Tshs20,000 per hour. The standard time allowed per unit of output is half an hour. Piecework is paid at the rate of Tshs15,000 per standard hour. If an employee produces 500 units in nine hours on a particular day, what is the employee's gross pay for that day?

- A Tshs3,375,000
- B Tshs4,500,000
- C Tshs5,000,000
- D Tshs3,750,000

**Question 10**

A company manufactures a single product at the rate of 25 units per direct labour hour. 660 direct labour hours were budgeted to be worked in a period during which 640 hours were actually worked and 16,390 units were manufactured.

**Required:**

Calculate the following ratios for the period:

- (a) Efficiency;
- (b) Capacity;
- (c) Production volume

**Question 11**

The following are the particulars for June 2012 relating to two employees working in the Boiling department of Byaro Manufacturing Company exclusively for job No. M220.

Name	Designation	Wage (Tshs)
Sharo	Machine Operator	800,000 per month
Aisha	Mechanic	20,000 per day

The normal working hours per week consisting of six days are 48 at 8 hours a day. Sundays are paid holidays (there were no other holidays during the month).

**Additional information:**

- Social Security Fund (SSF) contribution was 10% of monthly wages by employers.
- SSF contribution was 10% of monthly wages by employees.
- National Health Insurance (NHI) contribution was 5% of monthly wages by employers.
- NHI contribution was 3% of monthly wages by employees.
- Pay as You Earn (PAYE) tax of 20% on basic wage was deducted.

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### Required:

From the above data:

(a) Prepare the Payroll for June 2012 to show:

- (i) Total Net Wages Paid
- (ii) Total PAYE for the month
- (iii) Total Employees SSF contribution for the month
- (iv) Total Employees NHI contribution for the month
- (v) Total Wage

(b) Calculate:

- (i) Total NHI contributions to be remitted by the employer
- (ii) Total SSF contributions to be remitted by the employer
- (iii) Total PAYE to be remitted by the employer.

### Answers to Self Examination Questions

#### Answer to SEQ 1

The correct option is **B**.

Any labour cost which is not directly incurred or cannot be readily chargeable or identifiable with a specific job, contract, work order or any other unit of cost is termed an indirect labour cost. The machine cost is the cost of producing machines and forms a part of the non-current asset cost. The labour maintenance cost is not a part of the machine maintenance cost. The direct labour cost is the cost of the efforts to produce the product.

#### Answer to SEQ 2

The correct option is **B**.

The input direct labour cost is charged directly to the product, process or job on an hourly basis or per unit basis. Allocation and apportionment arises in the case of overhead costs.

#### Answer to SEQ 3

The correct option is **C**.

All the expenses of salaries and wages (direct + indirect) are first debited to the wages control a/c and the corresponding credit is made to the general ledger adjustment a/c or the cash and bank a/c.

#### Answer to SEQ 4

The correct option is **B**.

All are factors that cause idle time.

#### Answer to SEQ 5

The correct option is **D**.

A piecework system pays employees by output. Diana earned on the basis of a piece rate system (Tshs1,000 x 40 units = Tshs40,000). The time rate is not given in the question.

#### Answer to SEQ 6

The correct option is **B**.

The combination of a time and piece rate system tries to overcome the deficiencies of a time-based system and a piecework system. Under these systems of wage payment, the worker is generally guaranteed a minimum time wage for the hours worked and an additional amount if the worker exceeds standards.

**Answer to SEQ 7**

The correct option is **A**.

Individual incentive schemes pay incentives to each worker depending upon the quantity and quality of his work. The standards are first set and then an incentive is paid for performance above these standards.

**Answer to SEQ 8**

The correct option is **A**.

There would be an increase in the total cost of labour as a result of additional labour being employed on a temporary basis.

**Answer to SEQ 9**

The correct option is **D**.

According to piecework,

$$\begin{aligned} \text{Wages} &= \text{Production units} \times \text{Standard time production per unit} \times \text{Standard pay per hour} \\ &= 500 \text{ units} \times 0.5 \text{ hour} \times \text{Tshs}15,000 \\ &= \text{Tshs}3,750,000 \end{aligned}$$

**Answer to SEQ 10**

$$\text{Standard hours of actual output} = \frac{16,390}{25} = 655.6 \text{ hours}$$

**(a) Labour efficiency ratio**

$$\begin{aligned} \text{Labour efficiency ratio} &= \frac{\text{Standard hours of actual output}}{\text{Actual hours worked}} \times 100 \\ &= \frac{655.6}{640} \times 100 \\ &= 102.4\% \end{aligned}$$

**(b) Labour Capacity ratio**

$$\begin{aligned} \text{Labour capacity ratio} &= \frac{\text{Actual hours worked}}{\text{Budgeted hours of input}} \times 100 \\ &= \frac{640}{660} \times 100 \\ &= 97\% \end{aligned}$$

**(c) Production volume ratio**

$$\begin{aligned} \text{Production volume ratio} &= \frac{\text{Standard hours of actual output}}{\text{Budgeted hours of output}} \times 100 \\ &= \frac{655.6}{660} \times 100 \\ &= 99.3\% \end{aligned}$$

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**Answer to SEQ 11**

**(a) Payroll for June 2012**

	Sharo		Aisha		Total	
	Tshs	Tshs	Tshs	Tshs	Tshs	Tshs
Gross monthly wages / Total wages Sharo (given) Aisha (20,000 x 30 days of June 2012)		800,000		600,000		1,400,000
<b>Less: Deductions</b>						
PAYE (20% of the basic wage)	160,000		120,000		280,000	
Social security fund by employees (10% of monthly wages)	80,000		60,000		140,000	
NHI contribution by employees (3% of monthly wages)	24,000	264,000	18,000	198,000	42,000	462,000
<b>Net monthly wages earned by employees</b>		<b>536,000</b>		<b>402,000</b>		<b>938,000</b>

**(b) Other calculations**

**Total NHI contributions to be paid by the employer**

	Sharo	Aisha	Total
	Tshs	Tshs	Tshs
NHI contributions by employer (5% x Monthly wages)	40,000	30,000	70,000
NHI contributions by employees (3% x Monthly wages)	24,000	18,000	42,000
	<b>64,000</b>	<b>48,000</b>	<b>112,000</b>

**Total SSF contributions to be paid by the employer**

	Sharo	Aisha	Total
	Tshs	Tshs	Tshs
SSF contributions by employer (10% x Monthly wages)	80,000	60,000	140,000
SSF contributions by employees (10% x Monthly wages)	80,000	60,000	140,000
	<b>160,000</b>	<b>120,000</b>	<b>280,000</b>

**Total PAYE to be paid by the employer**

	Sharo	Aisha	Total
	Tshs	Tshs	Tshs
PAYE (20% on basic wages)	160,000	120,000	280,000

## STUDY GUIDE B3: OVERHEADS ALLOCATION AND APPORTIONMENT - PRIMARY DISTRIBUTION

### Get Through Intro

In the manufacture of any product, incurring indirect costs is as inevitable as incurring direct costs. While preparing cookies, the dough and the labour of the baker are as essential as is the electricity (consumed by the oven), which is not a direct ingredient in cookies, but is indispensable for baking the cookies. You would not pay much for uncooked cookies!

Hence assigning indirect costs to the final product is as important as charging the direct costs. Indirect costs are known as overheads.

This Study Guide explains various methods of accurately assigning the overheads to the final products.

### Learning Outcomes

- a) Define overhead.
- b) Classify overheads into fixed and variable overheads.
- c) Allocate overheads using various methods.
- d) Define overhead apportionment and cost centres.
- e) State bases used to apportion overheads to all cost centres.

**1. Define overhead. Classify overheads into fixed and variable overheads.** **[Learning Outcomes a and b]**

Direct costs i.e. direct material, direct labour and direct expenses are those that can be easily traced to the physical units produced. On the contrary, by their very nature, indirect (overhead) costs cannot be specifically traced to physical units produced. However, the making of goods would be impossible without incurring such overhead costs.



**Example**

In the production of an exercise book, the amount of paper used can be easily traced to the product from the material requisitions. The cost of paper is hence a traceable cost. The machine that is used to bind the exercise book undergoes wear and tear each day. The depreciation of the machine is also a cost involved in the manufacture of notebooks. This cost however, cannot be easily traced to the product. Therefore this will be an indirect (overhead) cost of the product.

**Overhead (i.e. indirect) costs include** depreciation, fuel, heating, lighting, material handling, repairs, property taxes, **cost of services facilitating the day to day operations etc. that are essential for any production activity.** Since these costs are not easily traceable to the products, they need to be assigned to the products on a suitable, pre-determined basis.

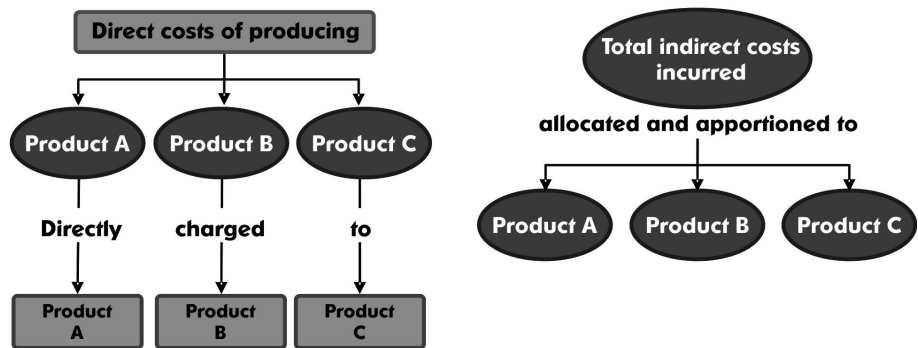
The rates for assigning the indirect costs to the products are determined on the basis of the budgeted figures that are calculated at the start of an accounting period. This assignment of the indirect costs to the products is known as the allocation and apportionment of overheads, which we will learn in Learning Outcome 3.



**Example**

Considering the above example of producing an exercise book, the paper cost (the direct material cost) will be directly charged to the product; the printed material or book. The depreciation of the printing machine will be assigned to the book using a suitable basis.

**Diagram 1: Treatment of direct and indirect costs**



According to their function and on the basis of their origin, overheads are classified as:

1. Production, manufacturing, or factory overheads
2. Non-manufacturing overheads:
  - (a) Administrative overheads
  - (b) Selling and distribution overheads
  - (c) Research and development overheads

**Fixed and variable overheads**

The abovementioned overheads can be further classified as fixed and variable overheads based on their behaviour.

The classification of costs into fixed and variable elements are discussed in Study Guide A3, Learning Outcome 6

## 2. Allocate overheads using various methods. Define overhead apportionment and cost centres.

[Learning Outcomes c and d]

There are two types of cost centres where overheads are incurred: the **production cost centre** and the **service cost centre**. The actual processing and manufacture of the product takes place in the production cost centre whereas service cost centres provide services to the production cost centres.

The **first stage** is where the accumulation of overheads occurs, according to the department. The total overheads are allocated and apportioned to the production and service cost centres. Thereafter, in the **second stage**, these costs are applied to the products that are processed in these cost centres.

The overhead costs are collected from various records such as financial accounts, cost records and so on.

Costs are accumulated for each cost centre. The costs are either allocated or apportioned to the cost centres. Whenever the overhead costs can be **assigned** to the cost centres **on an accurate basis**, the costs are **allocated** to the cost centres. Allocation is performed only when we can precisely assign the costs to a cost centre.

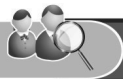


### Example

Large organisations provide canteen facilities for their employees. If the organisation has a system of coupons against which food is served, then the costs of the canteen can be allocated to the various departments / cost centres on the basis of the coupons submitted by the workers in each department.

This is a case of allocation of canteen costs as we have an accurate basis on which to allocate the costs. Coupons are an accurate basis as each coupon has a value that can give us a clear idea of the cost of food consumed by each department.

**Apportionment of costs** to the cost centres is performed when we do not have a precise basis to assign the overheads to the cost centres. In this case we generally apportion the costs using the most suitable basis available.



### Example

Consider the canteen example above. If the organisation does not have a coupon system, then it will not be in a position to accurately calculate the cost of food consumed by each department. In this case, we will take the most suitable basis for assigning the canteen costs to various departments. We will take the number of people in each department as the basis to assign the canteen costs to each department.

The method of apportionment of costs is used when the basis is not accurate. This is the most suitable method available that can give us reasonable assurance that the costs are not apportioned wrongly.



### Tip

**Cost allocation** refers to the charging of identifiable /traceable indirect cost items to either cost centres or cost units. **Cost apportionment** involves division of costs amongst two or more cost centres or cost units in proportion of the expected benefit gained.

Allocation and apportionment of overheads assigns the entire overheads to production and service cost centres.

We still need to re-distribute the service cost centre overheads to the production cost centres. This is because service centres provide services to the production cost centres. Hence the production cost centres have to bear the cost of these services. This is called **re-apportionment of overheads**, since the overheads once apportioned to the service cost centres are again re-apportioned to the production cost centres in this stage.





**Example**

In a factory which makes plastic goods, the production department is involved in the actual moulding and finishing of the plastic goods. The stores department does the work of receiving material requisitions and satisfying them. This is a service provided by the stores department to the production department.

If, in the first stage of apportionment, the stores department is apportioned a Tshs400,000 electricity cost then this cost will be again re-apportioned on a suitable basis to the production department. One may take as a basis the number of requisitions received from the production department.

---

**Calculation of overhead absorption rates**

Once the apportionment and the re-apportionment of the overheads are complete in the first stage, all the overheads are allocated and apportioned to the production departments. These are now to be assigned to the products. This is the stage where **the overhead absorption rates are calculated**.

Once we have the pool of overheads allocated and apportioned to the production departments, we need to divide these by the total number of a suitable unit. The most commonly used unit is a machine hour or a labour hour.

The above procedure provides us with the rate per machine hour / labour hour (or any other unit used). When this rate is multiplied by the number of machine hours or labour hours consumed by each product, the amount of overheads to be assigned to each product is obtained.



**Example**

Suppose the total machine maintenance cost allocated to a production department is Tshs120 million and the machine hours recorded in the department are 6,000. The machine maintenance will be assigned to the products on the basis of machine hours required per product as this is the most suitable basis.

The overhead absorption rate will be calculated as = Tshs120 million/6,000 machine hours  
= Tshs20,000 per machine hour.

If one unit of a product processed requires 5 machine hours then the overheads to be assigned to the product will be calculated as

Overhead absorption rate x number of machine hours consumed by the product  
= Tshs20,000 x 5 hours  
= Tshs100,000

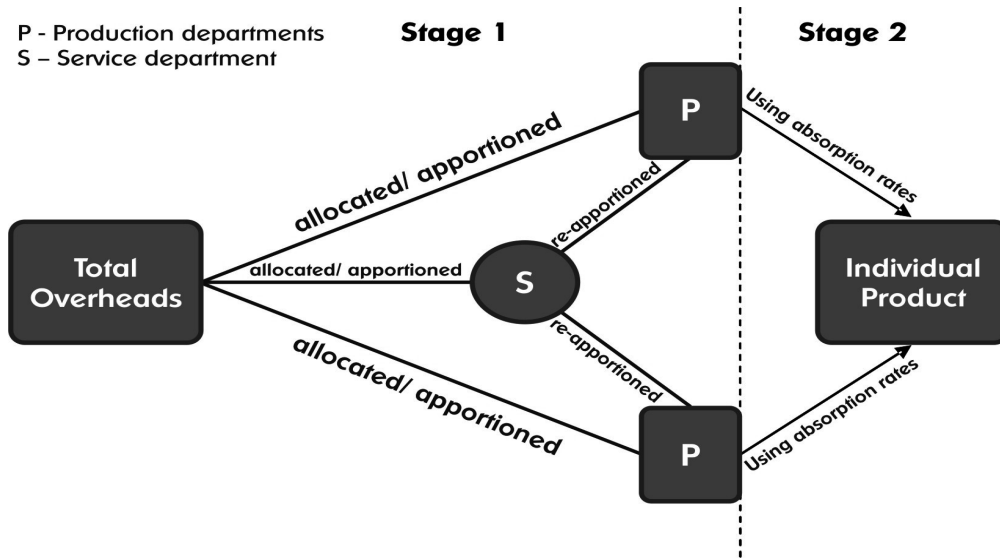
In conclusion, the amount of overheads assigned to the product will be Tshs100,000. This represents all the indirect costs which have gone into making that product.

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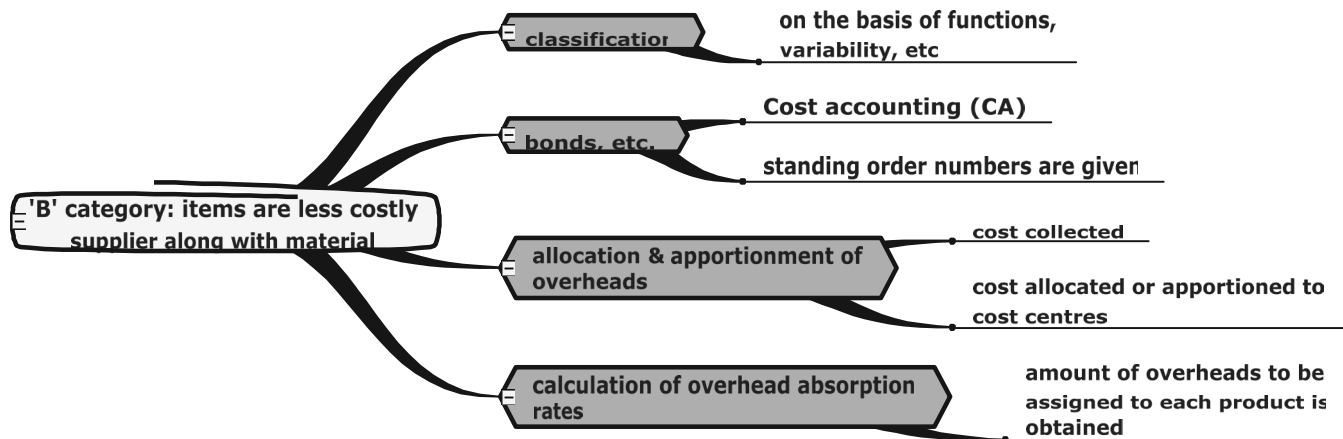
The detailed procedure for determining the **individual rates of absorption of overheads** for each department can be summarised as follows:

- (a) Allocate and apportion the total amount of overhead expenses incurred to the production and service cost centres.
- (b) Reapportion the service cost centre overheads to the production cost centres.
- (c) Calculate separate overhead rates for each production cost centre.
- (d) Assign cost-centre overheads to products.

Diagram 2: Allocation, apportionment and absorption of overheads



**SUMMARY**



**Test Yourself 1**

Assuming the total machine maintenance cost incurred and allocated to a production department as Tshs36 million and Tshs48 million respectively, and the recorded machine hours in that department as 12,000, calculate the overhead absorption rate.

- A Tshs4,000
- B Tshs2,500
- C Tshs3,000
- D Tshs3,333

**3. State bases used to apportion overheads to all cost centres.**

[Learning Outcome e]

The above Learning Outcome explained that the allocation and apportionment of overheads depends on whether there is an accurate basis available for assigning the overheads.

**3.1 Allocation of overheads**

**Assigning specific overheads** to a production/service cost centre or cost unit **on an appropriate basis** is known as the **allocation** of overheads.

When costs can be easily identified with a particular cost centre they are allocated to the cost centre.



### Example

The cost of tools issued to the maintenance department will be an overhead cost as these are not direct material items but items of indirect material. This is a specific cost that can be identified only with the maintenance department and hence this cost will be allocated to the maintenance department.

---

When **specific overheads** are incurred for a particular cost centre, those overheads are allocated to it.



### Example

A special repair cost is incurred in the machine shop (a cost centre where part processing of the product takes place) due to break down of a machine in the shop. This cost is incurred only in the machine shop and hence this overhead will be allocated only to the machine shop.

---

Allocation of **common costs** or **general overheads** becomes difficult at times as the basis for allocation is imprecise or arbitrary. In such cases, computation of the exact amount of overheads to be allocated to a cost centre becomes difficult. These can only be allocated to cost centres using an appropriate basis.



### Example

In a big manufacturing unit that requires a continuous supply of electricity, the electricity is normally generated in-house. This ensures an uninterrupted supply of electricity. In this case, electricity generation is a secondary activity to the main production activity and hence the cost incurred on this activity will be an overhead cost.

To keep track of the electricity consumption by each department, sub-meters are fitted in each of the departments. The electricity cost, in this case, will be assigned to each department on the basis of the sub-meter readings. Here the allocation of electricity cost is done as the basis of assigning this cost is accurate.

---

Overheads are always allocated to cost centres. When an organisation is divided into various departments according to their function, it may happen that such division is not suitable for cost allocation. Typically, cost centres are departments, but in some instances a department may contain several cost centres. This helps in the assignment of costs.



### Example

An organisation is divided into various departments, one of which is the production department. This department consists of three machines; the melting machine, the moulding machine and the finishing machine. The overheads incurred on each machine can be separately identified.

For costing purposes, instead of considering the entire production department as one single cost centre, we will consider each of the three machines installed as individual cost centres.

---

## 3.2 Apportionment of overheads

Certain costs cannot be traced to a particular cost unit or cost centre. Apportionment refers to the proportionate allotment of such overheads to two or more departments or cost centres on an equitable (most suitable) basis. This is done in the case of those overheads which cannot be wholly allocated to a particular department or cost centre.



### Example

Consider the above example of the 'in-house electricity generation unit'. If the sub-meters are not fitted in each department then it can pose a problem for the allocation of the electricity costs to the departments.

In this case we will use the most appropriate basis, such as the light points in each department. This will give us a fair amount of accuracy. As the capacity of each light point or power point is given in kilowatts this gives us a nearly accurate estimation of the power consumption in each department. This will now be a case of apportionment of overheads and not allocation.

---

Although the basis used in the above example does not seem to be accurate we still use it as it gives a greater accuracy than any other basis. It can be argued that all the light points are not in use at all times. However, apportionment is to assign overheads to the departments using a somewhat arbitrary basis as no accurate basis is available.

 **Example**

The salary of a cleaner (for all departments) is a common cost incurred by all departments. In this case, we do not have any precise basis on which we can assign this cost accurately to the various cost centres. We will therefore take the most suitable basis such as the floor area of each department / cost centre.

This will give a fairly accurate cost apportionment. The larger the area of the department, the greater is the amount of cost apportioned. This is because the cleaner will need more time and effort to clean the department.

The main difference between cost allocation and cost apportionment is that allocation is the tracing of the whole of a cost to a cost centre while apportionment is the distribution of common costs over the cost centres on some suitable basis. In other words, cost allocation is direct, but apportionment needs a suitable basis.

**3.3 Selection of an appropriate basis**

The selection of an appropriate basis for the apportionment of overheads to cost centres is a critical decision. If the basis is not reasonable, it might lead to over- or under-assignment of overheads to the products. One of the criteria is to apportion the overheads on the basis of the benefit received by the department.

 **Example**

The salary of the supervisor supervising more than one department/cost centre will be apportioned on the basis of the time spent by him in each department. This is a fair basis as he gets paid on the basis of the hours of work completed by him. In this case, each department should bear the supervision costs in the ratio of the time spent by the supervisor in each department.

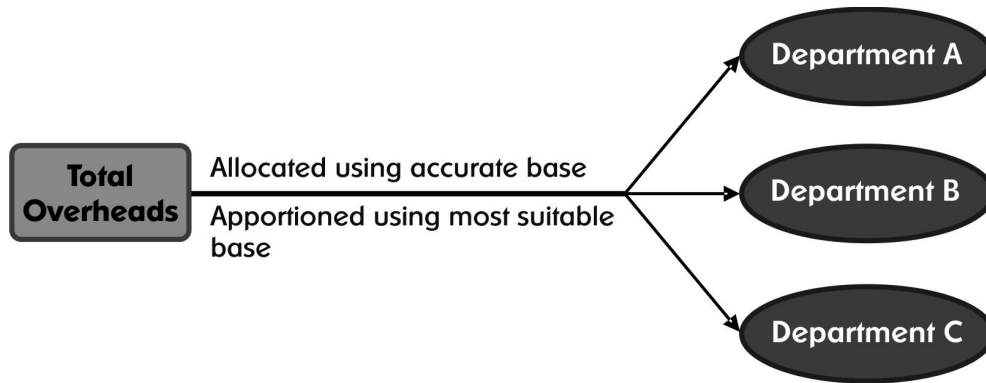
One may also apportion the overheads on the basis of the factor that is the most responsible for the costs incurred.

The commonly used bases for the apportionment of overhead costs to the cost centres are:

	<b>Overhead cost</b>	<b>Basis of distribution</b>
1	All labour related expenses e.g. time keeping, expenses, staff welfare expenses, canteen expenses and indirect labour	Number of employees or wages paid for each department. Direct labour hours are used as a basis for indirect labour
2	Lighting costs	Number of light points, floor space area occupied
3	Supervising costs	Time spent in each department or number of employees in the department
4	Rent, rates and property taxes, heat, light, air conditioning	Area occupied
5	Depreciation of plant and machinery	Capital value / book value of the machinery or plant will form the basis to apportion depreciation to the machine
7	Advertisement	Advertisement is apportioned to products as a percentage of sales value because advertisement expenses are incurred for the purpose of sale of the products

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**Diagram 3: Apportionment of overheads**



Let us consider the following numerical problem to learn the apportionment of the overheads to various departments of the organisation.



**Example**

Genilia Plc has incurred the following overhead costs during 20X3.

	Tshs'000
Factory rent	20,000
Depreciation on factory building	10,000
Canteen expenses	5,000
Lighting	10,000

The following information relates to the production and service department.

	Production departments		Service departments	
	Dept A	Dept B	Dept X	Dept Y
Floor area occupied (square metres)	3	4	2	1
Number of employees	30	40	25	5

In this case the overheads cannot be identified specifically with a cost centre for allocation and therefore need to be apportioned. The manner of apportionment of the overheads is given below.

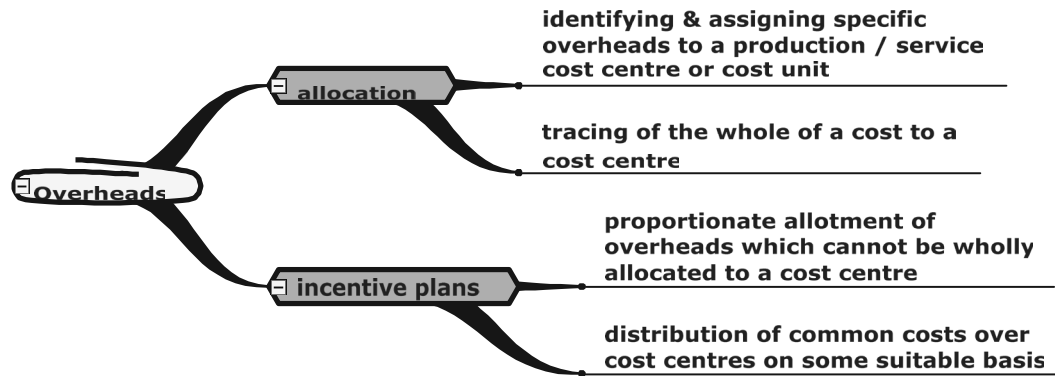
	Basis of apportionment	Total cost (Tshs'000)	Production department		Service department	
			A (Tshs'000)	B (Tshs'000)	X (Tshs'000)	Y (Tshs'000)
Factory rent	Floor area	20,000	6,000	8,000	4,000	2,000
Depreciation on factory building	Floor area	10,000	3,000	4,000	2,000	1,000
Canteen expenses	Number of employees	5,000	1,500	2,000	1,250	250
Lighting	Floor area	10,000	3,000	4,000	2,000	1,000
<b>Total</b>		<b>45,000</b>	<b>13,500</b>	<b>18,000</b>	<b>9,250</b>	<b>4,250</b>

**Workings**

**W1 Proportion to allocate costs using the suitable cost unit**

	Total	Dept A	Dept B	Dept X	Dept Y
Floor area	$3 + 4 + 2 + 1 = 10$	3/10	4/10	2/10	1/10
Number of employees	$30 + 40 + 25 + 5 = 100$	30/100	40/100	25/100	5/100

**SUMMARY**



**Test Yourself 2**

The overhead expenses which are incurred only in a specific department are:

- A Allocated first to the product and then to the department in which the product is processed.
- B Allocated directly to that department.
- C Allocated to the service cost centres which offer the service.
- D Allocated to all the departments equally.



**Test Yourself 3**

Show the apportionment of the following costs:

**Costs at the end of the year**

	Tshs'000
<b>Fixed costs</b>	
Rent and rates	4,000
Insurance	20,000
Depreciation on plant and machinery	25,000
General department expenses	37,500
<b>Variable costs</b>	
Indirect wages Fuel and power	15,000
Maintenance expenses	20,000
	10,000

**Additional cost related data (Amounts in Tshs'000)**

	Department A	Department B	Department C	Department D	Total
Floor area (sq.ft.)	2,000	2,000	4,000	2,000	10,000
Cost of plant and machinery	100,000	250,000	50,000	100,000	500,000
Horsepower	16	24	20	20	80
Labour hours	5,000	10,000	15,000	20,000	50,000
Machine hours	12,000	9,000	6,000	3,000	30,000
Direct expenses	25,000	25,000	20,000	5,000	75,000
Direct wages	30,000	30,000	26,000	15,000	101,000
Direct materials	27,000	19,500	15,500	-	62,000

Department D is a service department and all other departments are production departments

## 192: Accounting for Materials, Labour and Overheads

### Answers to Test Yourself

#### Answer to TY 1

The correct option is A.

The overhead absorption rate = Tshs48 million/12,000 machine hours  
= Tshs4,000 per machine hour.

#### Answer to TY 2

The correct option is B.

When the expenses are incurred only for a specific department, these can be easily identified with that department and hence can be allocated directly to that department. Overheads cannot be identified with a specific unit of product and hence cannot be allocated directly to products.

Overheads are never allocated to the service cost centres which offer the service but are allocated to the cost centres that use the service. Overheads incurred only in a specific department cannot be allocated to any other department.

#### Answer to TY 3

Analysis of distribution of actual overhead costs

(Amounts in Tshs'000)

Expenses	Basis of apportionment	Dept. A	Dept. B	Dept. C	Dept. D	Total expenses
<b>Fixed costs</b>						
Rent and rates	Floor area	800	800	1,600	800	4,000
Insurance	Cost of plant and machinery	4,000	10,000	2,000	4,000	20,000
Depreciation on plant and machinery	Cost of plant and machinery	5,000	12,500	2,500	5,000	25,000
General department expenses	Direct expenses	12,500	12,500	10,000	2,500	37,500
<b>Variable costs</b>						
Indirect wages Fuel and power	Labour hours	1,500	3,000	4,500	6,000	15,000
Maintenance expenses	Horsepower	4,000	6,000	5,000	5,000	20,000
	Machine hours	4,000	3,000	2,000	1,000	10,000
<b>Total expenses</b>		<b>31,800</b>	<b>47,800</b>	<b>27,600</b>	<b>24,300</b>	<b>131,500</b>

### Self Examination Questions

#### Question 1

Swing Inc is the manufacturer of sports bikes. The following overheads / materials have been used in the organisation. Classify the materials / overheads as direct or indirect.

Materials	Direct	Indirect
Plastic		
Glue		
Stationery		
Metal		
Lubricant		
Tyres		
Battery		

**Question 2**

Ace Ltd has three production departments and two service departments. The expenses for these departments as per primary distribution summary are as follows:

<b>Production departments</b>	<b>Tshs'000</b>	<b>Tshs'000</b>
A	6,000	
B	5,200	
C	4,800	16,000
<b>Service departments</b>		
Stores	800	
Time-keeping & Accounts	600	1,400

**Additional information:**

	<b>Dept A</b>	<b>Dept B</b>	<b>Dept C</b>
Number of workers	16	12	12
Value of stores requisition (Tshs'000)	5,000	3,000	2,000

Apportion the costs of service departments over the production departments.

**Answers to Self Examination Question**

**Answer 1**

<b>Materials</b>	<b>Direct</b>	<b>Indirect</b>
Plastic	✓	
Glue		✓
Stationery		✓
Metal	✓	
Lubricant	✓	
Tyres	✓	
Battery	✓	

**Answer 2**

**Overhead distribution statement**

<b>Item of cost</b>	<b>Basis of apportionment</b>	<b>Total (Tshs'000)</b>	<b>Dept A</b>	<b>Dept B</b>	<b>Dept C</b>
Cost as per primary distribution	-	16,000	6,000	5,200	4,800
Stores	Value of stores requisition (5:3:2)	800	400	240	160
Time keeping & accounts	Number of workers (4:3:3)	600	240	180	180
<b>Total</b>		<b>17,400</b>	<b>6,640</b>	<b>5,620</b>	<b>5,140</b>





## STUDY GUIDE B4: OVERHEADS ALLOCATION AND APPORTIONMENT - SECONDARY DISTRIBUTION

### Get Through Intro

Assigning indirect costs to the final product is as important as charging the direct costs. Indirect costs are known as overheads. In other words, overheads are all the indirect costs (material, labour and expenses) which are not directly identifiable with a product or service.

Overheads can be classified according to their function as follows:

- Production overheads
- Administration overheads
- Selling and distribution overheads

There are three steps involved in calculating the costs of overheads to be charged to cost units – allocation, apportionment and absorption. This Study Guide explains various methods of apportioning manufacturing overheads of service cost centres to production cost centres.

### Learning Outcomes

- a) State types of cost centres.
- b) Apportion overheads to all cost centres (production and service cost centres) = primary distribution / apportionment.
- c) State types of service cost centres (secondary distribution / appointment.
- d) Apportion manufacturing overheads of service cost centres to production cost centres, by using the following methods:
  - i. The direct (crude) method
  - ii. The step-down / The specific order of closing
  - iii. The repeated distribution / continuous allotment (among all departments)
  - iv. The modified repeated distribution method (starting distribution among the service cost centres)
  - v. The simultaneous equation / algebraic or mathematical) method

**1. State types of cost centres.**

[Learning Outcome a]

**1.1 Definition of cost centre**



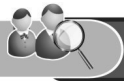
**Definition**

**Cost centre** is a location, area or group for which costs are accumulated.

**1.2 Types of cost centres**

As stated in Study Guide B3, there are two main types of cost centres, namely, **production cost centre** and **service cost centre**

A production cost centre is a cost centre that is essentially involved in the production of products. A service cost centre on the contrary is involved in providing support services to production department.



**Example**

In a shoe manufacturing company production cost centre will be the shoe cutting, finishing or moulding department. Service cost centre will be the repair and maintenance department that provides services of tools and machine maintenance to the production department.

Costs are always accumulated in these cost centres first and then charged to the products that pass through these cost centres.

The division of the entire organisation into various production and service cost centres enables easy accumulation and charging of costs to products. Costs are incurred in each of these departments but it is not essential that the product passes through each of these cost centres.

A product is never processed in a service cost centre or even overhead costs like electricity and fuel are not consumed by each product, but these need to be charged to the products to arrive at the total cost of production.

**2. Apportion overheads to all cost centres (production and service cost centres) = primary distribution / apportionment.**

[Learning Outcome b]

Primary distribution of overheads refers to the systematic allocation and apportionment of overhead expenses among production cost centres and service cost centres of an organisation. It is a process involving the allocation of directly identifiable overheads to the specific department and allocation of common overheads on the appropriate basis.

While doing primary distribution of overheads, it is significant to note that the **direct costs of the service departments should be considered as overheads**. Hence the direct material, direct labour and direct expenses of the service departments are allocated directly and recorded in the primary distribution since they are regarded as overheads from the production point of view.

However, direct materials, direct labour and direct expenses of the production departments need not to be included in this primary distribution since they are not regarded as overheads.

This is explained in detail in Study Guide B3.



**Test Yourself 1**

Which of the following is a commonly used base for the apportionment of supervision costs to the cost centres?

- A Number of employees or wages paid for each department
- B Area occupied
- C Time spent in each department
- D Sales volume

**3. State types of service cost centres (secondary distribution / appointment).****[Learning Outcome c]****3.1 Definition of service cost centre****Definition**

A service cost centre refers to a cost centre wherein there is no involvement of any direct costs. These cost centres are auxiliary in nature and work towards ensuring that the production cost centres (primary cost centres) function smoothly and efficiently.

**3.2 Types of service cost centres**

Following are some of the service cost centres (service departments):

**1. General administration**

The administration department serves a purely support function. Its main purpose is to ensure that the overall day to day functioning of the organisation goes smoothly. It does this by ensuring that:

- (a) All departments have the necessary infrastructure and resources they need;
- (b) All buildings and equipment are well maintained and in good order;
- (c) All employees are updated on organisational changes and new policies;
- (d) Official company policies are observed (e.g. employees arriving on time) and
- (e) All supporting paperwork of the organisation is up to date (e.g. requisition forms, time cards etc).

**2. Finance**

The finance department is involved with controlling and managing an organisation's money supply. This department has two main functions: treasury and control. With treasury, the finance department is required to determine how the on-going operations, projects and/or acquisitions of the organisation are to be funded as well as how the surplus funds, if any, are to be invested. Control requires the department to implement and monitor a system of procedures to ensure that there is no misuse or embezzlement of company funds.

**3. Purchasing**

The purchasing department is responsible for procuring all the goods or services that an organisation needs to conduct its operations. The rationale behind having a dedicated department to perform this function (as opposed to each department handling its own respective purchasing) is the efficiency and cost savings to the organisation as a whole that can be gained. Therefore the main responsibility given to a purchasing department is to procure all the goods or services that the organisation will require in the quickest time and at the lowest price, without compromising on quality.

**4. Stores**

The stores department of an organisation is responsible for the physical receipt and issue of raw materials. Efficient and well equipped stores are a pre-requisite of an effective inventory management system. An efficient store is one which ensures that the inventory is secured from deterioration, pilferage, leakage, theft, etc. and also ensures that there is proper synchronisation between purchase (receipt) of inventory and their subsequent issue to the production area.

**5. Maintenance**

The maintenance department is responsible for ensuring that all plant, equipments and machineries of an organisation work efficiently and effectively. This department carries on regular checks on plant and machinery and provide repair and maintenance work as and when necessary.

**6. Personnel**

The personnel department is responsible for manning the positions in the structure of an organisation. The specific functions of this department include human resource planning, recruitment and selection, training and performance appraisal.

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### 7. Marketing

The marketing department serves as a link between an organisation and its customers.

The main responsibilities for this department are twofold:

- To ascertain the current needs and demands of customers and
- To communicate to the market what the organisation's products and services are.

Most organisations also give their marketing department the ability to work closely with the production and the research and development departments, to help ensure that the finished products are in line in with the current market tastes.

### 8. Direct service provision

The direct service provision department is also commonly referred to as the client servicing department. Its function is to serve as a **single point contact** for an organisation's clients. This department becomes particularly beneficial for organisations whose clients have to deal with several of their departments. The direct service provision acts as an **intermediary between the client and the rest of the organisation**.



#### Example

An advertising company's client would need to interact with the following departments:

Creative department	to decide upon artwork / graphics for any upcoming advertisements
Copywriting department	to decide upon the text for any upcoming advertisements
Media department	to decide upon what publications the advertisements should appear in

To simplify life for their clients, most advertising companies have a client servicing department that will coordinate with these other departments on their behalf.

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### 3.3 Secondary distribution

Once the overheads are allocated and apportioned to the production and service cost centres (as explained earlier in this Study Guide) we need to re-apportion the service cost centre overheads to the production cost centres. This is because these service cost centres provide services to the production cost centres. Although the products are not actually processed in these service cost centres, costs are still incurred here.

These have to be assigned to the products in some way.

We first assign the service cost centre costs to the production and service cost centres

The total overheads assigned to the service cost centres are then re-assigned to the production cost centres on an appropriate basis (e.g. stores requisitions for stores, labour hours spent in the case of maintenance department).

The above is referred to as secondary distribution.



#### Example

In a large manufacturing unit, the stores department provides services to the production department as well as the maintenance department (service cost centre). It fulfils the material requisitions for raw materials from the production department, and tools and other repair equipment requisitions from the maintenance department.

This is a case of a service department providing services to the production and service departments.

---

The various methods of secondary distribution are discussed in the next Learning Outcome.



## Test Yourself 2

Coolme is engaged in manufacturing refrigerators. Which of the following departments of the organisation is **NOT** a service cost centre?

- A Marketing department
- B Painting department
- C Personnel department
- D Accounts department

- 4. Apportion manufacturing overheads of service cost centres to production cost centres, by using the following methods:**
- i. The direct (crude) method
  - ii. The step-down / The specific order of closing
  - iii. The repeated distribution / continuous allotment (among all departments)
  - iv. The modified repeated distribution method (starting distribution among the service cost centres)
  - v. The simultaneous equation / algebraic or mathematical) method

[Learning Outcome d]

Once the overheads are allocated and apportioned to the production and service cost centres, we need to re-apportion the service cost centre overheads to the production cost centres. This is because these service cost centres provide services to the production cost centres. Although the products are not actually processed in these service cost centres, costs are still incurred here.

These have to be assigned to the products in some way.

We first assign the service cost centre costs to the production and service cost centres

The total overheads assigned to the service cost centres are then re-assigned to the production cost centres on an appropriate basis (e.g. stores requisitions for stores, labour hours spent in the case of maintenance department)



## Example

In a large manufacturing unit, the stores department provides services to the production department as well as the maintenance department (service cost centre). It fulfils the material requisitions for raw materials from the production department, and tools and other repair equipment requisitions from the maintenance department.

This is a case of a service department providing services to the production and service departments.

It is also possible that two service centres render services to each other. This is known as providing reciprocal services.



## Example

The stores department provides services to the maintenance department in the form of fulfilling the requisitions for tools and equipment. The maintenance department also provides services to the stores in the form of repairs/maintenance to the assets in the stores department such as bins, racks, temperature control machines (used to store perishable items), weighing machines etc. The stores and the maintenance departments here provide services to each other. This is a case of reciprocal services.

### 3.1 The direct (crude) method

Under the direct method, the overhead costs belonging to the service / support departments are directly distributed among the production / primary departments without giving consideration to the fact that the service departments may be serving each other too. Thus, the support provided by one service department to the other service departments is totally ignored, leading to inaccurate apportionment of overhead costs. The direct method is not suitable for budgeting and controlling overheads.

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### Example

The overheads relating to two production departments, P1 and P2, and two service departments, S1 and S2 are given below:

Overheads as per primary distribution	Production departments		Service departments	
	P1 (Tshs million)	P2 (Tshs million)	S1 (Tshs million)	S2 (Tshs million)
	600	640	400	300

Further information:

The overheads of service department S1 are to be apportioned among P1 and P2 in the ratio of 3:2

The overheads of service department S2 are to be apportioned among P1 and P2 in the ratio of 2:1

The secondary distribution table using the direct method can be prepared as follows:

	Production departments		Service departments	
	P1 (Tshs million)	P2 (Tshs million)	S1 (Tshs million)	S2 (Tshs million)
Overheads as per primary distribution	600	640	400	300
Reapportionment of S1's overheads between P1 and P2 in the ratio of 3:2	240	160	(400)	-
Reapportionment of S2's overheads between P1 and P2 in the ratio of 2:1	200	100	-	(300)
<b>Total overheads</b>	<b>1,040</b>	<b>900</b>	<b>Nil</b>	<b>Nil</b>



### Example

Ace Ltd has three production departments and two service departments. The expenses for these departments as per primary distribution summary are as follows:

Production departments	Tshs'000	Tshs'000
A	6,000	
B	5,200	
C	4,800	16,000
<b>Service departments</b>		
Stores	800	
Time-keeping & Accounts	600	1,400

Additional information:

	Dept A	Dept B	Dept C
Number of workers	16	12	12
Value of stores requisition (Tshs'000)	5,000	3,000	2,000

Apportion the costs of service departments over the production departments.

**Overhead distribution statement**

Item of cost	Basis of apportionment	Total	Dept A	Dept B	Dept C
		(Tshs'000)			
Cost as per primary distribution	-	16,000	6,000	5,200	4,800
Stores	Value of stores requisition (5:3:2)	800	400	240	160
Time keeping & accounts	Number of workers (4:3:3)	600	240	180	180
<b>Total</b>		<b>17,400</b>	<b>6,640</b>	<b>5,620</b>	<b>5,140</b>

**3.2 The step-down / the specific order of closing method**

This is also called as non-reciprocal method. This method gives cognizance to the service rendered by service department to another service department. Therefore, this method is more complex as compared to the first method because a sequence of apportionments has to be selected here.

The sequence here begins with the department that renders service to the maximum number of other service departments. In other words, the cost of the service department which serves the largest number of other service and production departments is distributed first. After this, the cost of service department serving the next largest number of departments is apportioned.

The process continues till the cost of last service department is apportioned. The cost of last service department is apportioned amongst production departments only. The reapportionment order is relevant for this method.

Under this method, first the overheads belonging to the most serviceable department are distributed followed by the distribution of the second most serviceable department and so on. In this way, all overhead expense belonging to the service departments is distributed among the production / primary departments.

 **Example**

The overheads relating to two production departments, P1 and P2, and three service departments, Timekeeping (S1), Stores (S2) and Maintenance (S3) are given below:

Overheads as per primary distribution	Production departments		Service departments		
	P1 (Tshs million)	P2 (Tshs million)	S1 (Tshs million)	S2 (Tshs million)	S3 (Tshs million)
	800	1,400	400	500	300

Further information is available and is used as a basis for distribution:

	Production departments		Service departments		
	P1	P2	S1	S2	S3
No. of Employees	40	30	-	20	10
No. of Stores Requisitions	24	20	-	-	6
Machine Hours	2,400	1,600	-	-	-

The secondary distribution table using the step down approach can be prepared as follows:

(Amounts in Tshs million)

Departments	Overheads as per primary distribution				
S1	400	(400)			
S2	500	80	(580)		
S3	300	40	69.6	(409.6)	
P1	800	160	278.4	245.76	1,484.16
P2	1,400	120	232	163.84	1,915.84
<b>Total</b>	<b>3,400</b>				<b>3,400</b>

**Note:**

Following is the basis of apportionment:

S1: No. of employees: 2:1:4:3

S2: No. of Stores Requisitions: 3:12:10

S3: Machine Hours: 3:2



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### Example

The expenses of two production departments A and B and two service departments S1 and S2 are as follows:

Departments	Amount	Apportionment Basis		
	Tshs'000	S2	A	B
A	6,000	-	-	-
B	6,400	-	-	-
S1	4,000	20%	50%	30%
S2	3,000	-	40%	60%

#### Overhead distribution statement

Departments	A	B	S1	S2
	(Tshs'000)			
Amounts as given above	6,000	6,400	4,000	3,000
Expenses of Dept S1 apportioned over A, B and S2 (5:3:2)	2,000	1,200	(4,000)	800
Expenses of Dept S2 apportioned over A and B (2:3)	1,520	2,280	-	(3,800)
<b>Total</b>	<b>9,520</b>	<b>9,880</b>	<b>Nil</b>	<b>Nil</b>



### Test Yourself 3

1. The order of reapportionment is not relevant for direct method.
2. The order of reapportionment is not relevant for step down method.
3. Direct method of reapportionment does not involve apportioning costs of each service cost centre to production cost centres.
4. Step down method reapportionment the cost between service departments.

Which statement(s) is/are correct?

- A 1 and 4
- B 2, 3 and 1
- C 1, 2 and 4
- D 1 only

### 3.3 Reciprocal service method

When the service cost centres provide services to each other (mutually dependent) we use the reciprocal method of apportionment of service costs. The fact that the service departments do service each other might be of little significance where the value of services provided is less. However, in organisations that have fairly large portions of services being offered by the various service cost centres, this method is much more useful. It is cost beneficial only when the costs involved are high since it is a time consuming method.

The methods of reapportionment of mutually dependent service cost centres to the production cost centre are discussed below.

#### 1. The repeated distribution method

Under this method, the service department costs are distributed to other departments repeatedly according to the agreed percentages until the service centre costs become nil or too small to matter i.e. the total costs of the service centre are apportioned completely.

We will first try to solve a simple question where one service centre provides a service to another but does not consume any of its services. Let us try to understand it better with the help of an example.



### Example

Mac Plc has provided the following information on the overhead expenses incurred:

Production departments	Dept A Tshs'000	Dept B Tshs'000	Stores Tshs'000	Maintenance Tshs'000
Lighting and heating	15,000	20,000	6,000	2,500
Rent	20,000	40,000	7,000	5,000
Indirect materials	25,000	30,000	-	-
Indirect wages	4,000	6,000	3,000	5,000
Depreciation on machines	7,500	9,500	-	-
<b>Total</b>	<b>71,500</b>	<b>105,500</b>	<b>16,000</b>	<b>12,500</b>

The stores department received requisitions worth Tshs20,000,000 from department A, Tshs50,000,000 from department B and Tshs10,000,000 from the maintenance department. The maintenance workers spent 200 hours in department A, 375 hours in department B and 50 hours in the stores. Apportion the service costs to the production departments under the repeated distribution method.

The stores department receives requisitions from departments A, B and maintenance in the ratio 20,000,000:50,000,000:10,000,000 = 2:5:1

This means that any costs apportioned to this department will be divided amongst the rest of the departments in the ratio of 2:5:1.

The maintenance department spends time in departments A, B and stores in the ratio 200:375:50.

This means that the costs apportioned to this department will be divided amongst the rest of the departments in the ratio 200:375:50.

Let us apportion these costs to the departments

Production departments	Basis of apportionment	Total cost to be apportioned	Dept. A	Dept. B	Stores	Maintenance
<b>(Tshs'000)</b>						
Lighting and heating	Direct	NA	15,000	20,000	6,000	2,500
Rent	Direct	NA	20,000	40,000	7,000	5,000
Indirect materials	Direct	NA	25,000	30,000	-	-
Indirect wages		NA	4,000	6,000	3,000	5,000
Depreciation on machines	Direct	NA	7,500	9,500	-	-
<b>Sub-total</b>		NA	<b>71,500</b>	<b>105,500</b>	<b>16,000</b>	<b>12,500</b>
<b>Re-apportionment of service department costs</b>						
Stores dept.	Value of Materials requisitioned 2:5:1	16,000	4,000	10,000	(16,000)	2,000
Maintenance dept	Labour hours spent in the dept 200:375:50	14,500	4,640	8,700	1,160	(14,500)
Stores dept.	2:5:1	1,160	290	725	(1,160)	145
Maintenance dept	200:375:50	145	46	87	12	(145)
Stores dept.	2:5:1	12	3	8	(12)	1
Maintenance dept.	200:375:50	1	-	1	-	(1)
<b>Total</b>			<b>80,479</b>	<b>125,021</b>	<b>0</b>	<b>0</b>

In all the stages of redistribution of overheads, the ratios used for the division of overheads are the same. In the last stage, when the amount of overheads to be apportioned is negligible, it is apportioned to production department B, for rounding off purposes. The repeated distribution should be resorted to only when the costs involved are high enough. It involves lengthy and tedious calculations and hence should be made use of only when it is of benefit.

**Continued on the next page**

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At times when the amount to be re-apportioned amongst the service cost centres is very small, the entire service centre costs are re-apportioned only in the production departments, disregarding the fact that the services cost centres do service each other also for apportionment purposes.

In this case the apportionment will be as follows:

The total costs of stores to be apportioned = Tshs16,000,000

The total requisitions from the productions depts.

A and B = Tshs20,000,000 + Tshs50,000,000 = Tshs70,000,000

The ratio of distribution for stores dept. will be 20000:50000 = 2:5

The total costs to be apportioned for maintenance dept = Tshs12,500,000

The total time spent in the production departments = 200 + 375 = 575 hours

The ratio of distribution for maintenance will be = 200:375

The distribution will be as below

Production departments	Basis of apportionment	Total costs apportioned	Dept. A	Dept. B	Stores	Maintenance
		Tshs'000	Tshs'000	Tshs'000	Tshs'000	Tshs'000
Lighting and heating	Direct	NA	15,000	20,000	6,000	2,500
Rent	Direct	NA	20,000	40,000	7,000	5,000
Indirect materials	Direct	NA	25,000	30,000	-	-
Indirect wages		NA	4,000	6,000	3,000	5,000
Depreciation on machines	Direct	NA	7,500	9,500	-	-
Sub-total		NA	71,500	105,500	16,000	12,500
<b>Re-apportionment of service dept costs</b>						
Stores dept.	Value of materials requisitioned 2:5	16,000	4,571	11,429	(16,000)	
Maintenance dept.	Labour hours spent in the dept 200:375	12,500	4,348	8,152		(12,500)
<b>Total</b>			<b>80,419</b>	<b>125,081</b>	<b>0</b>	<b>0</b>



### Test Yourself 4

Amateur Plc has three production departments and two service departments. The following information is available from the departmental distribution summary for the month of May 20X3:

	Tshs'000	Tshs'000
<b>Production departments</b>		
A	4,800	
B	4,200	
C	3,000	12,000
<b>Service departments</b>		
X	1,400	
Y	1,800	3,200
		<b>15,200</b>

The expenses of service departments are charged on a percentage basis as follows:

Service departments	Production departments			Service departments	
	A	B	C	X	Y
X	20%	40%	30%	---	10%
Y	40%	20%	20%	20%	---

Show the distribution of the service department cost under the repeated distribution method.

## 2. The modified repeated distribution method (starting distribution among the service cost centres)

This method involves the apportionment of the overheads of the service cost centres to the production cost centres in two steps:

Step 1: first, the overhead cost of one service centre is apportioned to the other service centres according to the given percentages. Then, the cost of the second service centre is apportioned to the first and other service centres in the given percentages. Thus, the distribution of overheads takes place among the service centres. This results in computation of the total overhead cost of each service centre.

Step 2: the total overhead cost of each service centre (as computed in step 1) is apportioned among the production cost centres.



### Example

The overheads relating to three production departments, P1, P2 and P3, and two service departments, S1 and S2 are given below:

Overheads as per primary distribution	Production departments			Service departments	
	P1 (Tshs '000)	P2 (Tshs '000)	P3 (Tshs '000)	S1 (Tshs '000)	S2 (Tshs '000)
	16,000	20,000	8,400	18,000	8,000

The firm decides to apportion the overheads of the service departments to the production departments in the following way:

	P1	P2	P3	S1	S2
S1	40%	30%	20%	-	10%
S2	30%	30%	20%	20%	-

The **secondary distribution table using the modified repeated distribution method** can be prepared as follows:

#### Step 1: Calculation of service departments' overhead costs

	S1 (Tshs '000)	S2 (Tshs '000)
Overheads as per primary distribution	18,000	8,000
Dept. S1 (10% to S2)		1,800
Dept. S2 (20% of 9,800 to S1)	1,960	
Dept. S1 (10% to S2)		196
Dept. S2 (20% to S1)	40	
Dept. S1 (10% to S2)		4
<b>Total overheads</b>	<b>20,000</b>	<b>10,000</b>

#### Step 2: Re-apportioning overheads of S1 and S2 to P1, P2 and P3

	P1 (Tshs '000)	P2 (Tshs '000)	P3 (Tshs '000)
Overheads as per primary distribution	16,000	20,000	8,400
Dept. S1 (40% to P1, 30% to P2 and 20% to P3)	8,000	6,000	4,000
Dept. S2 (30% to P1, 30% to P2 and 20% to P3)	3,000	3,000	2,000
<b>Total overheads</b>	<b>27,000</b>	<b>29,000</b>	<b>14,400</b>

## 3. Simultaneous equations method

This method makes use of simultaneous equations to calculate the amount of overheads to be apportioned. Instead of calculating the overheads to be apportioned in steps as above, it makes **use of linear equations**.

The steps are:

Determine the true cost of the service department(s) by solving the equations.

Redistribute the cost of the service department (determined in step 1) to the production departments on the basis of the given ratio.

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Let us try to solve the above example of Mac Plc using simultaneous equations.



**Example**

Note: the entire amounts are in Tshs'000, unless stated.

Let us assume the total overheads for the stores department to be X and the total overheads for the maintenance department to be Y.

We can form the two equations as:  
 $X = 16,000 + 50/625Y$   
 $X = 16,000 + 0.08Y$ .....(i)

The given overheads are 16,000 and the portion to be apportioned from the maintenance department is in the proportion of 50/625 of the total cost of the maintenance department.

The second equation will be:  
 $Y = 12,500 + 1/8X$   
 $Y = 12,500 + 0.125X$ .....(ii)

The given overheads are 12,500 and the portion to be apportioned from the stores department is in the proportion of 1/8 of the total stores cost.

Solving the above two equations we can find the total overheads for stores and maintenance.

Let us substitute the value of Y in the equation (i)  
 $X = 16,000 + 0.08 (12,500 + 0.125X)$   
 $X = 16,000 + 1,000 + 0.01X$   
 $X = 17,000 + 0.01X$   
 $X - 0.01X = 17,000$   
 $0.99X = 17,000$   
 $X = 17,000/0.99$   
 $X = 17,172$  (rounded off)

Therefore, to calculate the total overheads for the maintenance department:

We substitute the value of X in the equations (ii) to get

$Y = 12,500 + 0.125 (17,172)$   
 $Y = 14,646$  (rounded off)

The total overheads obtained will be distributed among the production departments in the given ratios.

	Total overheads	Ratio of distribution	Production dept. A	Production dept. B	Stores	Maintenance
Overheads other than service overheads			71,500	105,500	16,000	12,500
Stores	17,172	2:5:1	4,293	10,733	(17,172)	2,146
Maintenance	14,646	200:375:50	4,686	8,788	1,172	(14,646)
Total			80,479	125,021	0	0

The service overheads are thereby apportioned to the production and service departments in a single step.



### Test Yourself 5

Calm Ltd has three production departments and two service departments. The departmental distribution summary of July 20X3 gives the following details:

	Tshs'000	Tshs'000
<b>Production departments</b>		
A	16,000	
B	13,000	
C	14,000	43,000
<b>Service departments</b>		
Stores	4,680	
Tool room	6,000	10,680
<b>Total</b>		<b>53,680</b>

The service department expenses are charged on a percentage basis:

Service departments	Production departments			Service departments	
	A	B	C	Stores	Tool room
Stores	20%	25%	35%	---	20%
Tool room	25%	25%	40%	10%	---

Prepare a statement showing the apportionment of the service costs to production departments by the simultaneous equation method.

### Answers to Test Yourself

#### Answer to TY 1

The correct option is **C**.

Supervision cost falls under factory overheads and it should be apportioned on the basis of time spent by supervisors in each department.

#### Answer to TY 2

The correct answer is **B**.

The painting department is directly engaged in manufacturing process, direct costs are incurred in this department. Thus, it is a primary or a production department.

#### Answer to TY 3

The correct option is **A**.

The order of reapportionment is irrelevant for direct method.

The step down method is also known non-reciprocal method. It gives cognizance to the service rendered by service department to another service department. The method is more complex because the apportionment sequence needs to be selected here.

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**Answer to TY 4**

Amateur Plc - Secondary distribution summary for May 20X3

	Ratio of apportionment	Production departments			Service departments	
		A	B	C	X	Y
		Tshs'000	Tshs'000	Tshs'000	Tshs'000	Tshs'000
According to primary distribution		4,800	4,200	3,000	1,400	1,800
Service Dept. X	20:40:30:10	280	560	420	(1,400)	140
Service Dept. Y	40:20:20:20	776	388	388	388	(1,940)
Service Dept. X	20:40:30:10	78	155	116	(388)	39
Service Dept. Y	40:20:20:20	16	8	8	7	(39)
Service Dept. X	20:40:30:10	2	3	2	(7)	0
		<b>5,952</b>	<b>5,314</b>	<b>3,934</b>	<b>0</b>	<b>0</b>

**Note:** the last step involves insignificant approximation.

**Answer to TY 5**

Note: the entire amounts are in Tshs'000, unless stated.

Let P = total overheads of stores department  
 N = total overheads of tool room department  
 $P = 4,680 + 10/100N$   
 $P = 4,680 + 0.1N$ ..... (1)  
 $N = 6,000 + 20/100P$   
 $N = 6,000 + 0.2P$ ..... (2)

By putting value of N in equation (1) we get:

$P = 4,680 + 0.1(6,000 + 0.2P)$   
 $P = 4680 + 600 + 0.02P$   
 $P = 5280 + 0.02P$   
 $P - 0.02P = 5280$   
 $0.98P = 5280$   
 $P = \text{Tshs}5,388$

Therefore,  $N = 6000 + 0.2 (5388) = \text{Tshs}7,078$

The service expenses will now be distributed among the departments as below:

Calm Ltd - statement showing the apportionment of the service costs to production departments for July 20X8.

	Total overheads	Basis	Dept. A (Tshs)	Dept. B (Tshs)	Dept. C (Tshs)	Stores (Tshs)	Tool room (Tshs)
Overheads		Direct	16,000	13,000	14,000	4,680	6,000
Re-apportionment of service overheads							
Stores	5,388	20:25:35:20	1,077	1,347	1,886	(5,388)	1,078
Tool room	7,078	25:25:40:10	1,769	1,770	2,831	708	(7,078)
<b>Total</b>			<b>18,846</b>	<b>16,117</b>	<b>18,717</b>	<b>0</b>	<b>0</b>

The overheads are distributed among the production and service centres in one single step as we know the total value of the overheads for the service departments.

**Self Examination Questions**

**Question 1**

Modern Plc has five departments. Details of indirect costs incurred in these departments for the month of December 20X8 are given below.

	Total Tshs'000	Production departments			Service departments	
		P Tshs'000	Q Tshs'000	R Tshs'000	S Tshs'000	T Tshs'000
Rent	20,000	4,000	8,000	3,000	3,000	2,000
Electricity	4,000	1,000	1,600	600	400	400
Fire insurance	8,000	1,600	3,200	1,200	1,200	800
Plant depreciation	40,000	10,000	15,000	10,000	3,000	2,000
Transportation	4,000	500	500	500	1,000	1,500
<b>Total</b>	<b>76,000</b>	<b>17,100</b>	<b>28,300</b>	<b>15,300</b>	<b>8,600</b>	<b>6,700</b>

Expenses of service departments are apportioned as under:

	P	Q	R	S	T
<b>S</b>	30%	40%	20%	-	10%
<b>T</b>	10%	20%	50%	20%	-

Reapportion service cost centre costs to production cost centres, using the repeated distribution technique under the reciprocal method.

**Question 2**

A business operates with two production centres and three service centres. Costs have been allocated and apportioned to these centres as follows:

Production centres		Service centres		
1	2	A	B	C
Tshs2,000,000	Tshs3,500,000	Tshs3,500,000	Tshs500,000	Tshs700,000

Information regarding how the service centres work for each other and for the production centres is as follows:

	Work done for:				
	Production centres		Service centres		
	1	2	A	B	C
By A	45%	45%	-	10%	-
By B	50%	20%	20%	-	10%
By C	60%	40%	-	-	-

Information concerning production requirements in the two production centres is as follows:

	Units produced	Machine hours	Labour hours
Centre 1	1,500 units	3,000 hours	2,000 hours
Centre 2	2,000 units	4,500 hours	6,000 hours

**Required:**

- Using the reciprocal method, calculate the total overheads in production centres 1 and 2 after reapportionment of the service centre costs.
- Using the most appropriate basis, establish the overhead absorption rate for production centre 1. Briefly explain the reason for your chosen absorption basis.



## 210: Accounting for Materials, Labour and Overheads

### Question 3

Sequin Plc has furnished the overhead cost details relating to two production departments, Assembling and Finishing, and three service departments, Timekeeping, Stores and Maintenance:

Overheads as per primary distribution	Production departments		Service departments		
	Assembling (Tshs million)	Finishing (Tshs million)	Timekeeping (Tshs million)	Stores (Tshs million)	Maintenance (Tshs million)
	1,600	2,800	800	1,000	600

Further information is available and is used as a basis for distribution:

	Production departments		Service departments		
	Assembling	Finishing	Timekeeping	Stores	Maintenance
No. of Employees	40	30	-	20	10
No. of Stores Requisitions	24	20	-	-	6
Machine Hours	12,00	800	-	-	-

#### Required:

Prepare the secondary distribution table using the step down approach.

### Answers to Self Examination Questions

#### Answer to SEQ 1

Modern Plc - statement showing reapportionment of service cost centre costs for December 20X8.

	Ratio of apportionment	Production departments			Service departments	
		P	Q	R	S	T
		Tshs'000	Tshs'000	Tshs'000	Tshs'000	Tshs'000
Figures as per primary distribution		17,100	28,300	15,300	8,600	6,700
Dept. S	30:40:20:10	2,580	3,440	1,720	(8,600)	860
Dept. T	10:20:50:20	756	1,512	3,780	1,512	(7,560)
Dept. S	30:40:20:10	454	605	302	(1,512)	151
Dept. T	10:20:50:20	15	30	76	30	(151)
Dept. S	30:40:20:10	9	12	6	(30)	3
Dept. T	10:20:50:20	0	1	2	0	(3)
		<b>20,914</b>	<b>33,900</b>	<b>21,186</b>	<b>0</b>	<b>0</b>

Note: the last step involves insignificant approximation.

#### Answer to SEQ 2

	Centre 1	Centre 2	Service A	Service B	Service C
	Tshs'000	Tshs'000	Tshs'000	Tshs'000	Tshs'000
Service B (50:20:20:10)	2,000	3,500	300	500	700
	250	100	100	(500)	50
	<b>2,250</b>	<b>3,600</b>	<b>4,00</b>	<b>0</b>	<b>750</b>
Service A (45:45:10)	180	180	(400)	40	
	<b>2,430</b>	<b>3,780</b>	<b>0</b>	<b>40</b>	<b>750</b>
Service C (60:40)	450	300			(750)
	<b>2,880</b>	<b>4,080</b>	<b>0</b>	<b>40</b>	<b>0</b>
Service B (50:20:20:10)	20	8	8	(40)	4
	<b>2,900</b>	<b>4,088</b>	<b>8</b>	<b>0</b>	<b>4</b>
Service A (45:45:10)	4	4	(8)		
	<b>2,904</b>	<b>4,092</b>	<b>0</b>	<b>0</b>	<b>4</b>
Service C (60:40)	2	2			(4)
	<b>2,906</b>	<b>4,094</b>	<b>0</b>	<b>0</b>	<b>0</b>

## Overheads Allocation and Apportionment – Secondary Apportionment: 211

Centre 1

The most appropriate basis to use is machine hours as the process is machine intensive.

$$\text{Overhead absorption rate} = \frac{\text{Tshs}2,906,000}{3,000 \text{ hours}} = \text{Tshs}968.67 \text{ machine / hours}$$

### Answer to SEQ 3

The **secondary distribution table using the step down approach** can be prepared as follows:

(Amounts in Tshs million)

Departments	Overheads as per primary distribution					
Timekeeping	800	(800)				
Stores	1,000	160	(1,160)			
Maintenance	600	80	139.2	(819.2)		
Assembling	1,600	320	556.8	491.52	2,968.32	
Finishing	2,800	240	464	327.68	3,831.68	
<b>Total</b>	<b>6,800</b>				<b>6,800</b>	

### Note:

Following is the basis of apportionment:

Timekeeping: No. of employees: 2:1:4:3

Stores: No. of Stores Requisitions: 3:12:10

Maintenance: Machine Hours: 3:2



## STUDY GUIDE B5: ABSORPTION OF OVERHEADS

### Get Through Intro

In order to be profitable, an organisation has to recover all the costs whether direct or indirect, from the revenue. Sometimes, the decisions may be based only on the direct costs. For example, if the overheads are recovered from other revenue, an organisation may accept an order that gives positive contribution (revenue minus variable costs) so as to increase the overall profit. However, the fact still remains that indirect costs or overheads must be recovered from normal revenue. In other words, unit revenue should be more than the total unit cost.

Since the overheads are not incurred for each production unit, we have to find out some procedures to allocate, apportion and ultimately link (absorb) the overheads to the unit costs. This process may involve apportionment and reapportionment on appropriate basis. Overheads may be absorbed at actual rates or predetermined rates.

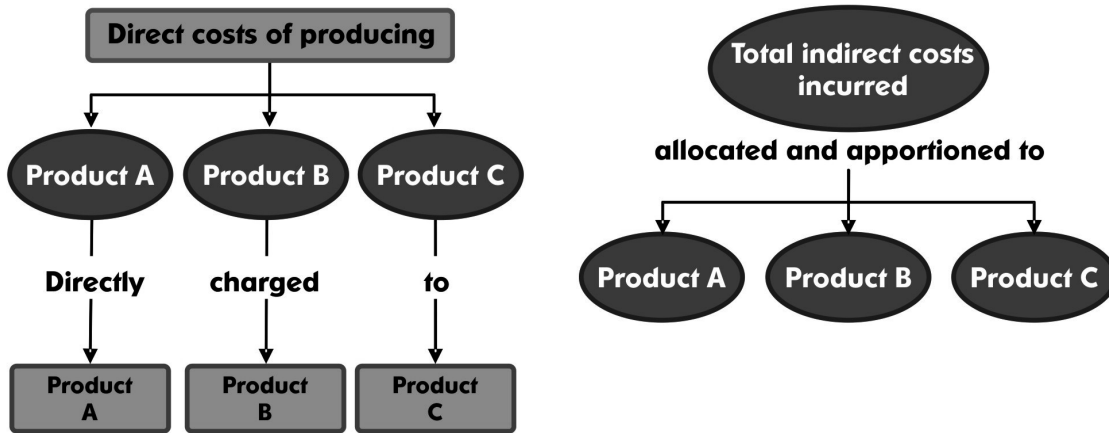
In the case of predetermined rates, since the absorption is done on the basis of certain assumptions, there may be some under or over absorption of overheads. How are these situations dealt with? This study guide will help you find the answers.

### Learning Outcomes

- a) Define overhead absorption and overhead absorption rates.
- b) Differentiate between pre-determined overhead absorption rates and actual rates.
- c) Differentiate between blanket / single plant and multiple / departmental rates.
- d) Calculate overhead absorption rates by using the following methods:
  - i. Percentage on direct material cost
  - ii. Percentage on direct labour
  - iii. Percentage on prime cost
  - iv. Direct material units / Usage
  - v. Direct labour hours
  - vi. Machine hours / usage
  - vii. Output / units
- e) State the situations suitable for each of the above methods.
- f) State the advantages and disadvantages of each of the above method.
- g) Calculate the over or under absorbed overheads.

**1. Define overhead absorption and overhead absorption rates.** [Learning Outcome a]

Diagram 1: Treatment of direct and indirect costs



**Overhead absorption**

According to their function and on the basis of their origin, overheads are classified as:

- (a) Production, manufacturing, or factory overheads
- (b) Non-manufacturing overheads
  - Administrative overheads
  - Selling and distribution overheads
  - Research and development overheads

**1.1 Treatment of manufacturing and non-manufacturing overheads**

The overhead absorption rates are arrived at using a two stage procedure:

1. Departments (more specifically cost centres) accumulate their costs.
2. The costs of the department are applied to the physical units (or any other measure of output) that pass through the departments. This step is called **overhead absorption**.

Manufacturing overheads are always absorbed by products on the basis of **machine hours** or **labour hours**. Non-manufacturing overheads are absorbed as a percentage of manufacturing overheads.



**Example**

In a bottling plant, overhead costs e.g. the costs of oil and lubricants for the bottling machine, are indirect materials that will form a part of factory costs. These are the costs incurred in the factory. The transport cost for carrying the bottles from the bottling plant to the market for sale is an indirect distribution cost which will be a part of the cost of sales. This cost is incurred once the finished products leave the factory.

The segregation of the costs into direct and indirect is also essential from the management's point of view as it helps in controlling costs.



### Example

Alan Plc manufactures leather purses. The major raw materials required are leather, dyes and high quality threads. Apart from these, it needs sewing machines to sew the purses and also workers who will sew them. These machines need a lot of maintenance. The cost sheet of Alan Plc is given below:

#### Extract from cost sheet of Alan Plc

	Tshs'000
Direct materials	
Leather	400
Dyes	250
Threads	100
Direct labour	400
<b>Prime cost</b>	<b>1,150</b>
Machine maintenance	400
	<b>1,550</b>

The above extract from the cost sheet shows all the expenses split under different headings. If, in any month, the total costs increase or decrease, then management can investigate this difference immediately by looking at the monthly cost sheets. This helps management take corrective steps to control the costs.

The line of demarcation between direct and indirect costs is very thin, as direct costs in one industry may be indirect costs in another.



### Example

Ink cartridges and paper are direct materials in the printing business. The cost of these will be direct material costs. The same ink and paper are an administrative overhead expense in an automobile spare parts manufacturing company, where they are used only for record-keeping in the accounts department. Accounts writing is a secondary activity compared to the main activity of manufacturing.

The **journal entries** relating to manufacturing overheads are as follows:

	Journal entry
Factory overheads incurred - for indirect expenses other than depreciation	Dr Factory overhead control account Cr Expenses payables control account Being factory overheads accrued
Factory overheads incurred - for depreciation accrued during the period	Dr Factory overhead control account Cr Provision for depreciation account Being depreciation on non-current assets located at factory, accrued
Factory overheads absorbed by a job or in a period	Dr Work in process control account Cr Factory overhead control account Being factory overhead sequentially tracked for job no.

Overhead absorption rate is the rate at which overheads are absorbed. This is derived by dividing budgeted overheads with budgeted units or budgeted hours.



### Test Yourself 1

How are overhead absorption rates derived?

- A By dividing actual overheads with actual units / hours
- B By dividing actual overheads with budgeted units / hours
- C By dividing budgeted overheads with actual units / hours
- D By dividing budgeted overheads with budgeted units / hours

**2. Differentiate between pre-determined overhead absorption rates and actual rates. [Learning Outcome b]**

After the allocation and apportionment of the overheads to the cost centres / departments these have to be **charged to the units of production** that are produced in these departments in a specific period. The process of charging the overheads to the units of output is called **absorption of overheads**.

The process of setting the rates for absorption of overheads involves:

- Estimating the total amount of overheads for a department.
- Selecting an appropriate allocation basis.**
- Dividing the total overheads by the total of the allocation basis to arrive at an overhead absorption rate.

An allocation basis is a factor based on which the overhead costs are allocated to the products or services in a systematic way. The most commonly and widely used allocation bases are machine hours and direct labour hours.

$$\text{Overhead absorption rate} = \frac{\text{Total overhead allocated / apportioned}}{\text{Total off allocation basis}}$$

The overhead absorption rates are either calculated on an actual basis or on a pre-determined basis.

**2.1 Actual overhead absorption rate**

When the overheads are calculated on an actual basis, the rates are always calculated on the basis of the overheads actually incurred. The actual overhead rate is calculated by dividing the actual overheads incurred by the actual units of production in the period.

$$\text{Actual overhead absorption rate} = \frac{\text{Actual overheads for the period}}{\text{Actual number of units produced in the period}}$$



**Example**

The data for Emerald Plc is given. Calculate the actual overhead absorption rate for the period.

Budgeted overheads	Tshs500,000,000
Actual overheads	Tshs560,000,000
Actual production (units)	35,000
Budgeted production (units)	40,000

$$\text{Actual overhead absorption rate} = \frac{\text{Tshs560,000,000}}{35,000} = \text{Tshs16,000}$$

Overheads are normally **period costs** i.e. they are incurred for an activity period. Hence, to calculate the absorption rates on the basis of the actual figures one has to wait until the end of the activity period to ascertain the rates. Therefore, this is the most accurate application of the overheads; however, assigning them at the end of the period is too late.

In order to achieve objectives such as product pricing, total cost determination and incorporation of control measures, the costs need to be ascertained accurately and in time. Accountants need information regarding product costs throughout the year. As a result, overhead absorption rates are usually computed in advance i.e. before production. These are known as pre-determined overhead absorption rates.

**2.2 Pre-determined overhead absorption rate**

The 'pre-determined overhead absorption rate method' is normally preferred over the actual absorption rate method. This rate is calculated by dividing the expected overhead costs by the chosen allocation basis. The budgeted figures, estimated before the start of the period, are used for this purpose. The overheads are added to the actual cost of the product on the basis of the '**pre-determined overhead recovery rate**'/unit according to the following formula:

$$\text{Pre - determined overhead absorption rate} = \frac{\text{Budgeted overhead for the period}}{\text{Budgeted number of units for the period}}$$

The pre-determined overhead recovery rate is preferred because the actual rate is subject to **too many fluctuations**. The major considerations behind using the pre-determined overhead absorption rate are:

1. To reduce the effects of fluctuations in the level of activity on unit costs.



**Example**

By their nature, certain overheads are variable such as indirect labour; maintenance costs etc. whereas others are fixed such as depreciation, rent, taxes, etc. Any fluctuation in the level of production leads to a change in the variable costs whereas the fixed costs remain unchanged. As a result, overhead rates based on the monthly volume (of allocation basis) may vary widely from month to month.

2. To reduce the effects of fluctuations in the total level of overhead costs incurred every month (e.g. due to seasonal or other variations).



**Example**

Overhead costs will vary due to a rise in the heating costs during winter and air-conditioning costs during summer etc.



**Example**

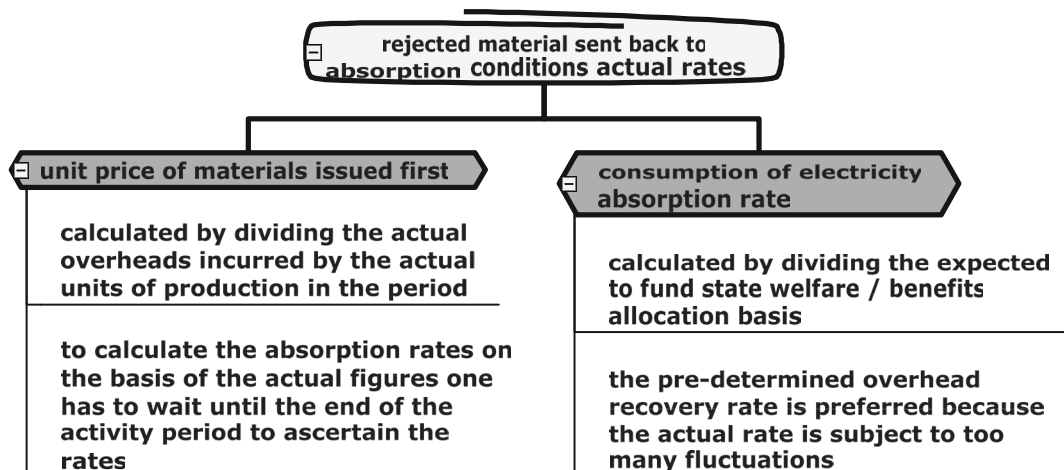
Preset Plc has revealed the cost information given below:

Budgeted overheads	Tshs400,000,000
Budgeted production in units	200,000
Actual overheads	Tshs455,000,000

$$\text{Pre-determined overhead absorption rate} = \frac{\text{Tshs400,000,000}}{200,000} = \text{Tshs2,000 per unit}$$

This amount of overheads will be added to the prime cost of the products when the actual cost of the products is calculated.

**SUMMARY**







**Test Yourself 2**

Consider the following data to calculate the actual overhead absorption rate for the period.

Budgeted overheads	Tshs250,000,000
Actual overheads	Tshs280,000,000
Actual production (units)	70,000
Budgeted production (units)	80,000

- A Tshs4,000
- B Tshs3,500
- C Tshs3,571
- D Tshs3,125

**3. Differentiate between blanket / single plant and multiple / departmental rates.**

[Learning Outcome c]

An organisation may use either of the following two methods to calculate the pre-determined rates of overhead absorption:

- Blanket overhead absorption rate or
- Departmental overhead absorption rate

**(a) Blanket overhead absorption rate**



**Definition**

**Blanket overhead rate** is a single overhead recovery rate calculated for all the departments. organisation.

$$\text{Blanket overhead absorption rate} = \frac{\text{Total budgeted overheads for entire factory for the period}}{\text{Total budgeted labour hours or machiner hours}}$$

The allocation basis is normally taken as machine hours or labour hours as these are the most appropriate allocation bases.

This method of overhead absorption is suited to single product industries that have uniform cost structures in all production departments. This is because the overhead rates are the same for all the products processed in every department.



**Example**

Manney Plc operates two production departments, the details of which are given below. Calculate a single overheads recovery rate for the overheads.

	Production dept. chairs	Production dept. tables	Total
Budgeted overheads (Tshs'000)	140,000	200,000	340,000
Budgeted labour hours	20,000	50,000	70,000

$$\begin{aligned} \text{The blanket overhead rate} &= \frac{\text{Total overhead}}{\text{Total labour hours}} \\ &= \frac{\text{Tshs340,000,000}}{70,000} \\ &= \text{Tshs4,857 per labour hour} \end{aligned}$$

The overhead rate as calculated above is used for all the products that are produced in the period. If the products undergo different processes and consume different quantities of resources e.g. machine hours or labour hours (the allocation bases), then this method will not hold true. Here, the departmental overhead rate will have to be computed, meaning each department has a separate overhead absorption rate.

### (b) Departmental overhead absorption rates



#### Definition

**Departmental overhead rate** is a **separate overhead rate calculated for each department** according to the nature of work carried out in each department.

The budgeted overheads are divided by the budgeted machine hours or labour hours or any other suitable allocation basis to arrive at an absorption rate for each department.

$$\text{Departmental overhead absorption rate} = \frac{\text{Overheads for respective department}}{\text{Labour hours or machine hours for that department}}$$



#### Example

##### Continuing the example of Manney Plc

Let us calculate a separate overhead rate for the chair and table departments:

##### Overhead absorption rate for Chair dept and Table dept

$$\begin{aligned} \text{Chair dept.} &= \frac{\text{Overheads of dept.}}{\text{Labour hours of dept.}} \\ &= \frac{\text{Tshs}140,000,000}{20,000} = \text{Tshs}7,000 \end{aligned}$$

$$\begin{aligned} \text{Table dept.} &= \frac{\text{Overheads of dept.}}{\text{Labour hours of dept.}} \\ &= \frac{\text{Tshs}200,000,000}{50,000} = \text{Tshs}4,000 \end{aligned}$$

In this case if a certain product does not pass through one of the departments then the overheads for that department will not be charged to that product at all.

Departmental overhead absorption rates are preferred where the machine hours as well as labour hours consumed are different for different departments. These rates are calculated according to different **working conditions** in each department. It is a very logical method of charging overheads in multi-product organisations where each product does not pass through all the departments.



#### Example

Stitch Plc manufactures ready-made formal shirts as well as t-shirts. The formal shirts pass through three departments A, B and C while the t-shirts pass through only two departments A and C. The departmental overhead absorption rates are Tshs500 for department A, Tshs8,000 for department B and Tshs500 for department C. The total labour hours consumed by each t-shirt are 5. One t-shirt requires 3 hours in department A and 2 hours in department C.

According to the departmental overhead rate method the overheads allocated will be:

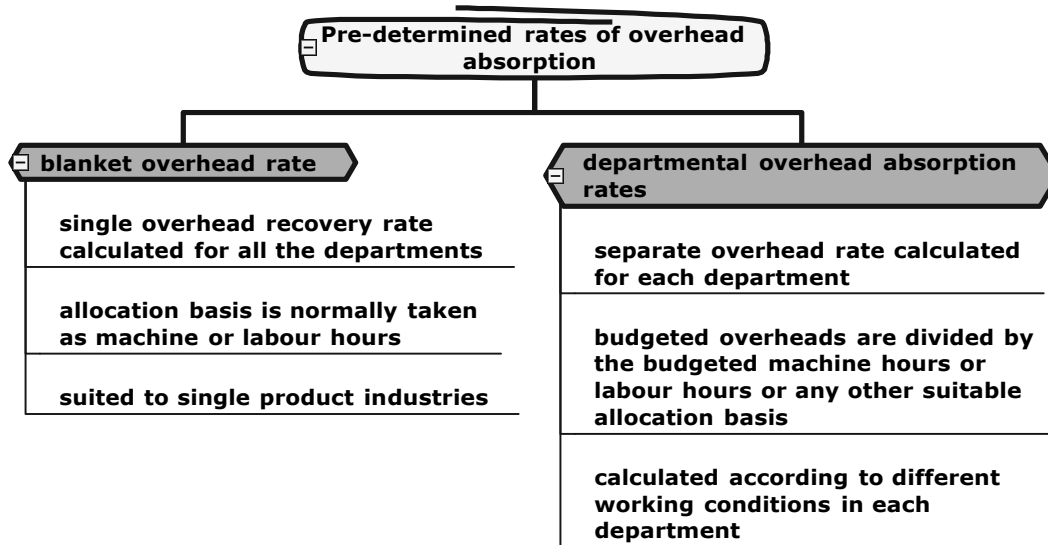
$$\begin{aligned} &= (\text{departmental overhead rate for department A} \times \text{hours in department A}) + (\text{departmental overhead rate for department C} \times \text{hours in department C}) \\ &= (\text{Tshs}500 \times 3 \text{ hours}) + (\text{Tshs}500 \times 2 \text{ hours}) \\ &= \text{Tshs}1,500 + \text{Tshs}1,000 \\ &= \text{Tshs}2,500 \end{aligned}$$

Continued on the next page

## 220: Accounting for Materials, Labour and Overheads

We can observe here that the t-shirts would have to bear an unnecessary burden of extra overheads from department B under the blanket rate method. In reality, they only pass through departments A and C and as a result, need only bear the proportion of overheads incurred in these departments.

### SUMMARY



### Test Yourself 3

What is the basic difference between blanket overhead rate and departmental overhead rate?

#### 4. Calculate overhead absorption rates by using the following methods:

- i. Percentage on direct material cost
- ii. Percentage on direct labour
- iii. Percentage on prime cost
- iv. Direct material units / Usage
- v. Direct labour hours
- vi. Machine hours / usage
- vii. Output / units

State the situations suitable for each of the above methods.

State the advantages and disadvantages of each of the above method.

[Learning Outcomes d, e and f]

Once the apportionment and the re-apportionment of the overheads are complete in the first stage, all the overheads are allocated and apportioned to the production departments. These are now to be assigned to the products. This is the stage where **the overhead absorption rates are calculated**.

Once we have the pool of overheads allocated and apportioned to the production departments, we need to divide these by the total number of a suitable unit. The most commonly used unit is a machine hour or a labour hour. The above procedure provides us with the rate per machine hour / labour hour (or any other unit used). When this rate is multiplied by the number of machine hours or labour hours consumed by each product, the amount of overheads to be assigned to each product is obtained.



### Example

Suppose the total machine maintenance cost allocated to a production department is Tshs120,000,000 and the machine hours recorded in the department are 6,000. The machine maintenance will be assigned to the products on the basis of machine hours required per product as this is the most suitable basis.

The overhead absorption rate will be calculated as = Tshs120,000,000/6,000 machine hours  
= Tshs20,000 per machine hour.

Continued on the next page

If one unit of a product processed requires 5 machine hours then the overheads to be assigned to the product will be calculated as

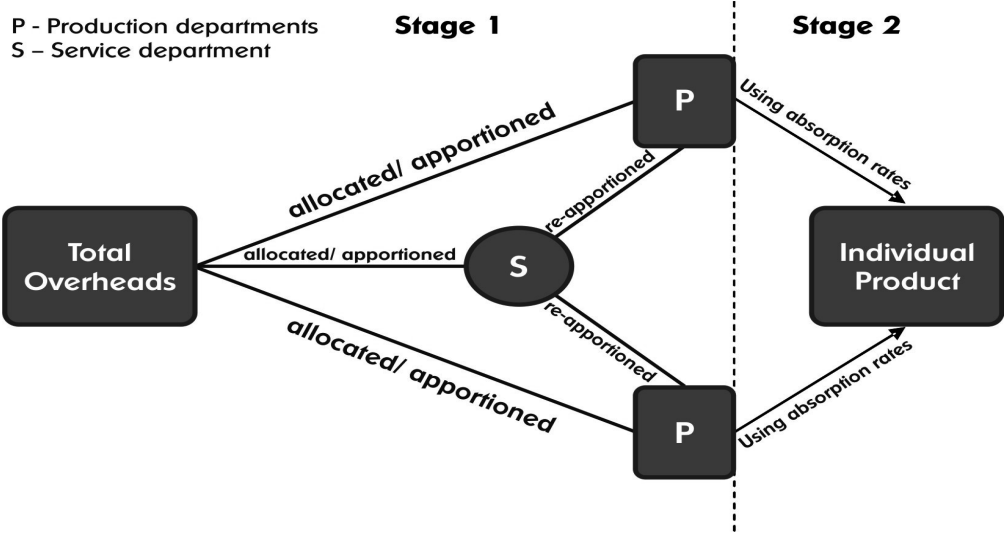
$$\begin{aligned} &\text{Overhead absorption rate} \times \text{number of machine hours consumed by the product} \\ &= \text{Tshs}20,000 \times 5 \text{ hours} \\ &= \text{Tshs}100,000 \end{aligned}$$

In conclusion, the amount of overheads assigned to the product will be Tshs100,000. This represents all the indirect costs which have gone into making that product.

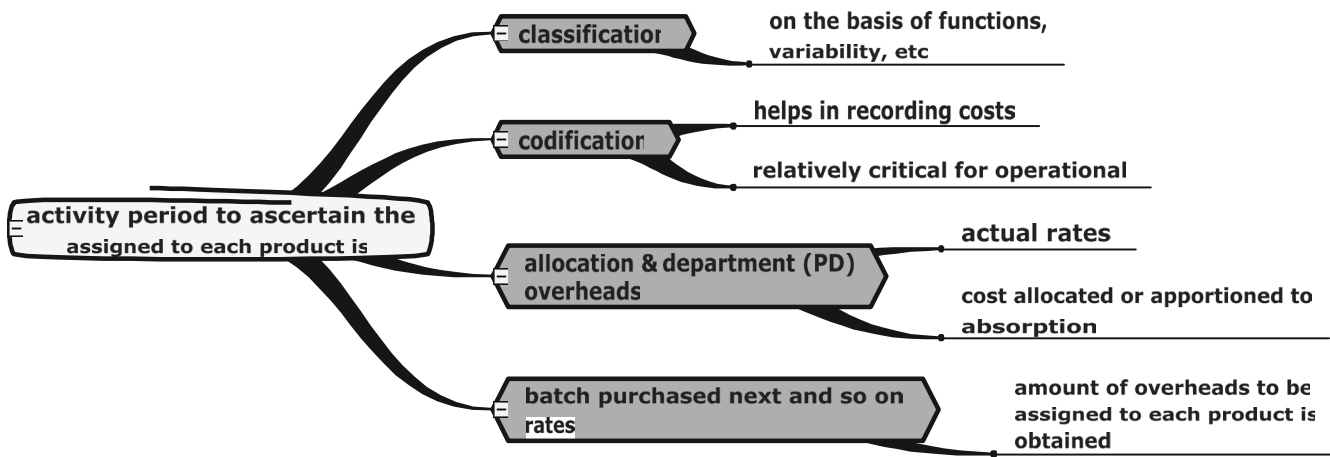
The detailed procedure for determining the **individual rates of absorption of overheads** for each department can be summarised as follows:

- Allocate and apportion the total amount of overhead expenses incurred to the production and service cost centres.
- Reapportion the service cost centre overheads to the production cost centres.
- Calculate separate overhead rates for each production cost centre.
- Assign cost-centre overheads to products.

**Diagram 2: Allocation, apportionment and absorption of overheads**



**SUMMARY**





**Test Yourself 4**

In the two stage procedure of calculation of the overhead absorption rates the overheads are first:

- A Apportioned to the service centres.
- B Allocated to the departments or cost centres.
- C Re-apportioned to the production centres.
- D Assigned directly to the products.

The departmental overhead rates are calculated using different **allocation bases** such as:

1. Direct labour hours
2. Machine hours
3. Percentage of direct material cost
4. Percentage of direct labour cost
5. Percentage of prime cost

**1. Direct material cost percentage rate / Percentage on direct material cost**

This method takes the **cost of the direct material consumed** by the department as an allocation base to calculate the overhead rate. It is expressed as a percentage, calculated as:

$$\text{Direct material cost percentage rate} = \frac{\text{Amount of overhead}}{\text{Direct material cost}} \times 100$$



**Example**

If the overheads for the production department in the organisation are Tshs20,000,000 and the direct material cost in the department is Tshs80,000,000, then the direct material percentage rate is worked out as follows:

$$\text{Overhead absorption rate} = \frac{\text{Tshs}20,000,000}{\text{Tshs}80,000,000} \times 100 = 25\%$$

As a result, if the material consumed per unit is Tshs100,000, the overhead assigned for one unit will be = 100,000 x 25% = Tshs25,000

**(a) Situations when the direct material cost percentage rate method can be used**

This method of allocation is generally preferred when:

- (i) The **material cost is the most important component of the total cost** of a product.
- (ii) The output is uniform in nature.
- (iii) There is some degree of stability in raw material prices and usage, especially in process industries where the material mix is constant.

**(b) Advantages of the direct material cost percentage rate method**

- (i) As the direct material cost can be easily obtained from the material records maintained by a company, this method is a relatively simple means of calculating the overheads absorption rate.
- (ii) By using this method, the overhead cost relating to handling and upkeep of materials can be easily absorbed.
- (iii) Expenses relating to stores can be distinguished from other overheads.

**(c) Disadvantages of the direct material cost percentage rate method:**

- (i) This method is not suitable in case of instability in the prices of raw materials.
- (ii) Factory overheads may be incurred on the basis of time. But, time factor is completely ignored in this method as it takes into account only the cost of raw materials.
- (iii) As this method is concerned with only the cost of material, the category of labour (skilled and unskilled) is completely ignored. Overheads may be incurred on the basis of the category of labour performing a task since different categories of labour would take different amounts of time.
- (iv) This method does not differentiate between fixed expenses and variable expenses.

**2. Direct labour cost percentage rate / Percentage on direct labour cost**

The **direct labour cost incurred** in the department is taken as the basis of allocation for calculating the overhead recovery rate under this method. This method is different from the labour hour rate method as it uses the **labour cost instead of the labour hours** to charge the overheads to the products. It is calculated as:

$$\text{Direct labour cost percentage rate} = \frac{\text{Amount of overhead}}{\text{Direct labour cost}} \times 100$$

**Example**

Overhead costs allocated to the production department are Tshs7,000,000 and direct wages incurred are Tshs35,000,000,

$$\text{Overhead absorption rate} = \frac{\text{Tshs7,000,000}}{\text{Tshs35,000,000}} \times 100 = 20\%$$

If the direct labour cost of a product is Tshs100,000, the overheads absorbed by the product will be = 100,000 x 20% = Tshs20,000.

**(a) Situations when the direct labour cost percentage rate method can be used:**

- (i) The department is **labour intensive** and the **labour cost is the most important component of the total cost**.
- (ii) There is uniformity in production and the category of labour employed (that is, the ratio between skilled and unskilled workers is constant).
- (iii) There is stability in the pay rates across the organisation.

**(b) Advantages of the direct labour cost percentage rate method**

- (i) Time factor is given due consideration as wages are paid to labour based on the time spent by them on work.
- (ii) As compared to material prices, labour rates are more stable in nature, thus, this method is a better way of absorbing overheads as compared to the direct material cost percentage rate method.
- (iii) Data required for calculation of the absorption rate is easily available from labour records maintained by an organisation.

**(c) Disadvantages of the direct labour cost percentage rate method**

- (i) In case an organisation follows the piece rate system of pay, time factor will be ignored under this method.
- (ii) No differentiation is made between the output produced by workers operating the machines and the output produced by manual labour.
- (iii) This method does not differentiate between fixed expenses and variable expenses.
- (iv) This method is not useful in case labour is not the most important element of cost.

## 224: Accounting for Materials, Labour and Overheads

### 3. Prime cost percentage method / Percentage on prime cost

Prime cost is the total of the direct material cost, direct labour cost and direct expenses. Overheads form a part of the costs that are added to the prime cost of the product. The prime cost percentage method absorbs the overheads **as a percentage of the prime cost** of the product. It is calculated as:

$$\text{Prime cost percentage rate} = \frac{\text{Amount of overhead}}{\text{Prime cost}} \times 100$$



#### Example

The overheads incurred in the production department are Tshs10,000,000 and prime cost for the cost centre is Tshs100,000,000.

$$\text{Overhead absorption rate} = \frac{\text{Tshs10,000,000}}{\text{Tshs100,000,000}} \times 100 = 10\%$$

The overheads absorbed in a product whose prime cost total is Tshs100,000, will be = Tshs100,000 x 10% = Tshs10,000

#### (a) Situations when the prime cost percentage method can be used

- (i) The output is uniform in nature.
- (ii) There is some degree of stability in raw material prices and usage, especially in process industries where the material mix is constant
- (iii) There is uniformity in production and the category of labour employed (that is, the ratio between skilled and unskilled workers is constant
- (iv) There is stability in the pay rates across the organisation

#### (b) Advantage of the prime cost percentage method

- (i) Data required for calculation of the absorption rate is easily available from material and labour records maintained by an organisation.

#### (c) Disadvantages of the prime cost percentage method

- (i) In case the predominating constituent of prime cost is the material cost, then due consideration is not given to the time factor. This method does not differentiate between fixed expenses and variable expenses. No differentiation is made between the output produced by workers operating the machines and the output produced by manual labour.

### 4. Direct labour hour rate / Direct labour hours

Under this method, **direct labour hours consumed in the department** are taken as the **basis for charging overheads**. According to this method, the absorption rate is calculated by dividing the overheads allocated and apportioned to a department by the number of labour hours consumed by the department.

$$\text{Labour hour rate} = \frac{\text{Total overheads allocated / apportioned}}{\text{Direct Labour hours worked}}$$



#### Example

The overheads allocated to the production department amount to Tshs10,000,000 and the direct labour hours utilised are 5000. The overhead absorption rate will be calculated as:

$$\text{Overhead absorption rate} = \frac{\text{Tshs10,000,000}}{5,000} = \text{Tshs2,000 per hour}$$

If one unit of output consumes 1.5 labour hours, then the overheads absorbed by the product will be = Tshs2,000 per hour x 1.5 hours per unit = Tshs3,000

**(a) Situations when the labour hours method can be used**

- (i) The department is **labour intensive** and the **labour cost is the most important component of the total cost**.
- (ii) The organisation decides to give consideration to the time factor.

**(b) Advantages of the direct labour hours method**

- (i) This method is a scientific method as a majority of the overhead expenses are related to the labour time.
- (ii) This is a perfect method for typically **labour-driven industries**.
- (iii) Most overhead expenses are generally incurred on the labour resource. These include welfare expenses, canteen expenses etc. This method therefore qualifies as the most logical method for computation of the overhead rate.

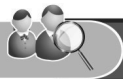
**(c) Disadvantages of the direct labour hours method**

- (i) This method leads to incorrect distribution of overheads as factors other than labour are not considered.
- (ii) Expenses such as depreciation of assets, power, fuel, etc., which are not related to labour, are totally ignored.

**5. Machine hour rate / Machine hours / usage**

Under this method, the products absorb overheads on the basis of **machine hours consumed** for production. The absorption rate is calculated as:

$\text{Machine hour rate} = \frac{\text{Amount of overhead}}{\text{Machine hours consumed in the department}}$
--

**Example**

The overheads allocated to the production department for the month are Tshs25,000,000 and the machine hours consumed are 2,500. The absorption rate will be calculated as:

$$\text{Overhead absorption rate} = \frac{\text{Tshs25,000,000}}{2,500} = \text{Tshs10,000 per machine hour}$$

If one product consumes 2 machine hours for production, the overheads absorbed for the product will be  
 = 2 hour x Tshs10,000 per machine hour = Tshs20,000

**Example**

Car manufacturing units are fully automated and produce cars with minimum human involvement. Using the machine hours as the basis for overhead absorption in this case is a logical way to assign overheads to products.

**(a) Situations when the direct material cost percentage rate method can be used:**

Machine hours are generally used as an allocation basis for assigning overheads to products, by **highly mechanised industries**. Labour is very sparingly used in these industries. It appears more logical to use this basis, as most of the overheads such as depreciation, insurance, repairs, power etc. are machine-related overheads in such industries.

**(b) Advantages of the machine hours method:**

- (i) Scientific way of absorbing production overheads
- (ii) Helps in comparing the relative costs and efficiencies of different machines in an organisation
- (iii) Helps in highlighting the idle hours of machines
- (iv) Helps management in choosing between manual work and use of machines by comparing the productivity of each alternative
- (v) Forms the basis of setting standards, estimating production costs, etc.



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### (c) Disadvantages of the machine hours method:

- (i) It is a relatively costly method as it involves analysing the number of machine hours worked accurately.
- (ii) Expenses not related to working of machines are ignored.
- (iii) The method does not provide accurate results if manual labour is as important as use of machines.
- (iv) Use of a blanket machine hour rate is not possible.

### 6. Direct material units / usage

Under this method, the products absorb overheads on the basis of **direct materials used** for production. The absorption rate is calculated as:

$$\text{Direct material usage rate} = \frac{\text{Amount of overhead}}{\text{Direct materials consumed in the department}}$$



### Example

The overheads allocated to the production department for the month are Tshs50 million and the direct materials consumed are 5,000 kg. The absorption rate will be calculated as:

$$\text{Overhead absorption rate} = \frac{\text{Tshs50 million}}{5,000 \text{ kg}} = \text{Tshs10,000 per kg}$$

If one product consumes 2 kg materials for production, the overheads absorbed for the product will be  
= 2 kg x Tshs10,000 per kg = Tshs20,000

### Alternate method

If instead of units of direct materials consumed, the cost of direct materials is considered, the answer will be derived in percentage.



### Example

Continuing the previous example,

The overheads allocated to the production department for the month are Tshs50 million and the direct materials consumed are 5,000 kg, the rate per kg is Tshs4,000. The absorption rate will be calculated as:

$$\text{Overhead absorption rate} = \frac{\text{Tshs50 million}}{5,000 \text{ kg} \times \text{Tshs4,000}} = 250\%$$

If one product consumes Tshs75,000 of the direct materials for production, the overheads absorbed for the product will be = Tshs75,000 x 250% = Tshs187,500

### (a) Situation when the direct material units method can be used

This method is most effective when the department is material intensive and the material cost is the most important component of the total cost.

### (b) Advantages of the direct material units method

- (i) This is a perfect method for material intensive industries.
- (ii) As the direct material cost can be conveniently obtained from the material records maintained by a company, this method is a relatively simple means of calculating the overheads absorption rate.
- (iii) By using this method, the overhead cost relating to handling and upkeep of materials can be easily absorbed.

**(c) Disadvantages of the direct material units method**

- (i) This method leads to incorrect distribution of overheads, as factors other than material usage are not considered.
- (ii) Expenses such as depreciation of assets, power, fuel, etc., which are not related to material usage, are totally ignored.

**7. Output / units**

This method is also known as production units method. Under this method, absorption rate is determined on the basis of number of units produced, and is known as Cost Unit Rate. The recovery rate is calculated by dividing the actual or budgeted factory overheads by the number of cost units produced. The absorption rate is calculated as:

$$\text{Cost unit rate} = \frac{\text{Amount of overhead}}{\text{Units produced}}$$

**Example**

The overheads allocated to the production department for the month are Tshs50 million and the total number of units produced are 7,500. The absorption rate will be calculated as:

$$\text{Overhead absorption rate} = \frac{\text{Tshs50 million}}{7,500 \text{ units}} = \text{Tshs6,667 per unit}$$

If one department produces 500 units, the overheads absorbed for the product will be = 500 units x Tshs6,667 per unit = Tshs3,333,500

Situation when the output / units method can be used: this method is most suitable in mining industries, brick laying units, foundries, etc. The method can be very well applied in industries whose output is measured in physical units like weight, volume and number.

**Disadvantages of the output / units method:** the main limitation of this method is that it can be only applied in industries which are engaged in producing limited number of items and the items can be easily measured in physical units.

**5. Calculate the over or under absorbed overheads.****[Learning Outcome g]**

In the above example of Preset Plc (in Learning Outcome 2) it is mentioned that the overheads are absorbed by the units according to pre-determined overhead absorption rates. These rates are calculated by dividing the budgeted overheads by the budgeted units. However, these figures are subject to change.

**Example**

Suppose the budgeted units are 200 and budgeted overheads are Tshs400,000. In this case the pre-determined overhead recovery rate will be Tshs400,000/200 = Tshs2,000 per unit. If the actual overheads amount to Tshs420,000 and the units produced are 230 then the actual overhead rate will be Tshs420,000/230 = Tshs1,826 per unit.

The overheads under the normal costing procedures are absorbed on the basis of the **pre-determined overhead absorption rates**. In the above case, if the overheads are absorbed in the units produced on the basis of the pre-determined absorption rates the overhead cost of the actual units will be = 230 units x Tshs2,000 per unit = Tshs460,000

	<b>Overheads (Tshs)</b>	<b>Rate (per unit)</b>
Actual	Tshs420,000	Tshs1,826
Pre-determined	Tshs460,000	Tshs2,000

## 228: Accounting for Materials, Labour and Overheads

From the above table it is clear that there is a difference between the actual figures and the figures according to the costing records. This is a drawback of cost accounting. The final records according to costing rules and the actual records according to financial accounting rules have to be reconciled at the end of the activity period for the difference in cost. This phenomenon is called **under-absorption and over-absorption of overheads**. The under- / over-absorbed overheads present substantial problems of analysis for management. In the above example, the overheads absorbed per unit are Tshs2,000, whereas the actual overheads incurred are Tshs1,826. The overheads are **over-absorbed to the extent of Tshs174 per unit**.

	Overheads per unit	Units	Total overheads Tshs
Overheads absorbed	Tshs2,000	230	Tshs460,000
Actual overheads	Tshs1,826	230	Tshs420,000

The above case reflects that the overheads have been **over-absorbed by Tshs40,000**. Similarly there can be a case of under-absorption of overheads where the overheads absorbed will be less than the actual overhead costs incurred.



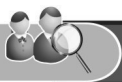
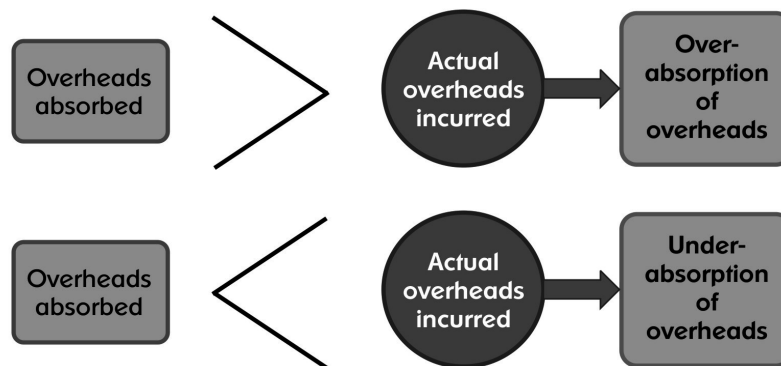
### Tip

#### In summary

**Overheads are under-absorbed** when the amount of **actual overheads** is **more than** the amount of the **overheads absorbed**.

**Overheads are over-absorbed** when the amount of the **actual overheads** is **less than** the amount of the **overheads absorbed**.

**Diagram 3: Under- and over-absorption of overheads**



### Example

Riverside Plc has budgeted overheads of Tshs600 million for the activity period. The organisation has decided to absorb the overheads on the basis of the budgeted machine hours. The budgeted machine hours worked for the period are 600,000.

The actual overheads incurred for the period are Tshs650 million and the machine hours worked are 560,000.

#### Required:

Calculate the under- / over-absorption of overheads and give reasons.

#### Answer

$$\text{Overhead absorption rate} = \frac{\text{Budgeted overhead}}{\text{Budgeted machine hours}}$$

$$= \frac{\text{Tshs600 million}}{600,000 \text{ hours}} = \text{Tshs1,000 per machine hour}$$

**Continued on the next page**

	Tshs million
Actual overheads incurred	650
Overheads absorbed (Tshs1,000 x 560,000 hours worked)	560
Overheads under-absorbed	90

The overheads are under-absorbed as the hours worked are less than the budgeted hours and also the actual overheads are more expensive as the actual overhead rate per machine hour is Tshs650 million/560,000 = Tshs1,160.7 per machine hour as compared to the budgeted rate of Tshs1,000 per machine hour.



### Test Yourself 5

Thermo Plc has provided the following data regarding the six month period ending Dec 20X3:

	Budgeted	Actual
Overheads (Tshs'000)	250,000	300,000
Number of units	200,000	200,000

#### Required:

Calculate and give reasons for the under- / over-recovery of overheads.

### Answers to Test Yourself

#### Answer to TY 1

The correct option is **D**.

The overhead absorption rates are derived by dividing budgeted overheads by budgeted units / hours.

#### Answer to TY 2

The correct option is **A**.

$$\text{Actual overhead absorption rate} = \frac{\text{Tshs}280,000,000}{70,000} = \text{Tshs}4,000$$

#### Answer to TY 3

Blanket overhead rate is a single overhead recovery rate calculated for all the departments in an organisation, whereas departmental overhead rate is a separate overhead rate calculated for each department according to the nature of work carried out in each department.

#### Answer to TY 4

The correct option is **B**.

#### Answer to TY 5

	Budgeted	Actual
Overheads (a)	Tshs250,000,000	Tshs300,000,000
Number of units (b)	200,000	200,000
Overhead rate (a/b) per unit	Tshs1,250	Tshs1,500

#### Thermo Plc - Statement showing under- / over-absorption of overheads for six months ending Dec 20X8

	Tshs	Reason
Overheads incurred	Tshs300,000,000	Although the number of units is the same, the overheads per unit have become more expensive. The actual rate is Tshs1,500 per unit whereas the budgeted rate is Tshs1,250 per unit
Budgeted overheads	Tshs250,000,000	
<b>Under-absorption</b>	<b>Tshs50,000,000</b>	

## 230: Accounting for Materials, Labour and Overheads

### Self Examination Questions

#### Question 1

Direct expenses are:

- A Apportioned to the products on a suitable basis.
- B Not charged to the products at all.
- C Charged to the cost of machines used.
- D Charged to the products directly.

#### Question 2

The blanket rate method uses:

- A One single rate to charge the overheads to all products.
- B Different rates for different departments.
- C Different rates for different products.
- D All of the above

#### Question 3

The information given below is extracted from the budget of Alpha Plc for the year ending 20X8:

	Tshs'000
Factory overheads	93,000
Direct material cost	300,000
Direct labour cost	150,000
Direct expenses	76,000
	Hours
Direct labour hours	232,500
Machine hours	75,000

#### Required:

Calculate the overhead rate for absorbing factory overheads using different allocation bases.

#### Question 4

The overhead absorption rate of Magnum Ltd is Tshs4,750 per machine hour. The budgeted machine hours for the period are 46,000. The actual total overheads incurred during the same period are Tshs205,665,000 and the actual machine hours recorded are 43,000.

#### What are the total overheads for the period?

- A Over-absorbed by Tshs1,415,000
- B Over-absorbed by Tshs12,835,000
- C Under-absorbed by Tshs1,415,000
- D Under-absorbed by Tshs12,835,000

#### Question 5

A company uses absorption costing with a predetermined hourly fixed overhead absorption rate. The following situations arose last month:

- (i) The actual hours worked were fewer than the planned hours
- (ii) The actual overhead expenditure was more than the planned expenditure

#### Which statement is correct?

- A Situation (i) would cause overheads to be under-absorbed and situation (ii) would cause overheads to be over-absorbed.
- B Situation (i) would cause overheads to be over-absorbed and situation (ii) would cause overheads to be under-absorbed.
- C Both situations would cause overheads to be over absorbed.
- D Both situations would cause overheads to be under absorbed.

**Question 6**

The non-production overheads can be assigned to the units of output on the basis of machine hours or labour hours worked.

- A** True  
**B** False

**Question 7**

Remo Plc absorbs its fixed overheads on the basis of machine hours. During the last year, total overheads incurred were Tshs120,000,000 and actual machine hours were 45,520. The fixed overheads were under absorbed by Tshs6,200,000. Assuming that the budgeted machine hours are 42,000, what is the fixed overheads absorption rate?

- A** Tshs2,640  
**B** Tshs2,500  
**C** Tshs2,860  
**D** None of the above

### Answers to Self Examination Questions

**Answer to SEQ 1**

The correct option is **D**.

Direct expenses are directly charged to the products as these are readily identifiable with the products. Indirect expenses are apportioned to the products on a suitable basis. All the expenses incurred, whether direct or indirect, must be charged to the products. Direct expenses cannot be charged to the cost of machines used. Option (c) is a vague situation.

**Answer to SEQ 2**

The correct option is **A**.

Under the blanket overhead rate method, a single overhead rate is calculated for the entire organisation. Different rates for different departments are calculated under the two stage procedure for calculation of the overhead absorption rates. Different rates for different products are charged when the processing of each product largely differs.

**Answer to SEQ 3**

Calculation of overhead absorption rate for Alpha Plc:

(a)	Direct material cost percentage rate = $\frac{\text{Amount of overhead}}{\text{Direct material cost}} \times 100$	$= \frac{\text{Tshs}93,000,000}{\text{Tshs}300,000,000}$ <b>= 31%</b>
(b)	Direct labour cost percentage rate = $\frac{\text{Amount of overhead}}{\text{Direct labour cost}} \times 100$	$= \frac{\text{Tshs}93,000,000}{\text{Tshs}150,000,000} \times 100$ <b>= 62%</b>
(c)	Prime cost percentage rate = $\frac{\text{Amount of overhead}}{\text{Prime cost}} \times 100$	$= \frac{\text{Tshs}93,000,000}{\text{Tshs}526,000,000} \times 100$ <b>= 17.68%</b>
(d)	Direct labour hour rate = $\frac{\text{Amount of overhead}}{\text{Direct labour hours}}$	$= \frac{\text{Tshs}93,000,000}{232,500}$ <b>= Tshs400 per labour hour</b>
(e)	Machine hour rate = $\frac{\text{Amount of overhead}}{\text{Machine hours}}$	$= \frac{\text{Tshs}93,000,000}{75,000}$ <b>= Tshs1,240 per machine hour</b>

## 232: Accounting for Materials, Labour and Overheads

### Working

Prime cost = Direct material cost + Direct labour cost + Direct expenses  
= Tshs300,000,000 + Tshs150,000,000 + Tshs76,000,000  
= Tshs526,000,000

### Answer to SEQ 4

The correct option is **C**.

Overheads absorbed are less than the actual overheads incurred.

	Tshs'000
Actual overheads incurred	205,665
Overheads absorbed Tshs4,750 x 43,000	204,250
<b>Overheads under-absorbed</b>	<b>1,415</b>

### Answer to SEQ 5

The correct option is **D**.

When the actual hours worked are fewer than the planned hours, the overheads absorbed will amount to less than what was actually planned. This is because the overheads are absorbed based on the standard absorption rate. Even if the actual expenditure is higher than the planned expenditure, the overheads absorbed based on the standard absorption rate will be less than the actual overheads absorbed and hence again overheads will be under-absorbed.

### Answer to SEQ 6

The correct option is **A**.

One of the ways of assigning the non-production overheads to the units of output is to find a factor which very closely affects the non-production overhead cost incurred on the product. The level of non-production overhead expenditure is often dependent on the number of machine hours or labour hours worked.

### Answer to SEQ 7

The correct option is **B**.

Actual overheads	Tshs120,000,000
<b>Less: Under absorption of overheads</b>	<b>(Tshs6,200,000)</b>
<b>Absorbed overheads</b>	<b>Tshs113,800,000</b>

Overhead absorption rate = Budgeted fixed overheads/Budgeted machine hours

Hence,

Machine hours worked = Overhead absorbed/Overhead absorption rate  
45,520 hours = Tshs113,800,000/OAR  
OAR = Tshs2,500

## STUDY GUIDE B6: PROCUREMENT

### Get Through Intro

Organisations across the globe today are competing to reduce operating cycle, improve quality and reduce production and overhead costs. In order to achieve this, the concept of supply chain management has gained prominence.

Supply chain management essentially involves better co-ordination and management between the inflow of materials from suppliers and outflow to the network of distributors responsible to reach the product(s) to the end consumers.

In this Study Guide we shall discuss the importance of purchasing and the procurement process in the light of its relevance in the overall supply chain management.

### Learning Outcomes

- a) Explain the role and nature of procurement and supply management in a supply chain context.
- b) Describe the procurement process.
- c) Explain the obstacles involved in procuring goods, works and services from global markets compared to procuring locally and identify the benefits of using local products rather than products from global markets.
- d) Explain the objectives of purchasing. Describe the basic functions that must be performed to satisfy the objectives of purchasing.
- e) Mention aids for identifying sources of supply.



**1. Explain the role and nature of procurement and supply management in a supply chain context.**

[Learning Outcome a]

**1.1 Supply chain**

Supply chain is the entire set of participants starting from the suppliers, transporters, storage providers, distributors to retailers. It basically refers to all those involved in the creation and reach of the product to the end consumer.

Supply chain has three main parts:

1. Procurement and acquisition of material
2. Manufacturing / processing of raw material into end products
3. Distribution of the above to the retailers / end consumers

Supply chain management (SCM) tries to unite / integrate the activities performed by each of its participants .i.e. suppliers, transporters, storage providers, distributors and retailers so as to produce the optimal quantity at the right time and at the minimal cost.

Supply chain management comprises of following:

- Procurement management
- Manufacturing
- Inventory management and control
- Transportation (Logistics)
- Warehousing
- Reverse logistics (returns)
- Order fulfilment

**1.2 Role and nature of procurement and supply management function**

We find that procurement is the start point in the supply chain. It is at the base of the process. Therefore a sub-optimal procurement would render all further processes inadequate. Therefore procurement plays a key role in the supply chain context.

The role and nature of procurement in the supply chain context emerges in the following areas:

**1. Drawing up a procurement policy**

- (a) Framing a procurement policy based on overall business interests and company policies
- (b) Policies should be such that they aim to cover all the interests of the company in terms of quality, cost and service
- (c) Once drawn up the policies should be continuously reviewed to cater to any changes in business environment or dependent variables.



**Example**

Solitaire Ltd. is a newly incorporated firm engaged in manufacturing of automobile spare parts. A study of the performance of industry peers has revealed that supply chain management is the key to efficiency.

Procurement from the right sources and planning has been an area of concern. The company proposes to draw up a detailed procurement policy as a first step in the light of overall company policies and industry practices.

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**2. Strategic decision on method of purchase**

Once of the key decisions is whether to have the procurement function centrally for the organisation (centralised procurement) or to approve decentralised purchase based on each location requirement (decentralised procurement).

### 3. Supplier management

Suppliers are at the base of the supply chain and procurement function plays a vital role in supplier selection and management. The procurement manager should thoroughly analyse usage, draw up the requirement and select suppliers. The role of procurement in ensuring timely supply of materials of good quality at the right price cannot be belittled.

### 4. Generating Savings

Supply chain management is ineffective without uninterrupted supply of right materials of required quality at reasonable cost. Even a small reduction in per unit cost of materials required in bulk quantities results in huge savings in the material cost of the company. This is the most important role of procurement.

### 5. Integration with other functions

The procurement function plays a key role in integration of the supply chain. There has to be close co-ordination with other participants of the supply chain to ensure optimal utilisation of resources. By working closely with other departments for the production metrics, this function can improve efficiency and effectiveness of the entire process.

### 6. Align procurement objectives with business goals

The procurement function should strive to continuously align its role and objectives with that of the overall organisation through a proactive approach:

- (a) Constant review of supply trends in the market
- (b) Estimating any changes in prices / material shortage / time constraints and planning accordingly
- (c) Drawing up a contingency plan for all critical inputs
- (d) Working closely with engineering and operational groups to plan for all important materials / services required especially in case of new launches or new processes.



## Test Yourself 1

Fill in the blanks:

- (a) \_\_\_\_\_ is at the start of the supply chain.
- (b) The procurement policy is based on overall \_\_\_\_\_ and \_\_\_\_\_.
- (c) \_\_\_\_\_ is purchase being made locally based on requirement.

## 2. Describe the procurement process.

[Learning Outcome b]

### 2.1 What is included in procurement process?

The procurement process may be either for materials, works or services.

#### 1. Materials could be in the form of:

- (a) Raw material of different types
- (b) Parts / components
- (c) Tools and equipments
- (d) Finished goods

#### 2. Services could be in the form of:

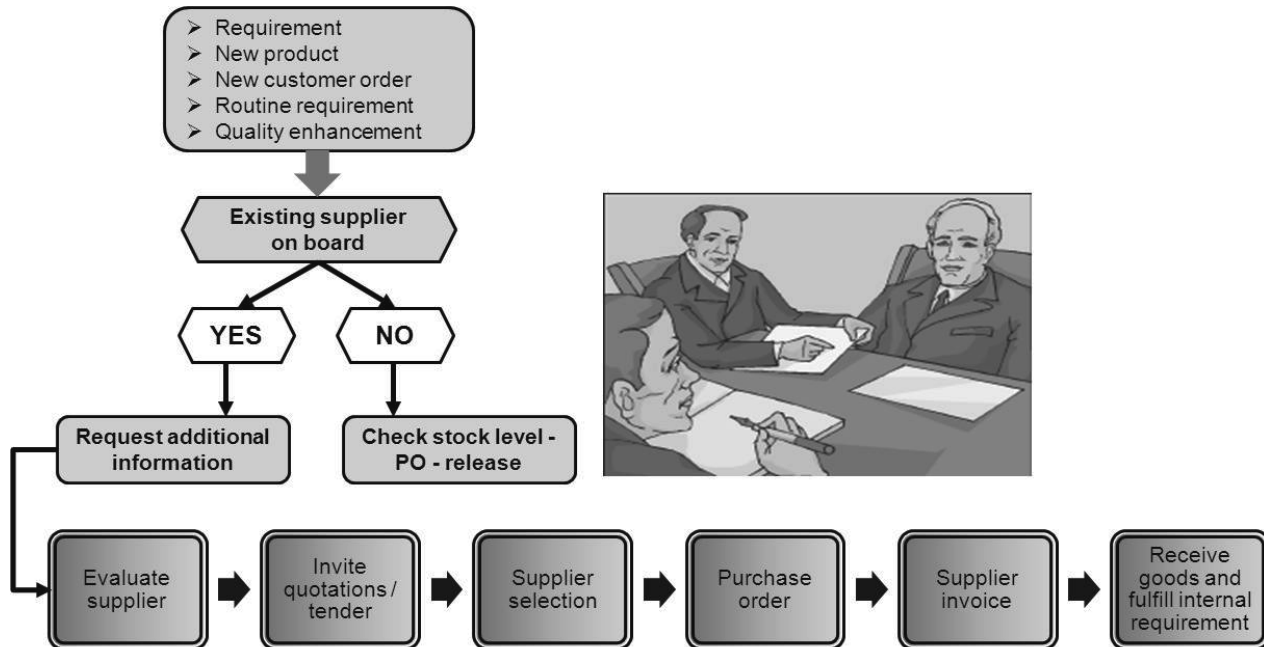
- (a) Production waste handlers
- (b) Service providers for maintenance
- (c) Computer programmers
- (d) Carriers

## 236: Accounting for Materials, Labour and Overheads

The procurement process follows the following flow chart

### 2.2 Procurement process flow chart

Diagram 1: Procurement process flow chart



### 2.3 Procurement process involves the following steps

#### 1. Identification of requirement

The participant in the supply chain primarily manufacturing function identifies the requirement and communicates the same. The requirement may be for a product or service. It may further be for a new product / service, existing product (based on new order or routine requirement). There could also be requests for quality enhancement.

#### 2. Fulfilment of requirement internally

The purchase requisition (PR) for material should clearly indicate the following:

- Date of requisition
- Product description
- Quantity required
- Date by when required
- Cost per unit
- Authorisation

A purchase requisition is a formal request to the procurement function to purchase materials

In case requirement for service, the PR should contain the details of service required, any specific skills / technical knowledge etc.

Based on the above if the requirement is in the nature of routine requirement the stock order is placed based on available stock list and catalogue.

In case of new requirement (non-routine) we proceed to supplier selection.

#### 3. Supplier scanning and selection

This is one of the most critical elements in the procurement process. If the requirement cannot be met through existing sources, additional information is called for so that the exact requirement can be communicated to prospective suppliers.

The suppliers are evaluated based on the following criteria:

- (a) The supplier's capabilities in terms of meeting standards of quality and service
- (b) Ability to scale up for future requirements
- (c) Availability of sufficient facilities and technical know-how
- (d) Management skills in terms of staff supervision, control over leakages etc
- (e) Information systems and use of technology
- (f) Compliance with environmental regulations
- (g) History in terms of order fulfilment with company / trade references
- (h) Cost competitiveness
- (i) Quality assurance procedures
- (j) Service (pre and post sales)
- (k) Years of experience in handling similar material / service
- (l) Matching in overall philosophy and practices with the company

A scorecard can be developed to evaluate the qualifying suppliers in terms of quality assurance, cost, service and time of delivery.

Based on the above parameters and analysis a supplier (s) is then shortlisted.



### Example

YZU Inc. Has developed the following balanced scorecard for local supplier evaluation

#### SCORECARD FOR SUPPLIER / VENDOR EVALUATION

##### Type of material

Name of supplier	Supplier A	Supplier B	Supplier C	Supplier D
Location				
Manufacturing capacities				
Financial position				
Management quality and expertise				
Ability to scale up				
Quality assurance & control				
Pricing				
Credit period				
Expectation on timely delivery				

##### Marking Scale 1 - 4

- 1: Satisfactory
- 2: Good
- 3: Very good
- 4: Outstanding

#### 4. Approval and purchase

The shortlisted supplier is approved internally and purchase order sent. The goods are dispatched by the supplier based on purchase order. Once goods are received they are inspected and the requirement fulfilled. In case of any discrepancy in the goods v/s order the supplier is informed and accordingly changes affected.

The payment is then made based on pre-determined terms of contract. Based on the credit period offered by the supplier, the payment is made by the accounts department. The procurement function should ensure that supplier accounts are properly tracked and settled on time. Supplier relationship management is the responsibility of the procurement function.



**Test Yourself 2**

Explain the term purchase requisition.

**3. Explain the obstacles involved in procuring goods, works and services from global markets compared to procuring locally and identify the benefits of using local products rather than products from global markets.**

**[Learning Outcome c]**

**3.1 Global Sourcing**

The world is shrinking today as one country. With the development of technology and transport it is possible to source goods and services from anywhere in the world. While evaluating any business, the practices across the globe for that industry are studied. Procurement is no exception. Today managers need not restrict themselves to the country of operation but can look at global markets for procurement of goods, works and services.



**Example**

Back office services of companies in US and UK is outsourced to call centres in developing countries like India where staff possess the required English speaking and communication skills. (this is a form of service procurement).

**1. Advantages of global sourcing**



**Example**

YXI Ltd is engaged in trading in ready-made garments in Tanzania. The company proposes to enter a new segment - kids wear. Analysis by the procurement department has shortlisted two countries from which the garments can be procured which would reduce the procurement cost by 25% as compared to domestic sourcing.

Sourcing of goods / services from global markets are certain distinct advantages

- (a) Lower cost of procurement from countries which have cost efficiencies / local advantages in producing the required materials at lower cost
- (b) Non-availability / scarcity of local goods / services can be met through global sources
- (c) Diversification through reduced dependency of one / few domestic sources
- (d) Experience in global trade which can be extended to bilateral ties through global marketing as well.

However global sourcing brings with itself certain disadvantages.

**2. Obstacles in procuring goods from global markets**

- (a) **Timely availability of materials:** It is possible that due to increased time of shipment, global procurement may take longer time to delivery which may affect the availability of required materials on time.
- (b) **Information leakage:** Outsourcing of certain services to providers in foreign countries may lead to leakage of confidential information from both the company and country perspective.
- (c) **Currency risk:** Global trade is always exposed to currency risk where the liability towards payment to suppliers may be higher than the originally contracted rate.
- (d) **Increased operation costs:** Sourcing from global markets may require increased cost of operations due to requirement of correspondent with local knowledge of that country and monitoring costs.
- (e) **Availability of transportation facilities:** Global sourcing requires uninterrupted operation of port and cargo facilities.
- (f) **Country risk:** Any political or social unrest in the country from which the product / service is sourced may jeopardise local operations.

### 3.2 Benefits of using local products over global sourcing

In the light of the obstacles to global sourcing, local procurement is always a preferred option. The benefits of local sourcing v/s. global sourcing are

1. **Quality monitoring and assurance:** Due to proximity to the supplier it is easier to check on quality and ensure that the same is as per the requirements of the internal customer. Similarly any service required can be explained and tested prior to engagement.
2. **Reference checks:** It is easier to conduct reference checks for local suppliers from peers / trade organisations.
3. **Benefits to the economy:** Local sourcing leads to creation of more employment opportunities and helps to achieve certain social objectives.
4. **Meeting deadlines:** Local sourcing helps to ensure timely delivery of materials / provision of service due to lower dependency on transport conditions.
5. **Development of procurement organisations:** As the industry matures, manufacturers may come together to form procurement organisations, through which the requirements of the industry as a whole are consolidated and negotiations affected so that good quality local suppliers can be empanelled and engaged by the individual companies.
6. **Better control:** Due to absence of currency risk and better knowledge of domestic country laws, local sourcing provides the benefit of better control over procurement operations.



### Test Yourself 3

Currency risk is a disadvantage of:

- A Global sourcing
- B Local sourcing
- C None of above
- D Inefficient procurement function

**4. Explain the objectives of purchasing. Describe the basic functions that must be performed to satisfy the objectives of purchasing.**

[Learning Outcome d]

#### 4.1 Objectives of purchasing

Having studied the overall role of procurement function and the process flow chart, let's proceed to understand the objectives of purchasing to ensure adequate material control and smooth operations.

The basic objectives of purchasing are:

1. **Optimal order quantity:** The purchase department should aim to order the right quantity so that the ordering costs and cost of holding are minimised
2. **Cost control:** All purchasing should be done keeping in view the overall cost budget. Further sufficient analysis of available options should be done to ensure cost efficiency and control.
3. **Right timing of purchase:** The timing of purchase is very critical so that inventory is not held in stock for an unnecessary long period of time without being put to productive use. This would lead to an increase in holding cost. Further in case of materials with an expiry date the timing of purchase is critical.
4. **Ensure timely availability of all required materials:** All the materials required in routine manufacturing / specific order fulfilment / new product launch should be available without interruption at the required time to eliminate any avoidable lead time in product procurement.
5. **Inventory control:** The purchasing department should ensure adequate inventory control to eliminate any theft / loss / misappropriation.

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- 6. Strong supplier relationships:** Supplier relationship is at the centre of procurement. Therefore, purchasing function staff should aim to have cordial supplier relationship to ensure timely delivery coupled with good quality and reasonable cost.
- 7. To ensure fair trade practices and protect company reputation:** All activities should be in line with company policies, should ensure fair trade practices and compliance with law.



### Example

Creative Inc. has received quotation from two suppliers for supply. Supplier A is 20% cheaper than the quote of Supplier B. However, the procurement manager is not satisfied with the internal controls of Supplier A to ensure compliance to quality standards and environmental regulations.

He advises the management to view the proposal considering all objectives of purchasing.

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## 4.2 Basic functions to fulfil the objectives of purchasing

In order to fulfil the above objectives, purchasing function should perform the follow basic functions

- 1. Scrutiny of purchase requisitions:** In case of regular materials, the storekeeper prepares the purchase requisition (PR) and in case of new requirements the PR is initiated by the concerned department head. This is normally prepared in triplicate with original to purchase department, one copy retained by person who initiates it and third to the authorising official. The PR should be scrutinised by the purchase function for completeness of information.
- 2. Indenting materials:** In case of routine orders an indent is prepared based on available catalogue and price list. In case two or more suppliers are on board, timely delivery and cost considerations are weighed and the order placed.
- 3. Selection of supplier:** On receipt of purchase requisition, the purchase department needs to select a source of supply. A list of suppliers (both approved and available) with all the details for each category of material should be maintained. Quotations should be invited. A tendering process can also be deployed wherever required.
- 4. Analysis of quotations:** Once quotations are received, they should be analysed and scanned. The vendor selection should be based on pre-determined criteria (discussed in the preceding learning outcomes).
- 5. Negotiation and supplier selection:** Further the purchase manager should negotiate with the shortlisted vendors in terms of required deliverables. A supplier should then be selected, and the terms and conditions agreed upon.
- 6. Liaisoning with operations and accounts:** Any changes in operational requirements should be enquired. The purchase manager should take inputs from accounts / operational teams where required prior to issue of purchase order. Further if the supplier lays down any specific requirement the concurrence of other departments should be obtained.
- 7. Issue purchase order:** A purchase order should be issued which is a written authorisation to supply particular material / materials. All the terms and conditions should be stated. The requisite number of copies should be prepared.
- 8. Legal compliance:** Compliance of all regulatory requirements with regard to the industry in which the company operates should be ensured. All quality control procedures should be complied with all the suppliers.
- 9. Settlement of bills:** Invoice received from the supplier, should be sent to accounts section to check the arithmetical accuracy and authenticity. The quantity / price should be tallied with the purchase order and stores received note. Once the invoice is verified the payment is made according to agreed terms.
- 10. Information dissemination:** The purchase department should maintain complete records with regard to each material and supplier. There should be periodic updates being sent to management and concerned departments on current market trends, estimated shortages / constraints etc.

- 11. Periodic evaluation of supplier:** The suppliers should be subject to periodic evaluation to analyse their performance during the period in terms of quality, time of delivery, sales practices, competitive pricing. If any of them is found unsuitable based on these parameters, in future quotations should not be invited from them.
- 12. Develop alternate sources of supply:** Purchasing function needs to ensure that alternate sources of supply are available for each category of material. They need to evaluate changing trends in purchasing and competition action to ensure optimal utilisation of time and resources.



### Test Yourself 4

State the objectives of purchasing.

### 5. Mention aids for identifying sources of supply.

[Learning Outcome e]



### Example

Precision Ltd. proposes to engage in trading in dry fruits and spices. As a new entrant in this industry the company needs to establish its procurement policy and identify sources of supply for each of its products. Further there are also certain services which would need to be procured. Should the company just follow competition or are there more efficient ways of identifying sources of supply.

An organisation may require a source of supply for a material or a service. Each industry has specific practices for sourcing. The following are the aids to identify sources of supply:

1. **Trade references:** In case the firm is a new entrant in the industry, sources of supply tapped by the existing peers in the industry form the most reliable means of identifying sources of supply.
2. **Global practices:** In case of certain industries global sourcing might offer distinct advantages in terms of cost and quality. Therefore, in today's time of globalisation, the procurement manager should evaluate the sourcing pattern of not only domestic companies but all by global players engaged in same line of business. These should be evaluated in the light of company policies and primary objectives.
3. **E-procurement:** Technology today offers complete information on what is available anywhere in the globe. Internet has revolutionised every walk of life. E-procurement refers to purchase of goods and services over the internet. There are numerous websites which provide list of registered suppliers of various materials. They also facilitate contact and trade over the internet itself. This helps to eliminate middlemen in the purchase process.
4. **Trade organisations:** In certain industries there are trade organisations that act as an advisory and regulatory board for the industry. These organisations offer services to their members through advisory on supply chain management, sales and marketing etc. Such organisations may act on behalf of the industry and help in empanelment of suppliers, negotiations and quality control.
5. **Media:** Media in terms of newspapers, television, internet where the suppliers advertise their offerings can be screened by the procurement manager. This is typically important to be aware of any new offers by existing suppliers or entry of new aggressive players on the supply side who are willing to offer better terms at the commercial rates being currently incurred by the firm.
6. **Tendering:** Tendering can be used as one of the aids in identification of supply sources. Tendering involves invitation of bids. There are different types of tendering methods
  - (a) **Open tender:** Under open tender advertisement is given in media normally newspaper and bids are invited for the tender document. Normally tender money is charged which is used to meet the expenses of tender issue. An earnest deposit is also taken which is refundable if the bid is not accepted.

Open offer has distinct advantages:

- (i) Ensures competitiveness and getting the most favourable bid
- (ii) Helps to eliminate bias/ favouritism in the selection process
- (iii) If trained staff is deployed ensures appropriate results
- (iv) Ensures transparency in operations with acceptance of most appropriate bid in terms of cost and quality.

However open offer is a time-consuming process and cannot be utilised as a routine form of procurement. It is ideal for high cost / major procurement of materials / services which require reasonable deliberation.



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- (b) **Limited tender:** In this case tendering is limited to few suppliers. From the overall list of available suppliers procured from other sources, a list of suitable ones is drawn up based on quality and service standards. Tenders are then invited from them. The criteria for acceptance in this case would primarily be pricing since other attributes are reviewed previously.
- (c) **Single tender:** This applies in case of large contracts where there is one well-known service provider / supplier. The firm contacts the supplier and invites the tender. Then discussions are held and the supplier or service provider is engaged.



### Test Yourself 5

Fill in the blanks:

- (a) \_\_\_\_\_ refers to purchase of goods and services over the internet.  
(b) \_\_\_\_\_ is a form of tendering limited to few suppliers.  
(c) The biggest advantage of open tender is that it ensures \_\_\_\_\_.

### Answers to Test Yourself

#### Answer to TY 1

- (a) Procurement  
(b) Business interests , company policies  
(c) Decentralised purchase

#### Answer to TY 2

A purchase requisition is a formal request to the procurement function to purchase materials. It is initiated by the store keeper in case of existing material or by the concerned department in case of new material. The purchase requisition (PR) for material should cover the product description, date of requisition, quantity required, cost per unit, date by when required and required authorisation(s).

In case requirement for service, the PR should contain the details of service required, any specific skills / technical knowledge etc.

#### Answer to TY 3

The correct option is **A**.

#### Answer to TY 4

The objectives of purchasing within the overall role of procurement is as follows:

- (a) Optimal order quantity  
(b) Cost control  
(c) Right timing of purchase  
(d) Ensure timely availability of all required materials  
(e) Inventory control  
(f) Strong supplier relationships  
(g) To ensure fair trade practices and protect company reputation

#### Answer to TY 5

- (a) E-procurement  
(b) Limited tender  
(c) competitiveness

## Self Examination Questions

### Question 1

Identify the different types of procurement?

### Question 2

ABC is a procurement and supply management consultant to M/s. TREGA Ltd. While developing a scorecard from supplier selection what parameters should ABC include to enable objective selection of a supplier in the procurement process?

### Question 3

“The function of purchasing function ends with supplier selection and receipt of materials”.

**State whether this statement is true or false.**

### Question 4

Advantage of local purchase is:

- A Better control
- B Absence of currency risk
- C Benefits to the economy
- D All of above

## Answers to Self Examination Questions

### Answer to SEQ 1

Procurement can be:

#### 1. Procurement of materials – Materials to be procured can be:

- (a) Raw material of different types
- (b) Parts / components
- (c) Tools and equipment
- (d) Finished goods

#### 2. Procurement of services - Services could be in the form of:

- (a) Production waste handlers
- (b) Service providers for maintenance
- (c) Computer programmers
- (d) Carriers

### Answer to SEQ 2

ABC Consultants

Client – M/s. TREGA Ltd.

Assignment – Development of scorecard for supplier selection

#### Parameters for supplier selection:

1. Number of years experience in dealing in material under consideration
2. Domain knowledge
3. Management quality and involvement in daily operations
4. Manufacturing expertise
5. Manufacturing capacity and ability to scale up
6. Customer service
7. Financial position
8. Trade references
9. Expectations on quality assurance
10. Prior experience in dealing with the group
11. Compliance procedures to meet the requirements of law

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### Answer to SEQ 3

The statement is false.

The purchasing function today goes far beyond mere procurement and receipt of materials. It includes the following:

1. Scrutiny of purchase requisitions
2. Indenting materials
3. Selection of supplier
4. Analysis of quotations
5. Negotiation and supplier selection
6. Liaisoning with operations and accounts
7. Issue purchase order
8. Legal compliance
9. Settlement of bills
10. Information dissemination
11. Periodic evaluation of supplier
12. Develop alternate sources of supply

### Answer to SEQ 4

The correct option is **D**.

Local purchasing offers better control because close supervision is possible due to proximity to the supplier. There is no risk of currency fluctuations since payment is made in the domestic currency. Furthermore, the larger interest of the economy is met through employment generation and absence of outflow of foreign exchange.

## STUDY GUIDE C1: INTEGRATED AND INTERLOCKING ACCOUNTING SYSTEMS

### Get Through Intro

Both financial accounting and cost accounting have different purpose. Financial accounts are prepared for external reporting purpose whereas cost accounts are prepared for taking managerial decisions. Naturally, there would be some differences under both the accounting systems.

This Study Guide focus on the need of interlocking cost accounting system and accounts maintained under this system. It also covers how financial profits and cost accounting profits are reconciled.

### Learning Outcomes

- a) Describe the interlocking cost accounting system.
- b) Describe the integrated cost accounting system.
- c) Differentiate between the two systems.
- d) Reconcile financial and cost accounting profits.

1. Describe the interlocking cost accounting system.  
Describe the integrated cost accounting system.  
Differentiate between the two systems.

[Learning Outcomes a, b and c]

1.1 Interlocking cost accounting system

Two sets of accounts are maintained under the interlocking system of accounting. One set maintains accounts according to the financial accounting system and another according to the cost accounting system. The **cost accounting system** differs from the financial system because it **does not record company transactions** with the **outside world** such as creditors account, debtors account and capital account. Instead, a common account known as the cost ledger control account is maintained to record these aspects of the transactions

1.2 Integrated cost accounting system

Under an integrated system, a common input is used by the financial and cost accounting systems. This refers to a system of accounting where a **single set of accounts** provides data for financial and cost accounting systems. An integrated system includes a control account for every major cost heading. These control accounts cover various items relating to cost and management accounting.



**Example**

Under integrated system control accounts are maintained for materials, direct labour, factory overhead expenses.

1.3 The differences between an interlocking system and an integrated system

	Interlocking system	Integrated system
Number of sets of accounts	Two sets of accounts are maintained.	Single set of accounts is maintained.
Duplication of work	Each transaction is processed twice leading to duplication of work.	Single processing of a transaction avoids duplication of work.
Time required to prepare cost accounts	Cost accounts are prepared after posting is made into the financial accounting system.	Cost accounts are prepared directly from the book of original entry. Hence, the time required to obtain cost records is reduced.
Reconciliation system	Reconciliation statement is prepared to discover the causes of discrepancy between the two accounting systems.	There is no need to prepare a reconciliation statement.
Cost of maintaining accounting system	Since two sets of accounts are maintained, it is comparatively expensive to maintain.	Comparatively less expensive to maintain.



**Test Yourself 1**

Two sets of accounts are maintained under \_\_\_\_\_ accounting systems.

- A Intermediate
- B Interlocking
- C Integrated
- D Intersection

Under this system, the following accounts are maintained:

**Stores ledger control account**

Dr	Tshs	Cr	Tshs
To balance b/d (opening inventory of raw materials)		By WIP control a/c (issued for production)	
To WIP control a/c (return from production)		By factory o/h a/c (issue of indirect materials)	
To cost ledger control a/c (purchases)		By cost ledger control a/c (purchase return)	
		By costing P&L a/c (abnormal loss / wastage)	
		By balance c/d (closing inventory of raw materials)	

**Wages control account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (Direct wages + Indirect wages incurred)		By WIP control a/c (direct wages)	
		By Factory o/h a/c (indirect wages)	
		By Administration o/h a/c (indirect wages)	
		By selling and distribution overheads a/c (indirect wages)	

**Factory overhead control account**

Dr	Tshs	Cr	Tshs
To stores ledger control a/c (indirect materials)		By WIP control a/c (absorption of overheads)	
To wages control a/c (indirect labour)		By overhead adjustment a/c (under absorption of overheads)	
To cost ledger control a/c (indirect expenses paid)			
To overhead adjustment a/c (over absorption of overheads)			

**WIP ledger control a/c**

Dr	Tshs	Cr	Tshs
To balance b/d/ (opening inventory of WIP)		By finished goods control a/c (transfer of goods)	
To stores ledger control a/c (issued direct materials)			
To wages control a/c (direct wages)			
To factory o/h control a/c (absorption of o/h)		By balance c/d/ (closing inventory of WIP)	

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**Finished goods ledger control account**

Dr	Tshs	Cr	Tshs
To balance b/d/ (opening inventory of finished goods)		By cost of sales a/c	
To WIP ledger control a/c (goods produced during the period)			
To Admin o/h a/c (absorption of admin o/h)		By balance c/d/ (closing inventory of finished goods)	

**Admin overhead account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (admin exps incurred)		By finished goods ledger control a/c (absorption of admin o/h)	
		By costing P&L a/c (transferred)	

**Selling and distribution overhead account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (selling/distribution exps incurred)		By Cost of sales a/c (absorption of admin o/h)	
		By costing P&L a/c (transferred)	

**Cost of sales account**

Dr	Tshs	Cr	Tshs
To selling and distribution o/h a/c		By Costing P&L a/c (transferred)	
To finished goods ledger control a/c			

**Overhead adjustment account**

Dr	Tshs	Cr	Tshs
To factory o/h a/c (under absorption)		By Factory a/h a/c (over absorption)	
		By Costing P&L a/c (transferred)	

**Costing P & L account**

Dr	Tshs	Cr	Tshs
Cost of sales		Overhead adjustment (over absorption)	
Overhead adjustment (under absorption)		Sales	
Stores ledger control a/c (abnormal loss / wastage)			
Costing profit (which needs to be reconciled with financial profit)			

Practical example of integrated / interlocking cost accounting system

 **Example**

From the following transactions of Success Plc prepare necessary accounts maintained under interlocking accounting system.

(All amounts are in Tshs'000)

	Tshs
Opening inventory	
Raw materials	8,000
WIP	7,500
Finished goods	9,000
Raw materials purchased	32,000
Raw materials returned to suppliers	2,000
Direct raw materials issued for production	27,000
Indirect raw materials issued for production	7,500
Direct raw materials returned to stores	2,500
Wages incurred	
Direct wages	40,000
Indirect wages	28,000
expenses paid	7,000
factory overheads Admin	40,000
expenses incurred	34,000
of admin expenses	30,000
Selling and distribution expenses incurred	15,500
Absorption of selling and distribution expenses	17,000
Sales	300,000
Closing inventory	
Raw materials	6,000
WIP	8,000
Finished goods	7,000

**Stores ledger control account**

Dr	Tshs	Cr	Tshs
To balance b/d (opening inventory of raw materials)	8,000	By WIP control a/c (issued for production)	27,000
To WIP control a/c (return from production)	2,500	By factory o/h a/c (issue of indirect materials)	7,500
To cost ledger control a/c (purchases)	32,000	By cost ledger control a/c (purchase return)	2,000
		By costing P&L a/c (abnormal loss / wastage)	-
		By balance c/d (closing inventory of raw materials)	6,000
	<b>42,500</b>		<b>42,500</b>

**Wages control account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (Direct wages + Indirect wages incurred)	68,000	By WIP control a/c (direct wages)	40,000
		By Factory o/h a/c (indirect wages)	28,000
		By Administration o/h a/c (indirect wages)	
		By selling and distribution o/h a/c (indirect wages)	
	<b>68,000</b>		<b>68,000</b>

Continued on the next page



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**Factory overhead control account**

Dr	Tshs	Cr	Tshs
To stores ledger control a/c (indirect materials)	7,500	By WIP control a/c (absorption of overheads)	40,000
To wages control a/c (indirect labour)	28,000	By overhead adjustment a/c (under absorption of overheads) (bal fig)	2,500
To cost ledger control a/c (indirect exps paid)	7,000		
To overhead adjustment a/c (over absorption of overheads)			
	<b>42,500</b>		<b>42,500</b>

**WIP ledger control a/c**

Dr	Tshs	Cr	Tshs
To balance b/d/ (opening inventory of WIP)	7,500	By finished goods control a/c (transfer of goods) (bal fig)	104,000
To stores ledger control a/c (issued direct materials)	27,000	By stores ledger control a/c (returned direct materials)	2,500
To wages control a/c (direct wages)	40,000		
To factory o/h control a/c (absorption of o/h)	40,000	By balance c/d/ (closing inventory of WIP)	8,000
	<b>114,500</b>		<b>114,500</b>

**Finished goods ledger control account**

Dr	Tshs	Cr	Tshs
To balance b/d/ (opening inventory of finished goods)	9,000	By cost of sales a/c (bal fig)	136,000
To WIP ledger control a/c (goods produced during the period)	104,000		
To Admin o/h a/c (absorption of admin o/h)	30,000	By balance c/d/ (closing inventory of finished goods)	7,000
	<b>143,000</b>		<b>143,000</b>

**Admin overhead account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (admin exps incurred)	34,000	By finished goods ledger control a/c (absorption of admin o/h)	30,000
		By costing P&L a/c (transferred)	4,000
	<b>34,000</b>		<b>34,000</b>

**Selling and distribution overhead account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (selling/distribution exps incurred)	15,500	By Cost of sales a/c (absorption of admin o/h)	17,000
To costing P&L a/c (transferred)	1,500		
	<b>17,000</b>		<b>17,000</b>

**Continued on the next page**

**Cost of sales account**

Dr	Tshs	Cr	Tshs
To selling and distribution o/h a/c	17,000	By Costing P&L a/c (transferred)	<b>153,000</b>
To finished goods ledger control a/c	136,000		
	<b>153,000</b>		<b>153,000</b>

**Overhead adjustment account**

Dr	Tshs	Cr	Tshs
To factory o/h a/c (under absorption)	2,500	By Factory a/h a/c (over absorption)	
		By Costing P&L a/c (transferred)	2,500
	<b>2,500</b>		<b>2,500</b>

**Cost Ledger Control account**

Dr	Tshs	Cr	Tshs
To Stores ledger control a/c – purchase returns	2,000	By Stores ledger control a/c – purchase	32,000
		By factory o/h control account – indirect exps paid	7,000
		By admin o/h a/c	34,000
		By selling and dist. o/h a/c	15,500
	154,500	By wages control a/c	68,000
	<b>156,500</b>		<b>156,500</b>

**Costing P & L account**

Dr	Tshs	Cr	Tshs
Cost of sales	153,000	Sales	300,000
Overhead adjustment (under absorption)	2,500	By selling and dist. o/h a/c (over absorption)	1,500
Admin o/h a/c (under absorption)	4,000		
Costing profit (bal fig)	142,000		
	<b>301,500</b>		<b>301,500</b>



**Test Yourself 2**

Scent Ltd uses material X in its manufacturing process. Inventory of material X on 1 December 20X3 was valued at a cost of Tshs6,604,000 (260 kg at Tshs25,400 per kg). 500 kg of material X were purchased on 7 December for Tshs13,000,000. Total 410 kg of material X were issued for production during the month.

Assuming that the LIFO method is applied at the end of each month;

What is the cost accounting entry for the issues of Material X during December 20X3?

**2. Reconcile financial and cost accounting profits.** **[Learning Outcome d]**

There are certain items which appear only in the financial books and are not recorded in cost accounting books whereas there may be some items which appear in cost accounts but do not find a place in the financial books. Because of this, the profit figures shown by the two sets of books will disagree, which leads to the need for reconciliation of financial and cost accounting profits. Reconciliation is necessary as it proves arithmetical accuracy of data, explains reasons for the difference in the two sets of books and affords reliability to them. Hence, the reconciliation of cost and financial accounts is essential and not redundant even in the modern age of computers.

The various reasons include different accounting treatments of the following items under cost and financial accounting:

**Overhead absorption:** under cost accounting, overheads are applied to the cost units at predetermined rates based on estimates. Here, the amount recovered may differ from the actual expenses incurred which in turn results in under or over-recovery of overheads. However, under financial accounting, only actually incurred overheads are recorded. In case the amount of under or over absorption of overheads is not charged to costing profit and loss account, the profits on two sets of books will vary.

**Inventory valuation:** under cost accounting, closing inventory is valued using the adopted inventory valuation methods suitable to the cost unit (e.g. FIFO, LIFO, weighted average, etc.). Sometimes, WIP is also valued at either prime cost or works cost. However, under financial accounting, inventory is valued at the lower of cost or net realisable value. Hence, there are chances of differences in the value of inventory, which will have an impact on the difference of profits under two sets of books.

**Depreciation:** similar to inventory valuation, if different basis of depreciation charge are adopted in cost accounts as compared to financial accounts, the profits will vary.

**Abnormal losses and gains:** various abnormal losses and gains are accounted for under financial accounting, whereas these are not recognised by cost accounting. These treatments also lead to differences in profits under two sets of books.

Some examples of entries affecting the profit figures of financial and cost accounting are:



**Example**

	Recorded only in financial statements	Recorded only in cost accounting statements
1. Loss / profit on sale of fixed assets.		
2. Expenses on stamp duty, discount and other expenses relating to the issue and transfer of shares and debentures.		
3. Fee received on issue and transfer of shares etc.		
4. Interest on bank loan, mortgage etc.		
5. Interest received on bank deposits and other investments.		
6. Fines and penalties		
7. Dividend received on investments in shares.		
8. Rental income etc.		
9. Notional rent / notional interest		
10. Under or over recovered expenses.		
11. Difference due to varying basis of valuation of stock or in the matter of charging depreciation.		

**Proforma of reconciliation of financial accounting and cost accounting profits**

If financial profit is taken as base to reconcile with cost profit

	Tshs	Tshs
<b>Profit as per financial accounting</b>		<b>X</b>
<b>Add:</b>		
Incomes included in cost accounts but not in financial accounts	X	
Expenses included in financial accounts but not in cost accounts	X	
Under-absorption of overheads in cost accounts	X	
Over valuation of closing inventory in cost accounts	X	
Under valuation of opening inventory in cost accounts	X	X
		<b>X</b>
<b>Less:</b>		
Incomes included in financial accounts but not in cost accounts	X	
Expenses included in cost accounts but not in financial accounts	X	
Over-absorption of overheads in cost accounts	X	
Over valuation of opening inventory in cost accounts	X	
Under valuation of closing inventory in cost accounts	X	X
<b>Profit as per cost accounting</b>		<b>X</b>

If cost profit is taken as base to reconcile with financial profit

	Tshs	Tshs
<b>Profit as per cost accounting</b>		<b>X</b>
<b>Add:</b>		
Incomes included in financial accounts but not in cost accounts	X	
Expenses included in cost accounts but not in financial accounts	X	
Over-absorption of overheads in cost accounts	X	
Over valuation of opening inventory in cost accounts	X	
Under valuation of closing inventory in cost accounts	X	X
		<b>X</b>
<b>Less:</b>		
Incomes included in cost accounts but not in financial accounts	X	
Expenses included in financial accounts but not in cost accounts	X	
Under-absorption of overheads in cost accounts	X	
Over valuation of closing inventory in cost accounts	X	
Under valuation of opening inventory in cost accounts	X	X
<b>Profit as per financial accounting</b>		<b>X</b>

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Let us look at a practical example of reconciliation of financial accounting and cost accounting profits:



### Example

Present Ltd's financial accounts show a profit of Tshs2,500,000 for the year ended in 31 December 20X3. On the same date, profit according to cost accounts was Tshs2,389,000. The following items were identified by Present which has led to the difference between these two profits:

Under absorption of factory overheads in cost accounting	Tshs220,000
Over absorption of admin overheads in cost accounting	Tshs165,000
Depreciation recorded under financial accounting	Tshs500,000
Depreciation recorded under cost accounting	Tshs515,000
Share dividend received by Present is recorded only in financial accounts	Tshs175,000
Income tax debited in statement of profit or loss only	Tshs225,000
Interest credited by bank is recorded in statement of profit or loss only	Tshs75,000
Abnormal gain recorded in financial accounts	Tshs125,000
Opening inventory recorded in financial accounts	Tshs500,000
Closing inventory recorded in financial accounts	Tshs475,000
Opening inventory recorded in cost accounts	Tshs524,000
Closing inventory recorded in cost accounts	Tshs498,000

### Required:

Prepare a statement of reconciliation of financial accounting and cost accounting profits taking financial profits as a base.

### Answer

	Tshs	Tshs
<b>Profit per financial accounting</b>		<b>2,500,000</b>
<b>Add:</b>		
Expenses included in financial accounts but not in cost accounts:		
Income tax	225,000	
Under-absorption of factory overheads in cost accounts	220,000	
Over valuation of closing inventory in cost accounts (498,000 – 475,000)	23,000	468,000
		<b>2,968,000</b>
<b>Less:</b>		
Incomes included in financial accounts but not in cost accounts		
Share dividend	175,000	
Bank interest	75,000	
Abnormal gain	125,000	
Depreciation over charged under cost accounts (515,000 – 500,000)	15,000	
Over-absorption of admin overheads in cost accounts	165,000	
Over valuation of opening inventory in cost accounts (524,000 – 500,000)	24,000	579,000
<b>Profit per cost accounting</b>		<b>2,389,000</b>



### Tip

Sometimes, financial accounts and additional information related to cost accounts are provided. In this case, first profits of cost accounts should be calculated and then that amount needs to be reconciled with the financial profits.



**Example**

Statement of profit or loss for the year ending 31 March 20X4 in the books of Ecstasy Ltd

	Tshs'000	Tshs'000
Sales (50,000 units x Tshs20,000)		1,000,000
<b>Less: Cost of goods sold</b>		
Opening inventory	-	
<b>Add: Purchases</b>	250,000	
<b>Add: Purchase expenses</b>	-	
<b>Less: Closing inventory</b>	(80,000)	
	170,000	
Direct labour wages	250,000	(420,000)
<b>Gross profit</b>		580,000
<b>Add: Other incomes</b>		
Rent of premises received	3,000	
Profit on sale of land	25,000	28,000
		608,000
<b>Less:</b>		
Factory overheads	325,000	
Depreciation on machinery	12,000	
Office overheads	55,000	
Selling and distribution overheads	80,000	472,000
<b>Net profit before tax</b>		<b>136,000</b>
<b>Less: Income tax paid – 10%</b>		13,600
<b>Net profit after tax</b>		<b>122,400</b>

**Additional information:**

Under cost accounting:

- (i) Factory overheads are absorbed as 80% of the prime cost.
- (ii) Office overheads are absorbed as Tshs900 per unit manufactured. Total production was 55,000 units.
- (iii) Selling and distribution expenses are charged at Tshs1,500 per unit.
- (iv) Absorption of depreciation on machinery is Tshs15,000,000.

**Required:**

- (a) Prepare cost statement for the year ended 31 March 20X4 in the books of Ecstasy Ltd.
- (b) Prepare a statement of reconciliation of financial accounting and cost accounting profits taking cost accounting profit as a base.

**Continued on the next page**

## 256: Cost Bookkeeping

### Answer

#### Cost statement for the year ended 31 March 20X4 in the books of Ecstasy Ltd

	Tshs'000	Tshs'000
Materials (purchases)	250,000	
Direct wages	250,000	
<b>Prime cost</b>		<b>500,000</b>
Factory overheads (500,000 x 80%)	400,000	
Depreciation on machinery	13,000	413,000
<b>Works cost</b>		<b>913,000</b>
Office overheads (55,000 x 900)		49,500
<b>Office cost / cost of manufacturing (for 55,000 units)</b>		<b>962,500</b>
Add: opening inventory of finished goods		-
<b>Less:</b> closing inventory of finished goods (5,000 units x Tshs962,500/55,000 units)		(87,500)
<b>Cost of goods sold (for 50,000 units)</b>		<b>875,000</b>
Selling and distribution overheads (50,000 units x Tshs1,500)		75,000
<b>Cost of sales / total cost</b>		<b>950,000</b>
<b>Profit (per cost accounts)</b>		<b>50,000</b>
<b>Sales</b>		<b>1,000,000</b>

#### Statement of reconciliation of financial accounting and cost accounting profits taking cost accounting profit as a base

	Tshs'000	Tshs'000
<b>Profit per cost accounting</b>		<b>50,000</b>
<b>Add:</b>		
<b>Incomes included in financial accounts but not in cost accounts</b>		
Rent of premises received	3,000	
Profit on sale of land	25,000	
<b>Over-absorption of overheads in cost accounts</b>		
Factory overheads	75,000	
Depreciation on machinery overcharged	1,000	104,000
		<b>154,000</b>
<b>Less:</b>		
<b>Expenses included in financial accounts but not in cost accounts</b>		
Income tax	13,600	
<b>Under-absorption of overheads in cost accounts</b>		
Office overheads	5,500	
Selling and distribution overheads	5,000	
Over valuation of closing inventory in cost accounts	7,500	31,600
<b>Profit per financial accounting</b>		<b>122,400</b>



### Test Yourself 3

State any five reasons why cost accounting profits need to be reconciled with financial accounting profits.

**Answers to Test Yourself**

**Answer to TY 1**

The correct option is **B**.

Two sets of accounts are maintained under an interlocking system of accounting. One set of accounts is maintained for the financial accounting system and another for the cost accounting system.

**Answer to TY 2**

Under the LIFO method, inventory purchased last is issued first. When inventory is issued for production it is debited to WIP, not factory overheads.

Cost of material X issued for production

$$= \text{Material used in production} \times \frac{\text{Material last purchased cost}}{\text{Material purchased units}}$$

$$= 410 \times \frac{\text{Tshs}13,000,000}{500}$$

$$= \text{Tshs}10,660,000$$

**Cost accounting entry**

Dr	WIP	Tshs10,660,000	
	Cr	Stores ledger control A/c	Tshs10,660,000

**Answer to TY 3**

Both accounting systems are different and hence profits derived under both systems would vary. This leads to the need for profit reconciliation. Reconciliation of both the profits is essential as it proves arithmetical accuracy of data, explains reasons for the difference in the two sets of books and affords reliability to them. The following are the major reasons why profits under both the systems vary:

1. Some items are recorded in cost accounts only, whereas some items are recorded in financial accounts only.
2. Under or over absorption of overheads under cost accounting may lead to a difference in profits.
3. In case inventory is valued under both the accounting using different methods, it may also lead to a difference in profits.
4. Like inventory valuation, if different basis of depreciation charge are adopted in cost accounts as compared to financial accounts, the profits will not match.
5. Accounting treatments of abnormal losses and gains are recorded under financial accounts only.



**Self Examination Questions**

**Question 1**

The Msauzi Company manufactures a product for sale. The following information is extracted from the company's records:

	<b>Tshs</b>
(i) <b>Inventory 1<sup>st</sup> July:</b>	
- Raw materials	200,000
- Working in Progress	340,000
- Finished Goods	280,000
(ii) Raw materials purchased during the month of July on credit	1,840,000
(iii) Raw materials issued to production (70% Direct, 30% Indirect)	1,800,000
(iv) Wages incurred (90% Direct, 10% Indirect)	1,700,000
(v) Factory overhead is charged to production at a as rate of 75% of direct labour cost	
- Actual overhead incurred (including indirect material and indirect labour)	1,100,000
(vi) Completed production transferred to finished goods	3,600,000
(vii) 80% of finished goods were sold	

**Required:**

Record the above transactions in the costing books of account (stores ledger control, production overheads, wages control, work in progress, finished goods, and cost of goods sold) which should portray the cost flow in this manufacturing company.

**(May 2013)**

**Question 2**

The following financial information has been exposed by Information Co for the year ended 31 December 20X3.

	<b>Tshs'000</b>
Opening inventory of finished goods (1,500 units)	120,000
Opening inventory of WIP	50,000
Closing inventory of finished goods (750 units)	80,250
Closing inventory of WIP	75,000
Consumption of raw materials	1,000,000
Direct wages paid	750,000
Factory overheads	500,000
Patents written off	125,000
Administrative overheads	405,000
Interest on loan paid	95,000
Bad debts	8,500
Selling and distribution overheads	50,000
Interest on investments received	45,000
Profit on sale of an asset	15,000
Sales (15,750 units)	3,150,000

**Additional information**

- (i) Opening inventory of finished goods is valued at Tshs102,000 per unit.
- (ii) Information has a policy to value WIP at factory cost under both financial accounting and cost accounting.
- (iii) Information absorbs factory overheads as 70% of the direct labour wages.
- (iv) Administration overheads are recovered at 25% of works cost.
- (v) Selling and distribution overheads are charged at Tshs2,500 per unit.

**Required:**

- (a) Prepare statement of profit or loss to show financial profits.
- (b) Prepare cost statement to show costing profits.
- (c) Prepare a statement of reconciliation of financial accounting and cost accounting profits.

**Answers to Self Examination Questions**
**Answer to SEQ 1**
**Stores ledger control account**

Dr	Tshs	Cr	Tshs
To balance b/d (opening inventory of raw materials)	200,000	By WIP control a/c (issued for production)	1,260,000
To cost ledger control a/c (purchases)	1,840,000	By factory o/h a/c (issue of indirect materials)	540,000
		By balance c/d (closing inventory of raw materials) (bal fig)	240,000
	<b>2,040,000</b>		<b>2,040,000</b>

**Wages control account**

Dr	Tshs	Cr	Tshs
To cost ledger control a/c (Direct wages + Indirect wages incurred)	1,700,000	By WIP control a/c (direct wages)	1,530,000
		By Factory o/h a/c (indirect wages)	170,000
	<b>1,700,000</b>		<b>1,700,000</b>

**Factory overhead control account**

Dr	Tshs	Cr	Tshs
To stores ledger control a/c (indirect materials)	540,000	By WIP control a/c (absorption of overheads) (75% x 1,530,000)	1,147,500
To wages control a/c (indirect labour)	170,000		
To cost ledger control a/c (indirect exps paid) (1,100,000 – 540,000 – 170,000)	390,000		
To overhead adjustment a/c (over absorption of overheads) (bal fig.)	47,500		
	<b>1,147,500</b>		<b>1,147,500</b>

**WIP ledger control a/c**

Dr	Tshs	Cr	Tshs
To balance b/d/ (opening inventory of WIP)	340,000	By finished goods control a/c (transfer of goods)	3,600,000
To stores ledger control a/c (issued direct materials)	1,260,000		
To wages control a/c (direct wages)	1,530,000		
To factory o/h control a/c (absorption of o/h)	1,147,500	By balance c/d/ (closing inventory of WIP) (bal fig)	<b>677,500</b>
	<b>4,277,500</b>		<b>4,277,500</b>

**Finished goods ledger control account**

Dr	Tshs	Cr	Tshs
To balance b/d/ (opening inventory of finished goods)	280,000	By cost of sales a/c (80%)	3,104,000
To WIP ledger control a/c (goods produced during the period)	3,600,000	By balance c/d/ (closing inventory of finished goods) (20%)	776,000
	<b>3,880,000</b>		<b>3,880,000</b>

**260: Cost Bookkeeping**

**Cost of sales account**

Dr	Tshs	Cr	Tshs
To finished goods ledger control a/c	3,104,000	By Costing P&L a/c (transferred)	3,104,000
	<b>3,104,000</b>		<b>3,104,000</b>

**Overhead adjustment account**

Dr	Tshs	Cr	Tshs
To Costing P&L a/c (transferred)	47,500	By Factory a/h a/c (over absorption)	47,500
	<b>47,500</b>		<b>47,500</b>

**Costing P & L account**

Dr	Tshs	Cr	Tshs
Cost of sales	3,104,000	Overhead adjustment (over absorption)	47,500
Costing profit (which needs to be reconciled with financial profit)		Sales	

**Answer to SEQ 2**

**Statement of profit or loss for the year ending 31 December 20X3 in the books of Information Co**

	Tshs'000	Tshs'000
Sales (15,750 units x Tshs200,000)		3,150,000
<b>Less: Cost of goods sold</b>		
Raw materials	1,000,000	
Direct labour wages	750,000	
<b>Add: Opening inventory</b>		
Finished goods	120,000	
WIP	50,000	
	<b>170,000</b>	
<b>Less: Closing inventory</b>		
Finished goods	(80,250)	
WIP	(75,000)	
	14,750	(1,764,750)
<b>Gross profit</b>		<b>1,385,250</b>
<b>Add: Other incomes</b>		
Interest on investments received	45,000	
Profit on sale of an asset	15,000	60,000
		<b>1,445,250</b>
<b>Less:</b>		
Factory overheads	500,000	
Patents written off	125,000	
Administrative overheads	405,000	
Interest on loan paid	95,000	
Bad debts	8,500	
Selling and distribution overheads	50,000	(1,183,500)
<b>Net profit</b>		<b>261,750</b>

**Cost statement for the year ended 31 December 20X3 in the books of Information Co**

	Tshs'000	Tshs'000
Materials consumed	1,000,000	
Direct wages	750,000	
<b>Prime cost</b>		<b>1,750,000</b>
Factory overheads (750,000 x 70%)	525,000	
<b>Add: Opening WIP</b>	50,000	
<b>Less: Closing WIP</b>	(75,000)	500,000
<b>Works cost</b>		<b>2,250,000</b>
Office overheads (2,250,000 x 25%)		562,500
<b>Office cost / cost of manufacturing (for 15,000 units at Tshs187,500)</b>		<b>2,812,500</b>
<b>Add: opening inventory of finished goods (1,500 units x Tshs102,000)</b>		153,000
		<b>2,965,500</b>
<b>Less: closing inventory of finished goods (750 units x Tshs187,500)</b>		140,625
<b>Cost of goods sold (for 15,750 units)</b>		<b>2,824,875</b>
Selling and distribution overheads (15,750 units x Tshs2,500)		39,375
<b>Cost of sales / total cost</b>		<b>2,864,250</b>
<b>Profit (as per cost accounts)</b>		<b>285,750</b>
<b>Sales (15,750 units x Tshs200,000)</b>		<b>3,150,000</b>

**Statement of reconciliation of financial accounting and cost accounting profits taking cost accounting profit as a base**

	Tshs'000	Tshs'000
<b>Profit as per cost accounting</b>		<b>285,750</b>
<b>Add:</b>		
<b>Incomes included in financial accounts but not in cost accounts</b>		
Interest on investments received	45,000	
Profit on sale of an asset	15,000	
<b>Over-absorption of overheads in cost accounts</b>		
Factory overheads (525,000 – 500,000)	25,000	
Office overheads (562,500 – 405,000)	157,500	
Over valuation of opening inventory in cost accounts (153,000 – 120,000)	33,000	275,500
		<b>561,250</b>
<b>Less:</b>		
<b>Expenses included in financial accounts but not in cost accounts</b>		
Patents written off	125,000	
Interest on loan	95,000	
Bad debts	8,500	
<b>Under-absorption of overheads in cost accounts</b>		
Selling and distribution overheads (50,000 – 39,375)	10,625	
Over valuation of closing inventory in cost accounts (140,625 – 80,250)	60,375	299,500
<b>Profit as per financial accounting</b>		<b>261,750</b>

**Workings**

**W1 Production units**

$$\begin{aligned}
 \text{Production units} &= \text{Sales units} + \text{Closing inventory units} - \text{Opening inventory units} \\
 &= 15,750 \text{ units} + 750 \text{ units} - 1,500 \text{ units} \\
 &= 15,000 \text{ units}
 \end{aligned}$$

Need to take inventory of finished goods



## STUDY GUIDE C2: COST STATEMENTS

### Get Through Intro

There are three main elements of cost; materials, labour and overheads. As a cost accountant, it is imperative to know how cost of a particular product is derived. This Study Guide focuses on how to prepare a cost statement. Cost statement is a cost sheet in which all costs are documented in a logical sequence, in accordance with their classification, to ascertain the cost of a product or service.

A cost statement can further be explained up to two parts, cost of goods manufacture statement and cost of goods sold statement. This help to find out the profit. Remember, the profit as per cost accounting and the profit as per income statement is not always the same. This is because there are certain items which are recorded only in cost accounts and not the financial accounts and there are certain items which are which are recorded only in financial accounts and not the cost accounts.

### Learning Outcomes

- a) Define a cost statement.
- b) Prepare the cost of goods manufactured statement.
- c) Prepare cost of goods sold statement.
- d) Prepare an income statement.

1. Define a cost statement.

[Learning Outcome a]



**Definition**

**Cost statement** is also commonly known as cost sheet. A cost sheet is the prime document for presenting the costs according to their function under the traditional absorption system of costing.

**Extract of Cost sheet**

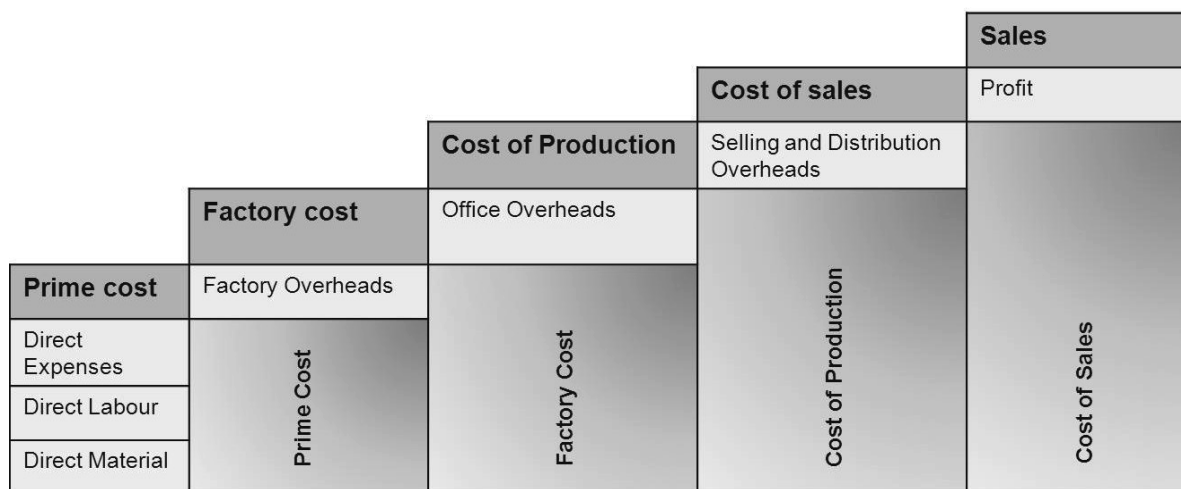
	Tshs	Tshs
Direct material	X	
Direct labour or direct wages	X	
Direct expenses	X	
<b>Prime cost</b>		<b>X</b>
Production overheads		X
<b>Production or factory or manufacturing cost</b>		<b>X</b>
Administration cost		X
Selling and distribution cost		X
<b>Total cost</b>		<b>X</b>

**Components of total cost**

From the above extract of cost sheet, the following are the prominent components of total cost.

<b>Prime cost</b>	Consists of costs of direct material, direct labour and direct expenses. It is also known as basic, first or flat cost
<b>Factory cost</b>	Comprises of prime cost and in addition works of factory overheads which include costs of indirect material, indirect labour and indirect expenses of the factory. The cost is also known as works cost, production or manufacturing cost.
<b>Office cost</b>	<b>In case</b> office and administrative overheads are added to factory cost office cost is arrived at this is also termed as administrative cost or the total cost of production.
<b>Total cost</b>	Office cost or total cost of production selling and distribution overheads are added to the total cost of production to get the total cost or the cost of sales.

**Diagram 1: Components of cost of sales**





### Example

You work for a company that manufactures miniature toy cars. If your company were to classify its costs by function you would find the costs analysed in the following way.

Production costs		Cost per unit (Tshs'000)	Total cost per unit (Tshs'000)
Direct materials	Steel alloy	0.07	0.13
	Plastic	0.02	
	Rubber	0.03	
	Box	0.01	
Direct wages	Production line	0.05	0.07
	Quality control	0.02	
Direct expenses	Tool hire	0.05	0.05
	<b>Prime cost</b>		<b>0.25</b>
Production overheads	Sundry line costs		0.05
	<b>Full factory cost</b>		<b>0.30</b>
<b>Non-production costs</b>	Admin costs	0.10	
	Selling and distribution costs	0.25	0.35
	<b>Total cost</b>		<b>0.65</b>

Let us study another example of calculating costs.



### Example

The following cost information of Sandpit Ltd is available for the month of March 20X3:

	Tshs'000
Raw material purchased from suppliers (20% on cash)	85,000
Octroi paid	10,000
Labour charges (@ Tshs5,000 per hour)	25,000
Direct expenses	20,000
Factory overheads	75% of direct labour charges
Administrative overheads	15% of work cost

	Direct raw materials	Work-in-progress
Opening inventory (Tshs'000)	16,000	15,000
Closing inventory (Tshs'000)	20,000	18,000

#### Required:

Derive the cost of production using cost statement.

**Continued on the next page**



## 266: Cost Bookkeeping

### Answer

Cost statement of Sandpit Ltd for the month of March 20X3

	Tshs'000	Tshs'000
Opening inventory of raw materials	16,000	
<b>Add: Purchased raw materials</b>		
Cash	17,000	
Credit	68,000	
<b>Add: Purchase expenses</b>		
Octroi	10,000	
	111,000	
<b>Less: Closing inventory of raw materials</b>	20,000	
Direct materials consumed		91,000
Direct labour wages (Tshs5,000 x 5,000 hours)		25,000
Direct expenses		20,000
<b>Prime cost</b>		<b>136,000</b>
Factory overheads (75% of direct labour charges)		102,000
<b>Current cost of factory / manufacturing</b>		<b>238,000</b>
<b>Add: Opening inventory of WIP</b>		15,000
		253,000
<b>Less: Closing inventory of WIP</b>		18,000
<b>Factory cost / works cost</b>		<b>235,000</b>
Administrative overheads (15% of works cost)		35,250
<b>Cost of production</b>		<b>270,250</b>



### Test Yourself 1

Derive prime cost from the following information:

Opening inventory of raw materials	5,000 units @ Tshs5,000 per unit
Purchases of raw materials	18,750 units @ Tshs8,000 per unit
Expenses incurred on raw material purchases	Tshs10,000,000
Closing inventory of raw material	5,625 units (inventory is valued using FIFO method)
Direct labour	20,000 hours @ Tshs4,760 per hour
Direct expenses	Tshs46,800,000

- 2. Prepare the cost of goods manufactured statement.  
Prepare cost of goods sold statement.  
Prepare an income statement.**

**[Learning Outcomes b, c and d]**

Both cost of manufacturing and cost of goods sold can be displayed in a single cost sheet / cost statement. Organisations need segregation between these two costs because usually production volume and sales volume are not always same.



**Example**

For example, if 15,000 units are manufactured during a year. This does not imply that organisation has sold 15,000 units only during that year, it can be either more or less than 15,000, depending upon the opening and closing inventory of finished goods.

The basic difference between these two costs arises because of the effect of the finished inventory.

Cost of goods manufacturing (cost of production) is made up of the entire cost involved for the production of a product.

Cost of goods sold includes the cost of manufacturing and the effect of opening and closing inventory of finished goods.

Income statement is another method of cost statement in which selling expenses is included to the cost of goods sold to derive cost of sales and expected profit margin is added to it to derive the expected sales amount.

The following example illustrates the preparation of cost of goods manufactured statement, cost of goods sold statement and an income statement.



**Example**

Zubin provides you the following cost data from his transactions for the month of January 20X4.

	Tshs million
Purchase of raw materials	250
Paid freight and octroi	10
Direct wages	80
Direct production expenses	40
Indirect production expenses	30% of prime cost
General admin expenses	5% of factory cost
Selling and distribution expenses	8% of the production cost
Income tax expenses	10

Zubin earns 20% gross profit on sales.

Opening and closing inventory of raw materials were Tshs30 million and Tshs40 million respectively; Opening and closing inventory of WIP was Tshs35 million and Tshs45 million respectively and opening and closing inventory of finished goods were Tshs40 million and Tshs50.55 million respectively.

**Required:**

- (a) Compute:  
 (i) Cost of production  
 (ii) Cost of goods sold  
 (iii) Cost of sales  
 (iv) Profit  
 (b) Prepare the income statement for the month of January 20X4

**Continued on the next page**

**268: Cost Bookkeeping**

**Answer**

Manufacturing account

	Tshs million	Tshs million
Opening inventory of raw materials	30	
<b>Add:</b> Direct materials purchased	250	
<b>Add:</b> Purchase expenses freight charges	10	
	290	
<b>Less:</b> Closing inventory of raw material	40	
<b>Raw material consumed</b>		250.00
Direct wages		80.00
Direct production expenses		40.00
<b>Prime cost</b>		<b>370.00</b>
Factory overheads (also known as indirect production overheads) 30% of prime cost		111.00
Current manufacturing cost		481.00
<b>Add:-</b> Opening inventory of WIP		35.00
Total goods processed during the period		516.00
<b>Less:-</b> Closing inventory of WIP		45.00
<b>Factory / works cost</b>		<b>471.00</b>
General & administrative expenses: 5% of factory cost		23.55
<b>COST OF PRODUCTION / COST OF MANUFACTURING</b>		<b>494.55</b>
<b>Add:</b> Opening inventory of finished goods		40.00
Goods available for sales		534.55
<b>Less:</b> Closing inventory of finished goods		50.55
<b>COST OF GOODS SOLD</b>		<b>484.00</b>
<b>Add:</b> selling and distribution expenses 8% of production cost		38.72
<b>COST OF SALES / TOTAL COST</b>		<b>522.72</b>
<b>Add:</b> Profit (20% on sales = 25% on cost)		130.68
<b>Sales</b>		<b>653.40</b>

As seen in the above cost statement; cost of manufacturing is Tshs494.55 million; cost of goods sold is Tshs484 million and cost of sales i.e. total cost is Tshs522.72 million. The profit for the month is Tshs130.68 million

Here cost of manufacturing is higher than the cost of goods sold which indicates that closing inventory of finished goods is higher than the opening inventory of finished goods.

**Income statement for the month of January 20X4**

	Tshs million
Revenue	653.40
Cost of sales (refer the manufacturing account above)	484.00
<b>Gross profit</b>	<b>169.40</b>
Selling and distribution costs	38.72
Finance cost	Nil
Administrative expenses	Nil
Other expenses	Nil
Profit before tax	38.72
Income tax expense	10.00
<b>Profit for the year (a)</b>	<b>28.72</b>

**Continued on the next page**

Working note 1: Revenue

<b>Cost of sales / total cost</b>	<b>522.72</b>
<b>Add: Profit (20% on sales = 25% on cost)</b>	130.68
<b>Sales</b>	<b>653.40</b>



**Important**

Students are advised to refer Paper T05 and understand the preparation of income statement.



**Example**

Supreme Ltd provides the following information for the year ending March 31, 20X3. Prepare cost statement from this financial information.

	<b>Tshs'000</b>	<b>Tshs'000</b>
Sales		300,000
Opening stock of raw material	18,000	
Purchases of direct materials	180,000	
Cost of moulds	4,500	
	202,500	
Closing stock material of raw material	(30,000)	172,500
Direct labour		45,000
Finished goods - opening inventory	60,000	
Finished goods - closing inventory	(75,000 )	
Salary of factory incharge	1,400	
Oil and grease	100	
Depreciation on machinery and equipment	1,200	(12,300)
<b>Gross profit</b>		<b>94,800</b>
<b>Other incomes</b>		
Bank interest	1,200	
Share dividend received	300	
Rent of building received	1,350	2,850
		<b>97,650</b>
<b>Expenses</b> Salary to		
staff Salesman	13,500	
commission Insurance	9,000	
of premises	1,500	
Warehouse expenses	1,200	
Directors remuneration	3,000	
Telephone and postage	1,050	
Showroom expenses	1,800	
Delivery van expenses	2,250	
Preliminary expenses	3,000	
Interest in secured debentures	1,050	(37,350)
<b>Net profit</b>		<b>60,300</b>

Continued on the next page

## 270: Cost Bookkeeping

### Answer

#### Statement of cost for the year ending 31 March 20X3

Particular	Tshs'000	Tshs'000
Raw material purchased	180,000	
<b>Add:-</b> opening stock of raw materials	18,000	
Raw material for consumption	198,000	
<b>Less:-</b> Closing sock of raw materials	30,000	
Raw material consumed		168,000
Direct labour		45,000
<b>Prime cost</b>		<b>213,000</b>
<b>Factory overheads</b>		
Cost of moulds	4,500	
Salary of factory in charge	1,400	
Oil and grease	100	
Depreciation on machinery and equipment	1,200	7,200
<b>Factory cost</b>		<b>220,200</b>
<b>Office and administrate overhead</b>		
Salary to staff	13,500	
Insurance of premises	1,500	
Directors remuneration	3,000	
Telephone and postage	1,050	19,050
<b>Cost of production</b>		<b>239,250</b>
<b>Add:-</b> Opening stock of finished goods		60,000
Goods available for sales		299,250
<b>Less:-</b> Closing stock of finished goods		75,000
<b>Cost of goods sold</b>		<b>224,250</b>
<b>Selling &amp; distribution expenses</b>		
Salesman's commission	9,000	
warehouse expenses	1,200	
Showroom expenses	1,800	
Delivery van expenses	2,250	14,250
<b>Cost of sales</b>		<b>238,500</b>

	Tshs'000
Sales	300,000
Cost of sales	(238,500)
<b>Profit</b>	<b>61,500</b>

Note: costing profit is different from the financial profits because the following items are entered only in financial accounts, not in cost accounts:

	Tshs'000	Tshs'000
<b>Other incomes</b>		
Bank interest	1,200	
Share dividend received	300	
Rent of building received	1,350	2,850
<b>Other expenses</b>		
Preliminary expenses	3,000	
Interest in secured debentures	1,050	(4,050)
<b>Difference in profits</b>		<b>(1,200)</b>



**Test Yourself 2**

Sophie is a sole trader. She deals in the business of electronic toys for kids. The following cost details are provided by her to prepare a cost statement for the month of January 20X4 and determine the gross profit margin on sales.

	Tshs'000
<b>Opening inventory</b>	
Raw material	8,250
Finished goods	6,600
<b>Closing inventory</b>	
Raw material	6,600
Finished goods	8,250
Raw materials purchased on credit from suppliers	82,500
Wages paid to direct labourers	33,000
Direct production expenses	3,300
Rent, rates and taxes	12,210
Electricity	4,950
Training cost of direct workers	1,100
Sale of scrap materials	330
Sale of factory scrap	110
Salary of senior staff	6,600
Office stationery	330
Salesman commission	3,300
Remuneration of marketing agents	1,650
Sales	165,000

**Answers to Test Yourself**

**Answer to TY 1**

	Tshs'000	Tshs'000
Opening inventory of raw material (5,000 units x Tshs5,000)	25,000	
<b>Add:</b> Purchase of raw materials (18,750 units x Tshs8,000)	150,000	
<b>Add:</b> Expenses incurred on purchases	10,000	
	185,000	
<b>Less:</b> Closing inventory of raw material (5,625 units x Tshs8,000)	45,000	
<b>Raw material consumed</b>		<b>140,000</b>
<b>Add:</b> Direct wages or labour (20,000 hours x Tshs4,760)		95,200
<b>Add:</b> Direct expenses		46,800
<b>Prime cost</b>		<b>282,000</b>

**272: Cost Bookkeeping**

**Answer to TY 2**

**Cost statement in the books of Sophie for the month of January 20X4**

	Tshs'000	Tshs'000
Raw materials purchased on credit from suppliers	82,500	
<b>Add:</b> Opening inventory of raw material	8.250	
Raw material for consumption	90,750	
<b>Less:</b> closing inventory of raw material	6.600	
Raw material consumed	84,150	
<b>Less:</b> Sale of scrap materials	330	
Cost of raw materials		83,820
Wages paid to direct labourer's Direct production expenses <b>Prime cost</b>		33,000
		3,300
<b>Factory overheads</b>		<b>120,120</b>
Rent, rates and taxes	12,210	
Electricity	4,950	
Training cost of direct workers	1,100	
	18,260	
<b>Less:</b> sale of factory scrap	110	18,150
<b>Factory cost</b>		<b>138,270</b>
<b>Administrative overheads</b>		
Salary of senior staff	6,600	
Office stationery	330	6,930
<b>Cost of production</b>		<b>145,200</b>
<b>Add:</b> Opening inventory of finished goods		6,600
Goods available for sales		151,800
<b>Less:</b> closing inventory of finished goods		8,250
<b>Cost of goods sold</b>		<b>143,550</b>
<b>Selling and distribution overheads</b>		
Salesman commission	3,300	
Remuneration of marketing agents	1,650	4,950
<b>Cost of sales</b>		<b>148,500</b>

**Computation of profits**

<b>Cost of sales (from cost statement)</b>	<b>148,500</b>
<b>Profit (balancing amount)</b>	<b>16,500</b>
<b>Sales (given)</b>	<b>1,65,000</b>

Gross profit margin on sales =  $16,500/165,000 \times 100 = 10\%$

**Self Examination Questions**

**Question 1**

From the following details, calculate the works cost and the cost of total goods processed during the period.

Consumption of raw materials	Tshs15 million
Payment of direct labourers	Tshs12 million
Chargeable expenses	Tshs5 million
Factory overheads	75% of the prime cost
Opening inventory of WIP	Tshs3 million
Closing inventory of WIP	Tshs4 million

**Question 2**

Rachel provides you the following information related to the inventory held in her organisation:

	Raw materials	Finished goods	Work-in-progress
Opening inventory	Tshs100,000	Tshs75,000	Tshs68,000
Closing inventory	Tshs150,000	Tshs70,000	Tshs72,000

From her cost sheet extracts, the following information was available:

Direct materials consumed	Tshs200,000
Total good processed during the period	Tshs750,000
Cost of goods available for sales	Tshs720,000
Factory overheads	Tshs182,000

**Required:**

Determine the following:

- (a) direct raw materials purchased
- (b) direct labour incurred
- (c) office cost and cost of goods sold

**Question 3**

Leather Ltd produces hand bags and it provides you the following cost information for the month of April 20X4.

Consumption of leather	Tshs7,500,000
Wages paid to workers involved in production	Tshs2,500,000
Direct expenses	80% of the direct wages
Overhead absorption rate (based on machine hours)	Tshs2,500
Machine hours utilised	900 hours
Administration overheads	1/5 <sup>th</sup> of factory cost
Selling and distribution overheads	Tshs125 per unit
Production units	34,200
Sales units (selling price Tshs1,000 per unit)	32,000

**Required:**

Prepare a cost statement showing total cost, cost per unit and profit per unit sold.



**Answers to Self-Examination Questions**

**Answer to SEQ 1**

Works cost = factory cost = Tshs55 million  
 Cost of total goods processed during the period = Tshs59 million

	Tshs million	Tshs million
Direct material consumed	15	
Direct labour wages	12	
Chargeable expenses	5	
<b>Prime cost</b>		<b>32</b>
Factory overheads (75% x Tshs32 million)		24
<b>Current manufacturing cost</b>		<b>56</b>
<b>Add:</b> Opening inventory of WIP		3
<b>Total goods processed during the period</b>		<b>59</b>
<b>Less:</b> Closing inventory of WIP		4
<b>Factory cost or work cost</b>		<b>55</b>

**Answer to SEQ 2**

Tip: this entire question needs to be solved using extracts of cost sheet proforma.

**(a) Direct raw materials purchases – Tshs250,000**

	Tshs'000
Opening inventory of raw materials	100
Add: Direct raw materials purchased (balancing figure)	<b>250</b>
	350
Less: Closing inventory of raw materials	150
Direct raw materials consumed	200

**(b) Direct labour incurred – Tshs300,000**

	Tshs'000
<b>Prime cost + Factory overheads (balancing figure)</b>	<b>682</b>
Add: opening inventory of WIP	68
Total goods processed during the period	750
Less: closing inventory of WIP	72
Works cost (750 – 72)	678

Here, factory overheads are given as Tshs182,000, hence prime cost would be Tshs500,000

	Tshs'000
Direct raw materials consumed	200
<b>Direct labour (balancing figure)</b>	<b>300</b>
Prime cost	500

**(c) Office cost – Tshs 645,000 and cost of goods sold – Tshs650,000**

	Tshs'000
<b>Office cost (720 – 75)</b>	<b>645</b>
Add: opening inventory of finished goods	75
Cost of goods available for sales	720
Less: closing inventory of finished goods	70
<b>Cost of goods sold (720 – 70)</b>	<b>650</b>

**Answer to SEQ 3**

Production units are 34,200 and sales units are 32,000 hence closing inventory units = 2,200

Cost statement showing total cost, cost per unit and profit per unit sold

	<b>Tshs (Total)</b>	<b>Tshs (Per unit)</b>
Consumption of leather (direct materials)	7,500,000	219.30**
Direct labour	2,500,000	73.10
Direct expenses (2,500,000 x 80%)	2,000,000	58.48
Prime cost	12,000,000	350.88
Factory overheads (900 hours x Tshs2,500 per hour)	2,250,000	65.79
Work cost	14,250,000	416.67
Administrative overheads (14,250 x 1/5)	2,850,000	83.33
Cost of production	17,100,000	500.00
<b>Add:</b> Opening inventory of finished goods	-	
	17,100,000	
<b>Less:</b> Closing inventory of finished goods (2,200 units x Tshs 500 per unit)	1,100,000	
Cost of goods sold (for 32,000 units)	16,000,000	500.00
Selling and distribution overheads (32,000 units x Tshs125)	4,000,000	125.00
Cost of sales (for 32,000 units)	20,000,000	625.00
<b>Profit (for 32,000 units)</b>	<b>12,000,000</b>	<b>375.00</b>
Sales (32,000 units x Tshs1,000)	32,000,000	1000.00

\*\*  $7,500,000/34,200 = 219.30$



## STUDY GUIDE C3: SIMPLE BUDGETS

### Get Through Intro

An efficient plan is essential for any organisation to achieve its goals. A budget is an operational level plan that is followed in order to achieve a financial target. Basically, it is an estimate of the expenses to be incurred to meet a particular target, e.g. in order to make Tshs100 millions of sales, an organisation may have to spend Tshs50 million on manufacturing, Tshs20 million on advertising and Tshs10 million on distribution expenses.

Half the battle is won if an organisation comes up with the best possible budget and all its departments manage to function within the parameters set by the budget.

However, this is easier said than done. Devising an optimal budget requires realistic forecasts, proper analysis of available historical data, and the ability to make astute estimates.

External factors have the capacity to upset a sound budget, but when a budget is based on the above factors it stands a better chance of being effective.

This Study Guide explains the reasons why an organisation uses a budget and takes you through the budgeting process and the administrative procedures used in the budgeting process.

An understanding of these fundamental principles will be of immense help when you make budgets in your professional capacity.

### Learning Outcomes

- a) Explain the meaning and objectives of a budget and budgetary control.
- b) Write short notes on: budget procedures, budget committee and budget manual.
- c) Prepare the following budget: sales, production, direct material usage, direct material cost, direct materials purchases, direct labour, overhead and production cost.
- d) Differentiate between functional master, and capital budgets.

**1. Explain the meaning and objectives of a budget and budgetary control.** [Learning Outcome a]

**1.1 Defining a budget**



**Definition**

A budget is a quantitative statement for a defined period of time, which may include planned revenues, expenses, assets, liabilities and cash flows. A budget provides a focus for an organisation aids the co-ordination of activities and facilitates control. Planning is achieved by means of a fixed master budget, whereas control is generally exercised through the comparison of actual costs with a flexible budget.

CIMA official terminology, 2005

A budget is different from a forecast. A forecast only aims to predict what will happen in the future. On the other hand, a budget helps an organisation to plan its objectives for the future and the methodology to achieve these objectives.

Analysis of the definition reveals the following:

1. A budget is prepared and approved before the start of the accounting period (known as the budget period).



**Example**

The budget for the year 20X8 needs to be prepared before the start of 20X8 i.e. by the end of the year 20X7.

2. It is all about **planning** for the **future period** and **controlling** the **activities** (and in turn the costs) of an organisation by pursuing management policies. The objective of this overall organisational plan is achieved by means of a master budget. A **master budget** is a statement showing estimation of revenue, costs and **profit / (loss)** for the organisation as a whole.
3. It is a **quantitative / financial** statement with an **action plan**. In other words, it is a business plan, normally expressed in monetary terms.
4. A budget includes statements showing income, expenditure, cash flow and the capital to be employed.
5. A budget may either be in the form of a fixed master budget or in the form of a flexible budget. A **fixed budget** is devised based on the assumption of a particular capacity level e.g. selling a certain quantity of goods. On the other hand, a **flexible budget** is designed to adjust the cost levels according to changes in the actual level of activity. Flexible budgets are mainly used to exercise control over business activities. This will be discussed further in Study Guide C4.



**Example**

A manufacturing company is required to plan the future production in order to estimate the labour and raw material requirements. This information can be obtained from the sales budget.

The territory-wise sales budgets for the year 20X9 based on the estimates of the sales division managers were as follows:

- South zone Sales of 20,000 units at a price of Tshs10,000
- North zone Sales of 12,500 units at a price of Tshs9,000
- East zone Sales of 10,000 units at a price of Tshs9,000
- West zone Sales of 8,000 units at a price of Tshs9,000

Total budgeted sales were 50,500 units for the whole organisation.  
Hence, the sales budget will look as follows:

	South zone	North zone	East zone	West zone	Total
Budgeted units	20,000	12,500	10,000	8,000	50,500
Budgeted selling price	Tshs10,000	Tshs9,000	Tshs9,000	Tshs9,000	
Total sales	200,000,000	112,500,000	90,000,000	72,000,000	474,500,000

With the help of this sales budget, the production department can prepare its budget for material and labour requirements.



## Test Yourself 1

Which of the following statements holds true for a flexible budget?

- (i) A flexible budget requires clear segregation between fixed and variable costs.
- (ii) Under flexible budgeting, budgets can be modified easily for changes in the volume of activity.
- (iii) Flexible budget changes every year.

- A Both (i) and (ii)
- B Both (ii) and (iii)
- C All of the above
- D None of the above

### 1.2 Budget period

The budget period is an important factor in developing a budget. The budget period can be short term (short range budgets) or long term (long range budgets).

1. Short range budgets are prepared for a period of less than a year. For example, short range plans are usually used by the wholesale or retail firms, manufacturing units etc.
2. Long range plans are prepared for a period of more than a year. For example, long range plans usually cover extensive research and development programmes, capital expenditures, financial profit forecasts etc.

Budget period has been explained furthering more detail, later in this Study Guide.

### 1.3 The various functions / objectives of budgets

The various functions of a budget highlight its usefulness to the organisation and elaborate on the reason we prepare budgets.

#### 1. Planning and achieving objectives

As we have already discussed, budgets are primarily statements showing the operational planning of an organisation. The process of budgeting is an integral part of planning for future operations, in order to achieve organisational objectives. The plan of an organisation is expressed in the form of a master budget that is a summary statement of all the functional budgets. The master budget provides management with ideas about how all the functional budgets can be co-ordinated so as to achieve the organisational objectives.

In planning future operations, the management is required to consider potential changes in the external as well as the internal environment and the steps needed to respond to these changes. This helps management to anticipate future problems before they arise.



## Example

It is thought that present demand for television sets is 10,000,000 units globally. Glob Ltd is a T.V. manufacturing company in Japan. Until the year 20X8, Glob Ltd produces and sells 1,000,000 T.V. sets per annum. However, keeping in mind the wide market available to Glob Ltd, the company has decided to increase its sales and production budget for the year 20X9 from 1,000,000 to 2,500,000 T.V. sets per annum. This target will enable the production managers to plan and negotiate labour and material contracts at favourable rates.

### 2. Coordinating

Coordinating involves synchronising all the business activities to achieve the organisational objectives. To devise the master budget, there should be **synchronisation between all functional budgets**. The budgeting process necessitates inter-departmental dialogue, which ensures that individual departmental budgets fit in with the common organisational goal.

However, coordination is difficult to achieve at times. This is because each functional unit would have its own departmental plans and these inter departmental budgets might not be fully integrated to fit into the master plan to achieve the organisational objectives.



### Example

The sales department and the production department prepare their respective functional budgets.

The sales department of 'Just do It' Ltd, has prepared its sales budget for 100,000 units.

Just do It Ltd has introduced a company policy for the year 20X9 to maintain an inventory of 6,000 units. This policy is adopted to ensure that the company is not out of stock at any point of time. The opening inventory of the company for 20X9 is estimated at 5,000 units.

The production budget needs to be prepared after coordinating with the sales budget and the company policy. Hence, the production department would budget for 101,000 units. The basis for the production budget would be the sales budget i.e. 100,000 units and an additional 1,000 units as the inventory level needs to be increased to 6,000 from 5,000.

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### 3. Motivation

A budget motivates managers to perform in line with the organisational goals / objectives.

Transparency in the budgeting process ensures involvement of the lower and middle management. One of the reasons for involving lower and middle management in the budgeting process is that greater participation creates a team spirit amongst the employees and in turn motivates them to meet that budget.

In order to remain motivated, the targets set in the budget need to be achievable. Linking the target with rewards or providing feedback to employees for deviating from the budget can help the employees to be motivated further.



### Example

The marketing department of P&M Plc received an urgent order of 1,000 units for sale in addition to their budgeted sales. As a result, the sales and the production budget for the month of June 20X9 will have to be revised. This will result in an additional workload on the workers in the production department.

Management should speak to the staff in advance and explain the situation to the workers in the production department. This will give them the feeling that they are involved in the management process of planning and budgeting. This feeling will motivate them to achieve the new target.

Management could also declare that the workers who produce extra units would get a bonus of Tshs2,000 per unit of goods sold. Because of the reward system, the workers would be further motivated to achieve their target.

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### 4. Control

Control is the action necessary to ensure that objectives and plans are attained in reality. The budget is a widely used tool for controlling the operational activities of a business.

Budgets are more useful if actual performances are compared with those budgeted and the difference, or variance, is examined. **This process of comparing and highlighting the variance / difference and then taking corrective measures is called budgetary control.**



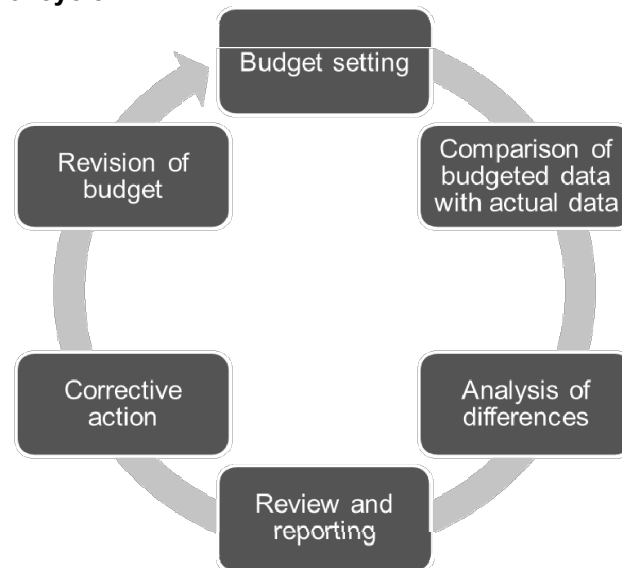
### Definition

**A budgetary control system is a means of monitoring revenue and costs and thereby exercising control in an entity by developing budgets and comparing budgeted figures with actual results. This system highlights any discrepancies and allows corrective action to be taken.**

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The procedure of budget monitoring can be seen as a periodic cycle, which is also termed as budgetary control cycle. It is illustrated in the below diagram:

Diagram 1: Budgetary control cycle



Budgetary control helps management to take timely corrective action in cases where actual performance is not in line with the budget.



### Example

Skytel Ltd is a manufacturing company. Skytel's budget period is one year. However, in order to achieve better control, the company splits its budget period into twelve monthly budgets and at the end of each month actual figures are compared with the corresponding budgeted figures.

In the months of January and February, management observed that the actual cost of raw materials exceeded the standard cost. This comparison of budget and actual figures is budgetary control. With further detailed study, management discovered that the poorly managed inventory system had led to emergency purchases at short notice and this had resulted in an increase in the cost of raw materials. Accordingly, as a corrective action, a perpetual inventory control system was introduced to ensure the timely purchase of the right quality and quantity of raw materials at the right price. Thus, the examination of the variance helped the company to take timely corrective action.

## 5. Performance evaluation and responsibility accounting

Budgetary planning helps to allocate the responsibility of the attainment of the budgeted targets and the operations to the area manager. Very often, managers' performance is evaluated on the basis of whether their department achieved the budget. In some organisations, incentives in the form of monetary benefits or promotions are given to managers based on their performance (meeting the budget). Also, comparison of actual figures with budgeted figures gives the managers an opportunity for introspection, and ultimately helps to improve their performance.



### Example

Thomas is a sales manager in Shoes Unlimited Co. His target for the year 20X8 was 25,000 units. However, he managed to sell 26,000 units. By comparing the actual figures with budgeted figures and analysing the market conditions, management concluded that Thomas had achieved his targets without much effort. So, in the subsequent budget for the year 20X9, management might plan to set a higher target for Thomas. Similarly, by comparing the actual figures with the budgeted targets, Thomas can evaluate his own performance which will motivate him to achieve higher targets.

## 6. Communicating

All levels of management normally get involved in the budgeting process. Essential ingredients of the budgeting process are:

- (a) Communication from top to bottom about the plans to be implemented
- (b) A flow of feedback (about difficulties in implementing the plans, if any) from the supervisory level (at the bottom of the management hierarchy) to the top management



## 282: Cost Bookkeeping

Again, in order to coordinate the budgeting process of different departments, horizontal communication amongst the departments is also vital.

Moreover, once the budget is finalised, it needs to be communicated to all levels of management for its implementation. Furthermore, each person affected by the budget should know his targets. In addition to this, there should be proper communication amongst all the functional departments so as to ensure successful achievement of the target.

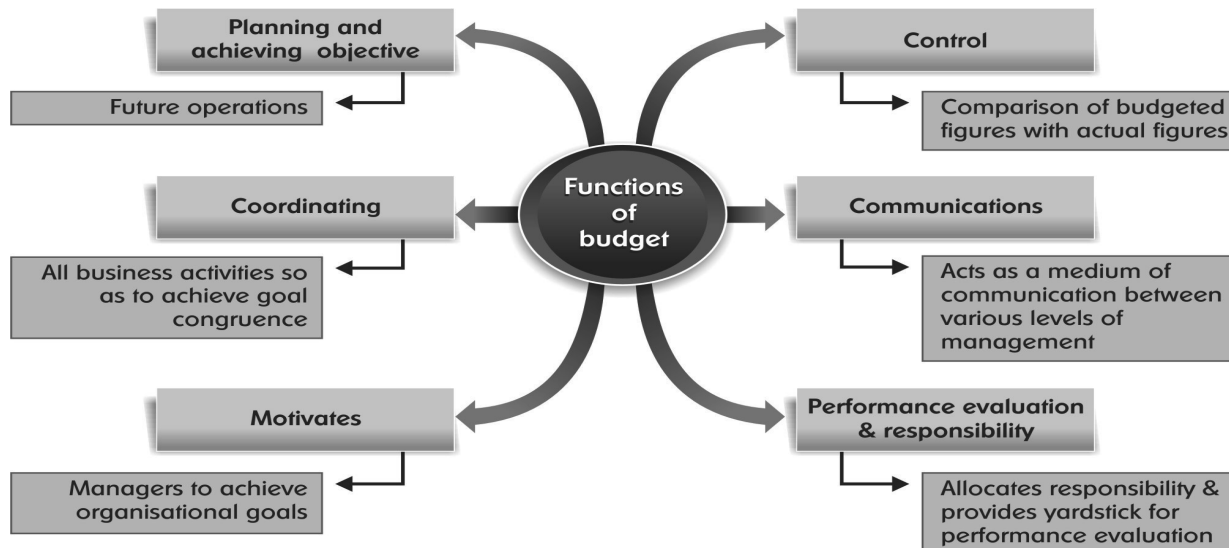


### Tip

In short, we can say that organisations prepare budgets for – PCMCP

**P** Planning  
**C** Coordinating  
**M** Motivation  
**C** Control  
**P** Performance evaluation  
**C** Communicating

**Diagram 2: Functions of budget**



## 2. Write short notes on: budget procedures, budget committee and budget manual. [Learning Outcome b]

Administrative intervention is needed to ensure that the budget process works effectively. The **budgetary procedures** are generally laid down in the **budget manual** and it is administered by the **budget committee**. These procedures help to gather the required data for compiling the budget.

The procedure for preparing a budget is different for every organisation. However, the steps stated below are more or less the same for all organisations. It takes weeks or months to construct a budget and the budget committee holds several meetings to bring together all the departments' budgets to form a consolidated master budget.

The **administrative procedures involved in budgeting** include the following:

### 1. Establishment of a budget committee

In small organisations (shops, small trading businesses) it is likely that one person may handle all the work relating to preparation of a budget.

However, in large organisations it becomes very difficult for a single person to manage all the business functions and consequently, the performances of the functional units (e.g. sales department, production department, finance department etc.) are looked after by different people.

Each functional department prepares its own budget and based on these functional budgets, the master budget (the budget of the entity as a whole) is prepared.

Compiling all functional budgets into the master budget and ensuring that this budget adheres to the corporate policy are the tasks of the budget committee. Normally, all the heads of the functional departments (sales, marketing, production etc.) and representatives of top management make up the budget committee.

The major tasks of the budget committee are:

- (a) **Preparing the master budget:** it is dependent on the preparation of the individual budgets of the various departments. The budget committee needs to allocate responsibilities and issue timetables to the functional heads for the preparation of the budget.
- (b) **Devising the budget:** it is the function of the budget committee to see whether all functional budgets are realistic and synchronised, and that ultimately goal congruence can be achieved. Goal congruence is when the actions of management and staff of all different departments match the objectives set by the business.
- (c) **Co-ordinating:** a master budget is the collective effect of all functional budgets. Hence, in achieving the budget, there should be proper co-ordination between various functional departments. The budget committee plays an important role in co-ordinating between the departments and issuing the budget manual.
- (d) **Appointing a budget officer (management accountant)** who acts like an accountant and co-ordinates the individual functional budgets.
- (e) **Reviewing** the master budget and **recommending** it for final approval to senior management.
- (f) **Communicating:** the budget committee is also required to communicate the final budget to the concerned people.
- (g) **Analysing the periodic performance** of the organisation, comparing the actual results with the budget and analysing the reasons for variances.
- (h) **Recommending changes** in the operational policy (based on the budget factors) and procedures for implementing them.



### Example

Impact Ltd manufactures two products: X and Y. The company uses the same raw material for manufacturing both the products. However, the raw material is in short supply.

According to a market survey, product Y has good market demand. The budget committee took the decision, with the approval of senior management, to produce only 1,000 units of X (to fulfil customer requirement) and thereafter to produce the maximum number of units of Y.

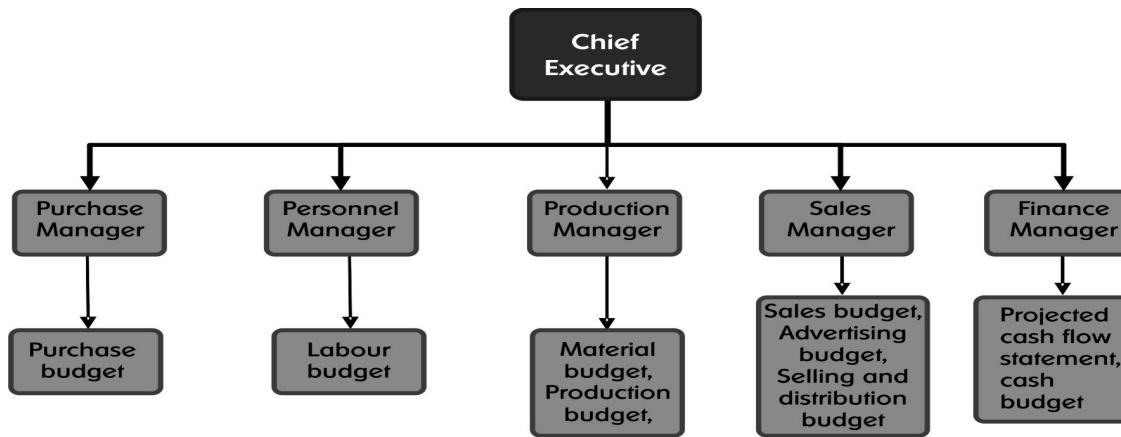
## 2. Preparation of an organisational chart

Appropriate **delegation of authority and responsibility** is required for effective implementation of the budgets. An organisational chart makes the delegation process easier.

This chart shows:

**Functional responsibility** of a particular departmental head and  
**Delegation of authority** to various levels of management.

Diagram 3: Example of an organisational chart showing the responsibilities of the functional managers



### 3. Accounting staff

The role of the accounting staff is to provide various services (e.g. providing past information, circulating and advising on instructions about the budget preparation and so on) to functional managers who are responsible for the preparation of their department's budget.

The accounting staff does not decide the contents of the departmental budgets, but they provide assistance and support to the functional managers so as to enable the functional managers to come up with their budgets. It is also the job of the accounting staff together with the budgeting committee to see that all the functional managers submit their budgets on time.

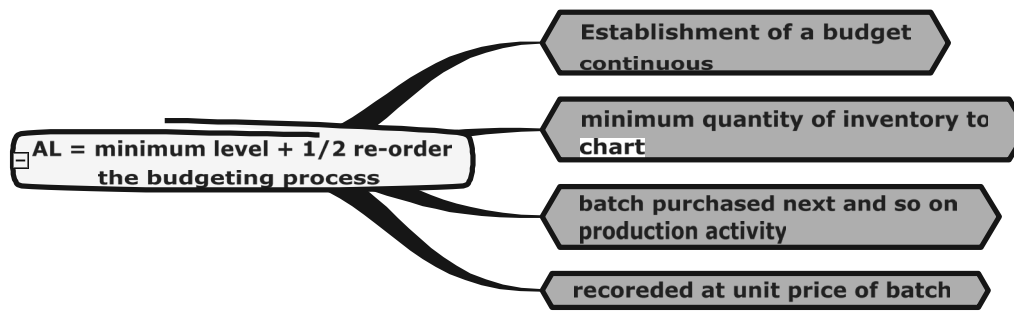
### 4. Preparation of a budget manual

A budget manual is prepared by a management accountant together with the budgeting committee. It expresses the objectives of the budget. It also lays down various programmes and procedures to be followed while devising the budget and using the budgetary data. A budget manual is a good **reference** for functional managers as well as for the accounting staff who are actually involved in the budgeting process.

The contents of the budget manual are as follows:

- (a) Principles and objectives of the budget and the significance of the budget in long term planning of the organisation
- (b) Length of the budget period
- (c) Scope of the budget (such as whether it is a flexible or a fixed budget)
- (d) Various steps to be taken while devising the budget and the various procedural forms
- (e) Procedures for preparing the budgeted cash flow and financial statements
- (f) The organisation chart and the responsibilities and duties of each departmental head in relation to the budget
- (g) The timetable and the sequence for preparation of each functional budget together with the date by which each departmental head should submit his / her budget to the budget committee.
- (h) An overview of the various functional budgets and the inter-relationship between these budgets
- (i) Functions and duties of the budget committee

## SUMMARY



## Test Yourself 2

Who prepares the budget manual?

- A Management accountant only
- B Budgeting committee only
- C Financial advisor and management accountant
- D Management accountant and budgeting committee

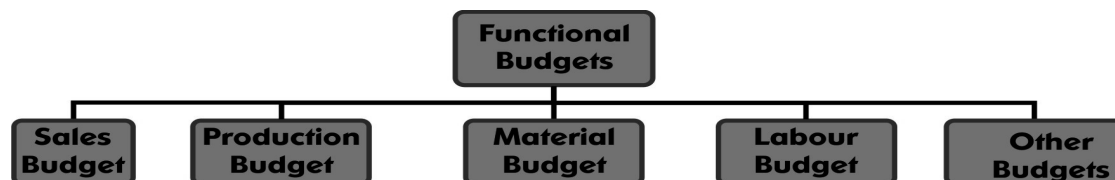
3. Prepare the following budget: sales, production, direct material usage, direct material cost, direct materials purchases, direct labour, overhead and production cost.

[Learning Outcome c]

We have already seen that the operational budget of an organisation comprises the budgets for all the functional activities (known as the functional budgets) and the master budget which is a consolidation of the functional budgets and aims at predicting the profit for the organisation during the budget period. The most common operational activities for which a functional budget is prepared are sales, production, material (usage and purchase), labour and overheads.

### 3.1 Functional budgets

Diagram 4: Functional budgets



#### 1. Sales budget

The sales budget is **the sales target** for a budget period. It is usually prepared by the marketing/sales department. It shows the projected volume of sales and the estimated selling prices of each of the products that the company plans to sell. The estimates of demand and price of a product are calculated based on the performance of the previous period, feedback from the market about potential demand, information about competitors, and so on.

Sales forecasting is required for preparing the sales budget and helps an organisation to estimate its sales revenue for the budget period. The two factors that influence the projected sales revenue are:

- (a) The projected volume of sales and
- (b) The projected price of the product

Once the budgeted sales volume and selling price is determined, the sales budget is devised. The sales budget is normally the foundation of all the other functional budgets since in most of the cases the potential demand for the products is the principal budget factor. Based on the sales budget estimates, a production budget is prepared. As a result, the usefulness of all other functional budgets depends upon the reliability of the sales budget.



**Example**

The following is the information provided by the sales manager of Colourful Park Ltd for the month of December 20X9:

	Product Blue	Product Red
Budgeted sales (in units)	10,000	40,000
Budgeted selling price (Tshs'000)	40	30

The sales budget of the company may be presented as follows:

Colourful Park Ltd Sales budget for month of December, 20X9			
Products	Budgeted sales	Budgeted sales per unit	Total sales revenue
	Units	Tshs'000	Tshs'000
Product: blue	10,000	40	400,000
Product: red	40,000	30	1,200,000
<b>Total</b>			<b>1,600,000</b>

In certain companies, the sales budget may be sub-divided so that managers have their individual goals. Sales budget can be sub-divided on the basis of:

- products
- management responsibility
- Area, etc.

**SUMMARY**



**Test Yourself 3**

Mark Trading Co sells two products A and B. The following estimates of sales volume are made for the year 20X9.

	Ist Quarter	IInd Quarter	IIIrd Quarter	IVth Quarter
Product A	100,000	140,000	90,000	120,000
Product B	90,000	120,000	100,000	110,000

The projected sales price for product A is Tshs10,000 per unit, while that of product B is Tshs20,000 per unit. You are required to prepare a sales budget for the year.

**2. Production budget**

A production budget is a forecast of the production volume for the budget period. It is normally devised based on the sales budget. The production plan should be in line with the sales plan and at the same time inventory levels for both raw materials inventory and finished goods inventory need to be taken into consideration.

While devising a production budget, the company must bear in mind that producing less than the sales target may run the risk of unfulfilled demand and, on the other hand, producing excess may require additional storage for the extra inventory. It also causes more funds to be invested in finished goods inventory.

The production budget helps to identify if there are any limiting factors in the production system such as availability of skilled labour, plant capacity, imbalance in machine capacities, availability of raw materials and so on. If there is a principal budget factor in the production system, the organisation should take steps to sub-contract workers or request existing workers to work for extra hours, hire additional machines or inspect new sources of raw materials.

Preparing the production budget is the responsibility of the production manager. The production budget is **expressed in quantities** of goods to be produced and might also show the cost of production.

 **Example**

A production budget based on the information provided by the sales manager and the stores manager of Colourful Park Ltd

	Product Blue	Product Red
Budgeted sales (refer to the sales budget)	10,000 (units)	40,000 (units)
Inventory level required as at 31 December 20X9	500	4,500
Inventory as at 1 December 20X9	200	2,000

The production budget for the year may be presented as follows:

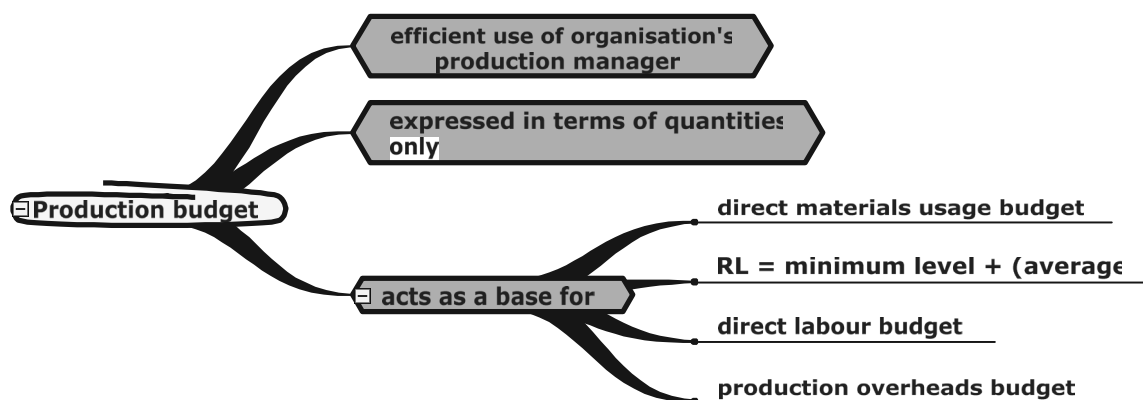
Colourful Park Ltd Production budget for month of December 20X9		
	Product Blue Units	Product Red Units
Budgeted sales	10,000	40,000
<b>Add:</b> closing inventory required	500	4,500
<b>Total requirement</b>	<b>10,500</b>	<b>44,500</b>
<b>Less:</b> opening inventory	200	2,000
<b>Budgeted production</b>	<b>10,300</b>	<b>42,500</b>

 **Important**

The following budgets are dependent on the production budget and need to be prepared once the production budget is finalised:

- Direct materials usage budget
- Direct materials purchase budget
- Direct labour budget
- Production overhead budget

**SUMMARY**





**Test Yourself 4**

Beauty Ltd manufactures toiletries. The company’s policy is to always maintain the closing inventory of 10,000 units. According to the sales budget the company has estimated that in the next year the company will achieve sales of 1,000,000 units. Show the company’s production budget.

**3. Direct materials budget**

**(a) Direct material usage budget**

The direct material usage budget is the estimate of the required materials for production of the planned volume of output during the budget period. Generally, the direct material usage budget is expressed in quantity. However, it may also be expressed in quantitative as well as in monetary terms. The production manager or the production supervisors usually prepare estimates of the materials which are required to meet the production budget.

The **purposes** of the direct material usage budget are:

- (i) Assisting the purchase department in planning for the purchases in order to ensure procurement of the right quantity and quality of materials in the right time.
- (ii) Helping to establish control over the material usage. Direct material usage budget acts as a yardstick with which actual usage can be compared during the relevant period and therefore assists in evaluating performance.



**Example**

**Continuing the previous example of Colourful Park Ltd**

In addition, consider the following information given for the year ended 31 December 20X9

	Product Blue	Product Red
Budgeted production	10,300	42,500
Required quantity of material ‘X’ per unit	5 Kilogram	2 Kilogram
Required quantity of material ‘Y’ per unit	8 Kilogram	3 Kilogram

Colourful Park Ltd							
Direct material usage budget for month of December 20X9							
	Product Blue			Product Red			Total
	Production (units)	Materials consumption per unit of production (Kilogram)	Total materials (Kilogram) (a)	Production (units)	Materials consumption per unit of production (Kilogram)	Total material (Kilogram) (b)	Total Kilogram (a + b)
Material X	10,300	5	51,500	42,500	2	85,000	136,500
Material Y	10,300	8	82,400	42,500	3	127,500	209,900

**(b) Direct material purchase budget**

The direct material purchase budget derives the estimated quantity and value of the various materials needed to be purchased during the budget period. This budget is expressed in both quantitative as well as in monetary terms.

The **purposes** of the direct material purchase budget are as follows:

- (i) This budget enables the material purchase department to plan for purchases well in advance.
- (ii) This budget helps in assessing the cash requirements for procurement of materials.
- (iii) This budget ensures that production is carried out without any interruption due to shortage of raw materials at any point of time.

The materials manager/purchase manager is the person responsible for preparation of the direct material purchase budget. Ultimately, it is his responsibility to ensure procurement of the right quantity and quality of material at the right price and at the right time.



### Example

Information provided by Colourful Park Ltd for the month of December 20X9 is as follows:

	Material x	Material y
Inventory as at 1 December 20X9	14,000 (units)	13,800 (units)
Budgeted inventory as at 31 December 20X9	10,000 (units)	12,500 (units)
Purchase price (Tshs'000)	2	3.5

The material purchase budget will be as follows:

Colourful Park Ltd		
Direct material purchase budget for the month of December 20X9		
	Material x Units	Material y Units
Quantity to be consumed according to the material usage budget	*136,500	*209,900
<b>Add:</b> budgeted closing inventory	10,000	12,500
	146,500	222,400
<b>Less:</b> planned opening inventory	14,000	13,800
<b>Total units to be purchased</b>	<b>132,500</b>	<b>208,600</b>
Budgeted purchase price (Tshs'000)	2	3.50
<b>Total budgeted cost of purchase (Tshs'000)</b>	<b>265,000</b>	<b>730,100</b>

\*For figures see the material usage budget above.

For control purposes the materials manager is most likely to break the annual material purchase budget into twelve monthly budgets.



### Test Yourself 5

The sales executive of Cool-one Ltd expects to sell 60,000 units of air coolers in the year. The production manager has estimated the requirements of the raw materials for producing each unit of air-cooler as:

Raw material X – 4 units  
Raw material Y – 6 units

The opening and closing balances of the finished goods and raw materials estimated are as follows:

Item	Inventory at the beginning of the next year (Units)	Inventory at the end of the next year (Units)
X	10,000	11,000
Y	15,000	17,000
Finished goods	8,000	11,000

**Required:**

Prepare a purchase budget showing the total amount of raw material purchased.



4. Direct labour budget

The direct labour budget is an estimate of the direct labour requirement (for each grade) for producing the planned volume of output according to the production budget. This budget should be developed in terms of both direct labour hours and direct labour costs.

The primary purpose of devising a direct labour budget is to assess the requirement for each grade of labour well in advance and also to estimate the related cost of the labour. It also provides the relevant data to estimate the unit cost of manufacturing each product, in order to assess cash outflow requirements and establish control.

The production supervisors and the production manager prepare the direct labour budget. However, normally it is the responsibility of the HR department to determine the rates per hour payable to each grade of labour.



**Example**

**Continuing the previous example of Colourful Park Ltd**

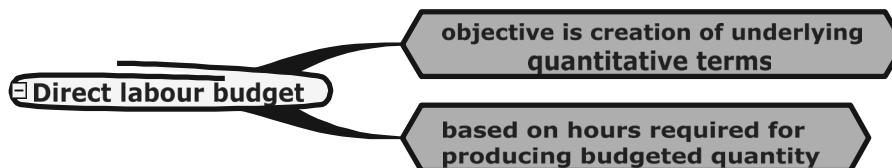
The following additional information is also given:

	Product Blue	Product Red
Labour hours required per unit of production	7 hours	3 hours
Rate per labour hour (Tshs'000)	8	8

Colourful Park Ltd			
Direct labour budget for month of December 20X9			
	Product Blue	Product Red	Total
A. Budgeted production (in units)	*10,300	*42,500	52,800
B. Labour hours required per unit	7 hours	3 hours	-
C. Total labour hours (A X B)	72,100	127,500	199,600
D. Rate per labour hour (Tshs'000)	8	8	8
E. <b>Total wages</b> (Tshs'000) (C X D)	<b>576,800</b>	<b>1,020,000</b>	<b>1,596,800</b>

\* For figures see the production budget for the month of December 20X9 above

**SUMMARY**



**Test Yourself 6**

Suggest a few steps that can be taken to avoid problems arising due to labour shortage.

## 5. Overhead budgets

The overhead budget of an organisation includes:

- (a) Production overhead budget
- (b) Selling and distribution overhead budget
- (c) Administrative overhead budget

**Diagram 5: Overhead budget of an organisation**



### (a) Production overhead budget

The production overhead budget is the estimate of indirect expenditure to be incurred while producing the planned quantities of output during the budget period.

The **steps** required for setting a factory overhead budget are as follows:

- (i) Classify the separate production overhead costs based on their behaviour, into fixed, variable and semi-variable costs. This involves estimating the costs (variable) that will vary with a change in production volume and the costs (fixed) that are not likely to vary with any possible change in production volume.
- (ii) Estimate the costs incurred at each cost centre (e.g. department) so that the costs can be controlled at their points of origin.

Also, classify the overheads into controllable and non-controllable categories.

The purpose of devising the factory overhead budget is to provide planned data for indirect material requirements and man-hours (number of workers x average number of hours a worker would work in a day) required and to estimate the other indirect costs of manufacturing (for those workers who are not directly involved in the production process). This is also helpful in determining cash outflow requirements and for establishing control.

The indirect material and the indirect labour are first quantified e.g. in terms of kilograms, hours, units and so on and then valued i.e. expressed in terms of money, to estimate the budgeted costs in the factory overhead budget. Other expenses (such as repairs, maintenance, power and so on) are expressed in monetary terms only.

Generally an accountant, in association with the production manager, prepares the factory overhead budget based on the historical data and the estimated volume of production / activity. In some organisations the production manager prepares this budget with respect to his department and finally senior management authorises it.



### Example

The following information is about production overhead costs to be incurred by Colourful Park Ltd during the year 20X9

Variable overhead rate per unit of production		
	Product Blue	Product Red
	(Tshs'000)	(Tshs'000)
Indirect material	1.5	0.9
Indirect labour	0.6	1.1
Power (to the extent variable )	0.8	0.4
Maintenance (to the extent variable)	1.0	0.5
Semi-variable and fixed overhead expenses		
	Product Blue	Product Red
	(Tshs'000)	(Tshs'000)
Power (to the extent fixed)	25,000	20,000
Maintenance (to the extent fixed)	5,000	8,000
Depreciation	50,000	75,000
Rent	20,000	20,000

The factory overhead budget will be calculated as follows:

Colourful Park Ltd			
Factory overhead budget for the month December 20X9			
	Product Blue	Product Red	Total
	(Tshs'000)	(Tshs'000)	(Tshs'000)
<b>Variable costs</b>			
Indirect material (W1)	15,450	38,250	53,700
Indirect labour (W2)	6,180	46,750	52,930
			106,630
<b>Semi-variable costs</b>			
Power (to the extent variable ) (W3)	33,240	37,000	70,240
Maintenance (to the extent variable) (W4)	15,300	29,250	44,550
			114,790
<b>Fixed costs</b>			
Depreciation	50,000	75,000	125,000
Rent	20,000	20,000	40,000
<b>Total</b>			<b>165,000</b>
<b>Total Costs</b>			<b>386,420</b>

### Workings

#### W1 Indirect material

Product Blue = 10,300\* units X Tshs15,000 = Tshs15,450,000

Product Red = 42,500\* units X Tshs900 = Tshs38,250,000

\* For figures see the production budget for the month of December 20X9 above.

#### W2 Indirect labour

Product Blue = 10,300 units X Tshs6,000 = Tshs6,180,000

Product Red = 42,500 units X Tshs1,100 = Tshs46,750,000

**Continued on the next page**

**W3 Semi-variable costs****Power**

Total cost = total variable cost + total fixed cost

Product Blue = Tshs8,240,000 (10,300 units X Tshs800) + Tshs25,000,000 = Tshs33,240,000

Product Red = Tshs17,000,000(42,500 units X Tshs400) + Tshs20,000,000 = Tshs37,000,000

**W4 Semi-variable costs****Maintenance**

Total cost = Total variable cost + Total fixed cost

Product Blue = Tshs10,300,000 (10,300 units X Tshs1,000) + Tshs5,000,000 = Tshs15,300,000

Product Red = Tshs21,250,000 (42,500 units X Tshs500) + Tshs8,000,000 = Tshs29,250,000

## Production cost budget

Since production costs is an addition of prime costs and factory overheads, production cost budget includes the combination of direct materials budget, direct labours budget, direct expenses budget and production overheads budget

**Example****Continuing with the previous example**

The production cost budget of colourful Park Ltd would be prepared as follows:

<b>Colourful Park Ltd</b>			
<b>Production cost budget for the month December 20X9</b>			
	<b>Product Blue (Tshs'000)</b>	<b>Product Red (Tshs'000)</b>	<b>Total (Tshs'000)</b>
<b>Direct materials (purchase cost)</b>			
Material X - 265,000	-	-	
Material Y - 730,100	-	-	995,100
<b>Direct wages Prime costs (A) Variable costs</b>	576,800	1,020,000	<b>1,596,800</b>
<b>Indirect costs</b>			
material (W1) Indirect	15,450	38,250	53,700
labour (W2) <b>Total</b>	6,180	46,750	52,930
<b>Semi-variable costs</b>			<b>106,630</b>
Power (to the extent variable ) (W3)			
Maintenance (to the extent variable) (W4)	33,240	37,000	70,240
<b>Total</b>	15,300	29,250	44,550
<b>Fixed costs</b>			<b>114,790</b>
Depreciation			
Rent	50,000	75,000	125,000
<b>Total</b>	20,000	20,000	40,000
<b>Factory overheads (B)</b>			<b>165,000</b>
<b>Production costs (A + B)</b>			<b>386,420</b>
			<b>2,978,320</b>

**(b) Selling and distribution overhead budget**

We have already seen how the sales budget is prepared. Once the sales budget is ready, estimating the appropriate selling and distribution expenses is a relatively straightforward task. In reality, the selling and distribution budgets are prepared separately.

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However, for simplicity's sake, the two overhead budgets have been presented together here. The sales manager is responsible for devising the sales budget whereas the distribution manager is responsible for devising the distribution budget.

A selling overhead budget **includes:**

The cost towards the sales personnel (such as salaries, commission, travelling expenses).

The cost of the sales office (such as office salaries, rental rates of office building, depreciation of office building, telephone and electricity expenses of office).

The cost of market promotion (such as cost of advertising, free samples, attractive secondary packing and so on).

A distribution budget includes **the cost of warehousing and distribution** (such as salaries of employees engaged in distribution, drivers' salaries, expenses towards vehicles, depreciation on the vehicles meant for distribution and so on).



### Example

The following information is about selling and distribution overhead costs to be incurred by Colourful Park Ltd during the year 20X9. The sales revenue for the year ended is Tshs1,600 million.

	% of sales
<b>A. Variable expenses</b>	
Sales commission	6%
Wages and salaries	2.5%
Travelling expenses	3 %
Advertising and promotion expenditure	1%
<b>B. Fixed selling expenses</b>	
Marketing staff's salary (Tshs'000)	50,000
Advertising expenses (Tshs'000)	30,000
Depreciation (Tshs'000)	45,000
Warehousing expenses (Tshs'000)	75,000

**Required:**

Prepare a selling and distribution expenses budget.

**Answer**

<b>Colourful Park Ltd</b>		
<b>Selling expenses budget for month of December 31, 20X9</b>		
	(Tshs'000)	(Tshs'000)
<b>A. Variable expenses</b>		
Sales commission (6% of Tshs1,600 million)	96,000	
Wages and salaries	40,000	
Travelling expenses	48,000	
Advertising and promotion expenses	16,000	
<b>Total variable selling expenses</b>		<b>200,000</b>
<b>B. Fixed selling expenses</b>		
Marketing staff's salary	50,000	
Advertising expenses	30,000	
Depreciation	45,000	
Warehousing expenses	75,000	
<b>Total fixed selling expenses</b>		<b>200,000</b>
<b>Total selling expenses</b>		<b>400,000</b>

**(c) Administrative overheads budget**

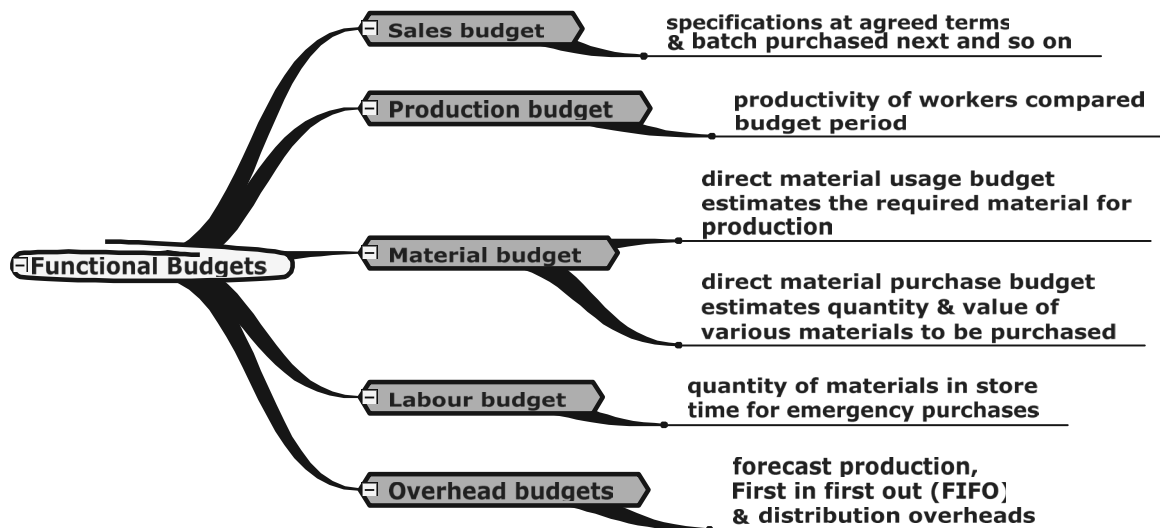
The administration overhead budget is normally the responsibility of the head of the administration department. The major inputs for estimating the administration overhead costs for the budget period are the previous year's expenses for the same items. Most administrative costs are fixed in nature. The current budgeted figures are usually a percentage increment on the previous year's figures, taking the inflation into account.

**Example**

The administration overhead budget of Colourful Park Ltd during the year 20X9 is as follows:

Colourful Park Ltd	
Selling expenses budget for the month December 31 20X9	
(Tshs'000)	
<b>Administration overheads</b>	
Stationery	3,000
Printing	5,000
Salaries	20,000
Office rent	2,000
Telephone charges	500
Electricity charges	900
Miscellaneous	1,600
<b>Total</b>	<b>33,000</b>

**SUMMARY**



**SUMMARY**



**3.2 Master budget**

A master budget is a projected financial plan. It displays a consolidation of the functional budgets to present the overall impact of the projected operational activities on the profitability of the organisation as a whole. It is a statement showing the estimation of revenue, costs and profit (loss) for the organisation during the budget period. A master budget normally contains all functional budgets, capital expenditure budget, budgeted SOCI (income statement) and budgeted SOFP (balance sheet) of the budget period.

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The preparation of the master budget is based on previous year's profit and loss account, the balance sheet and other information obtained for the budget period. However, the major difference between a functional budget and master budget is that the first one represents sectional goals whereas the second one deals with the company's overall plan of action for the budget period.

### (a) Usefulness

- (i) The prime advantage of the master budget is that it helps to co-ordinate all the other budgets and to devise the short-term objectives of an organisation. Any conflict between departments is resolved by the master budget as it is a consolidation of all the functional budgets.
- (ii) A budget is a good medium of communication between the various departments as it consolidates the functional budgets.
- (iii) It enables preparation of an overall plan for achieving the budget targets.
- (iv) The master budget incorporates the targets of every department and therefore acts as a measure of performance evaluation.



### Example

Camron Plc manufactures and sells two products Bing and Xing. The company is planning its budget for the forthcoming year ending on 31 December 20X9. The following are the expectations for 20X9:

#### 1. Statement of financial position (balance sheet) for the year ended 31 December 20X8

<b>Amazing Plc</b>		
<b>SOFP as at 31 December 20X8</b>		
	(Tshs'000)	(Tshs'000)
<b>Assets</b>		
Non-current assets		
Buildings		60,000
Plant and machinery at cost	249,300	
<b>Less: Depreciation</b>	100,000	149,300
Current assets		
Inventory	41,765	
Receivables	26,104	
Cash	5,800	
		73,669
<b>Total assets</b>		<b>282,969</b>
<b>Equity and liabilities</b>		
Capital and reserves		
Share capital (Tshs10,000 each)		200,000
Reserves and surplus		73,600
<b>Current liabilities</b>		
Payables		9,369
<b>Total equity and liabilities</b>		<b>282,969</b>

#### 2. Finished products

	<b>Bing</b>	<b>Xing</b>
Budgeted sales (units)	6,000	5,300
Budgeted selling price per unit (Tshs'000)	32	44
Finished goods at 1 January 20X9	1,200	270
Finished goods at 31 December 20X9	530	1,600
Unit cost of opening inventory (Tshs'000)	20	28

**Continued on the next page**

**3. Production details****(i) Direct material**

	<b>X</b>	<b>Y</b>
<b>Material per unit of production</b>		
Bing	1.5 kg	2 kg
Xing	0.5 kg	4 kg
Opening inventory of raw material	1,470	8,000
Closing inventory of raw material	800	1,330
Budgeted cost per kg of material purchased (Tshs'000)	1.50	1.00

**(ii) Direct labour**

For the production of one unit of Bing and Xing, 2 and 3 direct labour hours are required respectively. Labour is paid at Tshs4,800 per hour.

**(iii) Factory overheads**

The estimated factory overheads are Tshs103,100,000 including Tshs20,000,000 for depreciation. The factory overheads are absorbed on a direct labour hour basis.

**(iv)** The estimated selling and distribution overheads are Tshs40,500,000 per annum.

**(v)** There is no opening and closing work-in-progress.

**(vi)** A capital expenditure on buildings estimated at Tshs200,000,000 will be incurred in the third quarter of the year.

**(vii)** Quarterly budgeted receipts and payments are as follows:

	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
	<b>(Tshs'000)</b>	<b>(Tshs'000)</b>	<b>(Tshs'000)</b>	<b>(Tshs'000)</b>
Payments				
Payables	9,570	12,000	13,300	7,000
Staff salaries	44,000	47,320	35,320	20,000
Other expenses / payments	13,300	53,189	250,380	6,731
Receipts against sales	93,300	133,700	133,700	53,400

**Required:**

Prepare the following budgets for the year ended 31 December 20X9 for Camron Plc:

- (i) Sales budget
- (ii) Production budget (quantities only)
- (iii) Direct material budget (usage and purchase)
- (iv) Direct labour budget
- (v) Cost of goods sold budget (using FIFO)
- (vi) Cash budget
- (vii) Budgeted profit and loss account (income statement)
- (viii) Budgeted SOFP (balance sheet).

**Continued on the next page**



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Answer

(i) Sales budget

Camron Plc Sales budget for the year ended 31 December 20X9			
Products	Budgeted sales		Total sales revenue
	Units	per unit (Tshs'000)	(Tshs'000)
Bing	6,000	32	192,000
Xing	5,300	44	233,200
<b>Total</b>			<b>425,200</b>

(ii) Production budget

Camron Plc Production budget for the year ended 31 December 20X9		
	Product Bing Units	Product Xing Units
Budgeted sales	6,000	5,300
<b>Add:</b> Closing inventory of finished goods	530	1,600
<b>Total requirement</b>	<b>6,530</b>	<b>6,900</b>
<b>Less:</b> Opening inventory of finished goods	1,200	270
<b>Budgeted production</b>	<b>5,330</b>	<b>6,630</b>

(iii) Direct material usage budget

Camron Plc Direct material usage budget for the year ended 31 December 20X9								
	Product Bing			Product Xing			Total	
	Production (units)	Materials consumption per unit of production (Kg)	Total materials (Kg) (a)	Production (units)	Materials consumption per unit of production (Kg)	Total material (Kg) (b)	Total (Kg) (a + b)	Total (Tshs'000)
<b>Material X</b>	5,330	1.5	7,995	6,630	0.5	3,315	11,310	16,965
<b>Material Y</b>	5,330	2	10,660	6,630	4	26,520	37,180	37,180

(iv) Direct material purchase budget

Camron Plc Direct material purchase budget for the year ended 31 December 20X9		
	Material X Units	Material Y Units
Quantity to be consumed according to the material usage budget	11,310	37,180
<b>Add:</b> Budgeted closing inventory	800	1,330
	<b>12,110</b>	<b>38,510</b>
<b>Less:</b> Planned opening inventory	(1,470)	(8,000)
<b>Total units to be purchased</b>	<b>10,640</b>	<b>30,510</b>
Budgeted purchase price (Tshs'000)	1.50	1.00
<b>Total budgeted cost of purchase (Tshs'000)</b>	<b>15,960</b>	<b>30,510</b>

Continued on the next page

## (v) Direct labour budget

Camron Plc Direct labour budget for the year ended 31 December 20X9			
	Product Bing	Product Xing	Total
A. Budgeted production (in units)	5,330	6,630	11,960
B. Labour hours required per unit	2 hrs	3 hrs	
C. Total labour hours (A x B)	10,660	19,890	30,550
D. Rate per labour hour (Tshs'000)	4.80	4.80	4.80
<b>E. Total wages((Tshs'000) (C x D)</b>	<b>51,168</b>	<b>95,472</b>	<b>146,640</b>

## (vi) Cost of goods sold budget (using FIFO)

Camron Plc Cost of goods sold budget for the year ended 31 December 20X9				
	Product Bing		Product Xing	
	Units	(Tshs'000)	Units	(Tshs'000)
Opening inventory	1,200	24,000	270	7,560
<b>Add: Cost of production (W1)</b>	5,330	109,798	6,630	194,126
<b>Less: Closing inventory (W1)</b>	(530)	(10,918)	(1,600)	(46,848)
<b>Cost of goods sold</b>	<b>6,000</b>	<b>122,880</b>	<b>5,300</b>	<b>154,838</b>

## (vii) Cash budget

Camron Plc Cash budget for the year ended 31 December 20X9				
	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
	(Tshs'000)	(Tshs'000)	(Tshs'000)	(Tshs'000)
Sales	93,300	133,700	133,700	53,400
<b>Total receipts</b>	<b>93,300</b>	<b>133,700</b>	<b>133,700</b>	<b>53,400</b>
<b>Less: Payments</b>				
Payables	9,570	12,000	13,300	7,000
Staff salary	44,000	47,320	35,320	20,000
Other expenses	13,300	53,189	250,380	6,731
<b>Total payments</b>	<b>(66,870)</b>	<b>(112,509)</b>	<b>(299,000)</b>	<b>(33,731)</b>
<b>Net cash flow</b>	<b>26,430</b>	<b>21,191</b>	<b>(165,300)</b>	<b>19,669</b>
<b>Add: Opening cash balance</b>	<b>5,800</b>	<b>32,230</b>	<b>53,421</b>	<b>(111,879)</b>
<b>Closing balance</b>	<b>32,230</b>	<b>53,421</b>	<b>(111,879)</b>	<b>(92,210)</b>

## (viii) Budgeted SOPL

Camron Plc Statement of comprehensive income for the year ended 31 December 20X9		
	(Tshs'000)	(Tshs'000)
Sales		425,200
<b>Less: Cost of goods sold</b>		
Opening stock	31,560	
Add: Production cost		
Material (Tshs16,965,000 + Tshs37,180,000)	54,145	
Labour (Tshs51,168,000 + Tshs95,472,000)	146,640	
Overheads	103,100	
Less: Closing stock (Tshs10,918,000 + Tshs46,848,000)	(57,766)	(277,679)
<b>Gross profit</b>		<b>147,521</b>
<b>Less: Selling and distribution overheads</b>		<b>(40,500)</b>
<b>Net profit</b>		<b>107,021</b>

Continued on the next page

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**(ix) Budgeted SOFP**

<b>Amazing Plc</b>		
<b>Statement of financial position as at 31 December 20X8</b>		
	<b>(Tshs'000)</b>	<b>(Tshs'000)</b>
<b>Non-current assets</b>		
Buildings (Tshs60,000,000 + Tshs200,000,000)		260,000
Plant and machinery at cost	249,300	
<b>Less:</b> Depreciation (Tshs100,000,000 + Tshs20,000,000)	(120,000)	129,300
<b>Current assets</b>		
Inventory (W3)		60,296
Receivables (W4)		37,204
<b>Total assets</b>		<b>486,800</b>
<b>Equity and liabilities</b>		
Capital and reserves		
Share capital (Tshs10,000 each)		200,000
Reserve and surplus (73,600 + 107,021)		180,621
<b>Current liabilities</b>		
Payables (W5)		13,969
Bank overdraft		92,210
<b>Total equity and liabilities</b>		<b>486,800</b>

**Workings**

**W1 Cost of finished goods**

**Product Bing**

	<b>(Tshs'000)</b>	<b>(Tshs'000)</b>
Direct material		
X (1.5 kg x Tshs1,500 per kg)	2.25	
Y (2 kg x Tshs1,000 per kg)	2.00	
		4.25
Direct labour (Tshs4,800 per hr x 2 hrs)		9.60
Factory overheads (Tshs3,375 (W2) x 2 hrs)		6.75
<b>Total cost of production per unit</b>		<b>20.60</b>
Total cost of production (5,330 x Tshs20,600)		109,798
Closing inventory (Tshs20,600 x 530 units)		10,918

**Product Xing**

	<b>(Tshs'000)</b>	<b>(Tshs'000)</b>
Direct material		
X (0.5 kg x Tshs1.50 per kg)	0.75	
Y (4 kg x Tshs1 per kg)	4.00	4.75
Direct labour (Tshs4.80 per hour x 3 hours)		14.40
Factory overheads (Tshs3,375 (W2) x 3 hours)		10.13
<b>Total cost of production per unit</b>		<b>29.28</b>
<b>Total cost of production (6,630 x Tshs29,280)</b>		<b>194,126</b>
<b>Closing inventory (Tshs29,280 x 1,600 units)</b>		<b>46,848</b>

**W2 Calculation of overhead absorption rate**

$$\text{Factory overhead absorption rate} = \frac{\text{Factory overheads}}{\text{Total labour hours}}$$

$$= \text{Tshs}103,100,000 / 30,550 \text{ hours}$$

$$= \text{Tshs}3,375 \text{ per hour}$$

**Continued on the next page**

**W3 Closing inventory**

	(Tshs'000)	(Tshs'000)
Raw material		
X (800 kg x Tshs1,500)	1,200	
Y (1,330 kg x Tshs1,000)	1,330	
<b>Total closing inventory of material</b>		<b>2,530</b>
Finished goods		
Bing (530 units x Tshs20,600)	10,918	
Xing (1,600 units x Tshs29,280)	46,848	
<b>Total closing inventory of finished goods</b>		<b>57,766</b>
<b>Total inventory</b>		<b>60,296</b>

**W4 Receivables**

	(Tshs'000)
Opening balance of receivables	26,104
<b>Add: Sales (sales budget)</b>	<b>425,200</b>
<b>Less: receipts against sales (cash budget)</b>	<b>(414,100)</b>
<b>Closing balance of receivables</b>	<b>37,204</b>

**W5 Payables**

	Tshs'000
Opening balance of payables	9,369
<b>Add: Purchases (purchase budget)</b>	<b>46,470</b>
<b>Less: payments against purchase (cash budget)</b>	<b>(41,870)</b>
<b>Closing balance of payables</b>	<b>13,969</b>

**4. Differentiate between functional, master and capital budgets.****[Learning Outcome d]**

In the previous Learning Outcome, we already studied what are functional budgets and master budgets and how they are prepared by an organisation. Let us study what capital budgets are.

**Capital budgets**

The capital expenditure budget is an outline of an organisation's decision to allocate funds amongst its various existing and upcoming projects. The managers may overlook the risk of obsolescence while preparing their short-term capital expenditure plans. Hence, it is advisable that an organisation must prepare its capital expenditure budget on the basis of the long-term capital expenditure plans of its managers.

A capital expenditure budget is decided on the basis of:

An individual manager's request for issuing funds to the projects he handles.

The senior management's decision to allocate funds amongst the various projects of the organisation. The decision is made according to the long-term objectives of the organisation.

An organisation can decide the amount of its expected capital expenditure by:

Forecasting the capital investment projects that it is going to undertake. Usually the amount of expected capital expenditure exceeds the amount of cash surplus that the organisation will have during the budgeted period. In such a case the organisation has to make arrangements to borrow money from various sources to finance the projects.

Obtaining the expected cash balance by preparing a long-term budget. The organisation chooses the capital investments depending upon the expected cash surplus that it expects to have during the budgeted period.

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#### Distinguish between functional, master and capital budgets

Functional budget	Master budget	Capital budget
Trails income or expenditures that are applied to a very specific purpose e.g. sales, production, material (usage and purchase), labour and overheads.	Summarises the planned activities; compiles and summarises the operational budgets	A budget that details the planned expenditures for facilities, equipment, new products, and other long - term investments
Comprises the budgets for all the functional activities	Comprises all operational budgets into one budget	Comprises of the components that helps a company create a budget for acquiring assets.
Aims to address spending and revenue for a particular function within a business	Aims at predicting the profit for the organisation during the budget period	Aims at procurement of funds and disbursement of funds.

#### Answers to Test Yourself

##### Answer to TY 1

The correct answer is **A**.

A flexible budget can change according to a change in the volume of output. Also, while preparing flexible budgets it is essential to identify each item of cost differently in order to know how it would respond to volume changes. Thus, there is a need to classify costs as fixed and variable.

##### Answer to TY 2

The correct option is **D**.

A budget manual, expresses the objectives of the budget, is prepared by a management accountant together with the budgeting committee

##### Answer to TY 3

##### Mark Trading Co

The sales budget for the year 20X9:

	Ist Quarter	IInd Quarter	IIIrd Quarter	IVth Quarter	Total
	Tshs million	Tshs million	Tshs million	Tshs million	Tshs million
Product A	1,000	1,400	900	1,200	4,500
Product B	1,800	2,400	2,000	2,200	8,400
<b>Total sales</b>	<b>2,800</b>	<b>3,800</b>	<b>2,900</b>	<b>3,400</b>	<b>12,900</b>

##### Answer to TY 4

<b>Beauty Ltd</b>	
Production budget for the year ended ...	
	<b>Soap Units</b>
Budgeted sales	1,000,000
<b>Add:</b> Budgeted closing inventory	10,000
Total requirement	1,010,000
<b>Less:</b> Opening inventory (W1)	10,000
<b>Required production</b>	<b>1,000,000</b>

#### Workings

##### W1

The closing inventory of last year is the opening inventory of the current year. Hence, the opening inventory is also taken to be 10,000 units.

**Answer to TY 5****Steps:**

1. First calculate the budgeted figure for the finished goods.
2. Then calculate the budgeted figure for direct materials purchase.

**Step 1 Calculation of estimated production quantity of finished goods**

	<b>Units</b>
Estimated sales for the year	60,000
<b>Add:</b> closing balance	11,000
	71,000
<b>Less:</b> opening balance	8,000
<b>Estimated production</b>	<b>63,000</b>

**Step 2 Calculation of budgeted direct material purchase**

<b>Annual direct material purchase budget for the year to .....</b>		
	<b>Material X Units</b>	<b>Material Y Units</b>
Quantity required as per material usage budget (W1) & (W2)	252,000	378,000
<b>Add:</b> budgeted closing inventory	11,000	17,000
	263,000	395,000
<b>Less:</b> planned opening inventory	10,000	15,000
<b>Total units to be purchased</b>	<b>253,000</b>	<b>380,000</b>

**W1** 63,000 units of finished goods x 4 units of raw material X

**W2** 63,000 units of finished goods x 6 units of raw material Y

**Answer to TY 6**

Some steps that organisations can take to avoid problems arising from shortage of labour hours are:

Reducing the level of closing inventory required as this will allow a decrease in the number of units to be produced.

Recruiting new labour can help to increase the production volume.

Reducing the wastage or idle hours of workers enables the organisation to use the time of the available labour force much more efficiently.

Improving the productivity ratio i.e. cutting down on the number of hours required to produce a unit.

Convincing the existing labour force to work for additional time can help to increase the production volume.

**Self Examination Questions****Question 1**

The words budget and budgetary control have the same meaning and can replace each other:

- A** True
- B** False

**Question 2**

The budget that consolidates all other budgets to present the overall impact of the projected activities on the company's profit is called as:

- A** Flexible budget
- B** Cash budget
- C** Master budget
- D** Capital expenditure budget

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#### Question 3

What does the direct material purchase budget depend on?

- A Sales budget
- B Production budget
- C Labour budget
- D None of the above

#### Question 4

Prepare the quarterly production budget for Gega Plc for year ended 20X9 with the help of the following information:

	1st Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
Opening inventory (units)	200	-	-	-
Desired closing inventory (units)	300	350	400	450
Budgeted sales (units)	700	850	1000	1150

#### Question 5

On the basis of the information given in **Question 4**, prepare the direct labour budget for Gega Plc for the year ended 20X9. Assume that the expected labour cost per unit is Tshs1,500.

#### Question 6

With the help of the following information, prepare the factory overhead budget of Gega Plc for the year ended 20X9.

**Budgeted production figures (in units) are as follows:**

Q1	Q2	Q3	Q4
800	900	1050	1200

(a) The indirect material requirement for each quarter is as follows:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1000 units	1200 units	1,350 units	1,400 units
The indirect material cost per unit is Tshs2,000.			

(b) A unit of the finished product would consume one indirect labour hour. The indirect labour cost per unit is Tshs800.

(c) It is estimated that two units of power (horsepower (HP)) will be consumed for producing a unit of the finished product. The power cost is Tshs750 per HP.

(d) The variable maintenance cost per unit is Tshs500. This cost is in proportion to the total units produced.

(e) Some of the fixed costs are as follows:

	Tshs'000 per month
Depreciation at straight line basis	3,000
Rent of warehouse, workshop etc.	2,000
Fixed power cost	1,000
Fixed maintenance cost	1,000

**Question 7**

A manufacturer has to purchase 5 kg of raw materials for the manufacture of one of its products. The following shows the budgeted details for the next period:

	Units
Sales	11,875
Opening inventory of finished goods	2,500
Closing inventory of finished goods	1,875

	Kg
Opening inventory of raw materials	31,250
Closing inventory of raw materials	33,125

State how much raw material needs to be purchased according to the budget for the next period (in kg):

- A 55,078
- B 58,125
- C 61,328
- D 63,672

**Question 8**

Colours Ltd deals in cotton shirts. It has received an order of three types of shirts, full sleeves (FS), half sleeves (HS) and sleeveless (SL).

The following information relates to that project:

Total 50,000 shirts need to be supplied within one month. The proportion of FS, HS and SL will be in the proportion of 2:2:1. Selling price per shirt will be as follows:

	Tshs'000
FS	20.00
HS	15.00
SL	12.50

Standard requirements of raw materials are as follows:

Cotton	500 gm per shirt @ Tshs10,000 per kg
Threads	2 boxes per shirt @ Tshs5,000 per box
Buttons	1 pack per shirt @ Tshs2,000 per pack

Opening inventory and expected closing inventory of raw materials is as follows:

	Inventory on 1 April 20X1	Expected inventory on 1 May 20X1
Cotton	750 kg	1,000 kg
Threads	3,000 boxes	4,000 boxes
Buttons	1,500 pack	2,000 pack

Inventory of readymade shirts is as follows:

	Inventory on 1 April 20X1	Expected inventory on 1 May 20X1
FS	3,000	5,000
HS	2,000	1,000
SL	1,000	1,500

Standard requirements of labour hours are as follows:

Standard labour wage per hour is Tshs7,500 for skilled workers and Tshs5,000 for semi-skilled workers.

For each FS, 2 hours of skilled labourer and 1.5 hours of semi-skilled labourers are required.  
 For each HS, 1.5 hours of skilled labourer and 1.0 hours of semi-skilled labourers are required.  
 For each SL, 1.5 hours of skilled labourer and 0.5 hours of semi-skilled labourers are required.

**Required:**

Prepare functional budgets.



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**Answers to Self Examination Questions**

**Answer to SEQ 1**

The correct option is **B**.

The budget is an action plan expressed in financial terms. On the other hand, budgetary control uses the budget for planning and controlling different activities of the business. Budgetary control involves comparing the budgeted figures with actual figures and analysing the variances.

**Answer to SEQ 2**

The correct option is **C**.

Master budget consolidates all functional budgets and the capital expenditure budget of the budget period to present the overall impact of the projected activities on the company's profit.

**Answer to SEQ 3**

The correct option is **B**.

The direct material purchase budget depends on the production budget.

**Answer to SEQ 4**

<b>Gega Plc</b>				
<b>Production budget for the year ended 31 December 20X9</b>				
	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
	<b>Units</b>	<b>Units</b>	<b>Units</b>	<b>Units</b>
Budgeted sales	700	850	1000	1150
<b>Add:</b> budgeted closing inventory	300	350	400	450
Total requirement	1000	1200	1400	1600
<b>Less:</b> opening inventory	200	300	350	400
<b>Required production</b>	<b>800</b>	<b>900</b>	<b>1050</b>	<b>1200</b>

**Answer to SEQ 5**

<b>Gega Plc</b>				
<b>Direct labour budget for the year ending 20X9</b>				
	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
Units to be produced	800	900	1050	1200
Direct labour at Tshs1,500/unit	1,500	1,500	1,500	1,500
<b>Total direct labour cost</b>	<b>Tshs1200,000</b>	<b>Tshs1350,000</b>	<b>Tshs1575,000</b>	<b>Tshs1800,000</b>

**Answer to SEQ 6**

**Step 1 Calculate variable expenses**

**(i) Indirect material**

	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>	<b>Total Tshs'000</b>
Indirect material	1000	1200	1,350	1,400	
Indirect material/unit (Tshs'000)	2	2	2	2	
<b>Budgeted indirect material cost (Tshs'000)</b>	<b>2,000</b>	<b>2,400</b>	<b>2,700</b>	<b>2,800</b>	<b>9,900</b>

**(ii) Indirect labour**

	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total Tshs'000
Indirect labour hours	800	900	1050	1200	
Indirect labour cost per unit(Tshs'000)	0.8	0.8	0.8	0.8	
Budgeted Indirect labour cost (Tshs'000)	640	720	840	960	<b>3,160</b>

**Step 2 Calculate semi-variable expenses****(i) Power (variable expenses)**

	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total Tshs'000
Variable units (2 units of HP per unit of product)	1,600	1,800	2100	2,400	
Cost of power/unit (Tshs'000)	0.75	0.75	0.75	0.75	
(Tshs'000)	1,200	1,350	1,575	1,800	<b>5,925</b>

**(ii) Maintenance (variable expenses)**

	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Total Tshs'000
Variable Units	800	900	1,050	1,200	
Maintenance cost/unit (Tshs'000)	0.5	0.5	0.5	0.5	
(Tshs'000)	400	450	525	600	<b>1,975</b>

**Total semi-variable expenses**

	1 <sup>st</sup> Quarter Tshs'000	2 <sup>nd</sup> Quarter Tshs'000	3 <sup>rd</sup> Quarter Tshs'000	4 <sup>th</sup> Quarter Tshs'000	Total Tshs'000
Power- variable	1,200	1,350	1,575	1,800	5,925
- fixed (Tshs1,000,000 x 3months)	3,000	3,000	3,000	3,000	12,000
Total power expenses	4,200	4,350	4,575	4,800	17,925
Maintenance -variable	400	450	525	600	1,975
- fixed (Tshs1,000,000 x 3)	3,000	3,000	3,000	3,000	12,000
Total maintenance cost	3,400	3,450	3,525	3,600	13,975

**Step 3 Fixed overhead expenses**

	1 <sup>st</sup> Quarter Tshs'000	2 <sup>nd</sup> Quarter Tshs'000	3 <sup>rd</sup> Quarter Tshs'000	4 <sup>th</sup> Quarter Tshs'000	Total Tshs'000
Depreciation (3,000 X 3)	9,000	9,000	9,000	9,000	36,000
Rent (2,000 X 3)	6,000	6,000	6,000	6,000	24,000
Total	15,000	15,000	15,000	15,000	<b>60,000</b>

### 308: Cost Bookkeeping

#### Step 4 Factory overheads budget

<b>Gega Plc</b>					
<b>Factory overhead budget for the year ended 31 December 20X9</b>					
	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>	<b>Total</b>
	<b>Tshs'000</b>	<b>Tshs'000</b>	<b>Tshs'000</b>	<b>Tshs'000</b>	<b>Tshs'000</b>
<b>Variable cost</b>					
Indirect material	2,000	2,400	2,700	2,800	9,900
Indirect labour	640	720	840	960	3,160
Total variable cost (a)	2,640	3,120	3,540	3,760	13,060
<b>Semi-variable cost</b>					
Power	4,200	4,350	4,575	4,800	17,925
Maintenance cost	3,400	3,450	3,525	3,600	13,975
Total semi-variable cost (b)	7,600	7,800	8,100	8,400	31,900
<b>Fixed cost</b>					
Depreciation	9,000	9,000	9,000	9,000	36,000
Rent	6,000	6,000	6,000	6,000	24,000
Total fixed cost (c)	15,000	15,000	15,000	15,000	60,000
<b>Total (a + b + c)</b>	<b>25,240</b>	<b>25,920</b>	<b>26,640</b>	<b>27,160</b>	<b>104,960</b>

#### Answer to SEQ 7

The correct option is **B**.

Production according to the budget:  $(11,875 + 1,875 - 2,500) = 11,250$  units

Raw materials required for production:  $(11,250 \times 5) = 56,250$  kg

Raw materials purchased according to the budget:  $(56,250 + 33,125 - 31,250) = 58,125$  kg

#### Answer to SEQ 8

##### Sales budget

Description of shirts	No of shirts (50,000 in 2:2:1)	Selling price per shirts (Tshs'000)	Sales revenue (Tshs'000)
FS	20,000	20.00	400,000
HS	20,000	15.00	300,000
SL	10,000	12.50	125,000
<b>Total sales</b>	<b>50,000</b>		<b>825,000</b>

##### Production budget

Description of shirts	Estimated sales	Closing inventory of readymade shirts	Opening inventory of readymade shirts	Required Production of shirts
FS	20,000	5,000	3,000	22,000
HS	20,000	1,000	2,000	19,000
SL	10,000	1,500	1,000	10,500
	<b>50,000</b>	<b>7,500</b>	<b>6,000</b>	<b>51,500</b>

Description of shirts	Required Production of shirts	Required cotton kg	Required threads' boxes	Required buttons' pack
FS	22,000	11,000	44,000	22,000
HS	19,000	9,500	38,000	19,000
SL	10,500	5,250	21,000	10,500
	<b>51,500</b>	<b>25,750</b>	<b>103,000</b>	<b>51,500</b>

**Raw materials purchase budget**

Raw materials	Required	Opening inventory	Closing inventory	Required purchases	Purchase price (Tshs'000)	Purchase expenses (Tshs'000)
Cotton (kg)	25,750	750	1,000	26,000	10	260,000
Threads (boxes)	103,000	3,000	4,000	104,000	5	520,000
Buttons (pack)	51,500	1,500	2,000	52,000	2	104,000
						<b>884,000</b>

**Labour budget (amount in Tshs'000)**

Description of shirts	Required Production of shirts	Required hours of skilled workers	Required hours of semi-skilled workers	Wages - skilled workers (Tshs7,500/hr)	Wages - semi-skilled workers (Tshs5,000/hr)	Total wages (Tshs'000)
FS	22,000	2.00	1.50	330,000.00	165,000.00	495,000.00
HS	19,000	1.50	1.00	213,750.00	95,000.00	308,750.00
SL	10,500	1.50	0.50	118,125.00	26,250.00	144,375.00
	<b>51,500</b>	<b>5.00</b>	<b>3.00</b>	<b>661,875.00</b>	<b>286,250.00</b>	<b>948,125.00</b>

