CHAPTER 1

THE SCOPE OF COST ACCOUNTING

Contents

1. The need for Cost Accounting systems.
2. Definition of Cost Accounting.
3. Definition of Management Accounting.
4. Definition of Financial Accounting.

Learning outcomes

After studying this chapter you should be able to:

- Define Cost Accounting.
- Understand the range of information provided by the cost accounting system.
- Compare and contrast financial and cost and management accounting.
- Explain the nature of responsibility accounting and use of cost centres, profit centres and investment centres.

1.0 COST AND MANAGEMENT ACCOUNTING

Managers need detailed information about the working of the business to enable them plan, control and make decisions. The cost and management accounting system provide financial information regarding the financial aspects of business performance needed by management.

1.1 Management accounting

Management accounting is the application of the principles of accounting and financial management to create, protect, preserve and increase value so as to deliver that value to the stakeholders of profit and not for profit enterprises both public and private.

1.2 Cost accounting

Cost accounting is the establishment of budgets, standard costs and actual costs of operations, processes, activities or products and the analysis of variances profitability or social use of funds.

1.21 Cost accounting and management accounting are terms which are used interchangeably. However, this is not entirely right.

1.22 Cost accounting is part of management accounting. Cost accounting provides a bank of data for the management accountant to use. Cost accounting aims to establish the following:

a) the cost of goods produced or services provided;
b) the cost of a department or work section;
c) what revenues have been;
d) the profitability of a product, service or department or the organization in total;
e) selling prices;
f) the value of stocks of goods;
g) future costs of goods and services; and
h) comparison of actual and budgeted costs

2.0 COST ACCOUNTING SYSTEM

A cost accounting system is a system used by an organization to gather, store and analyse data about costs. The purpose of a cost accounting system is to provide management information about costs and profits.

A cost accounting system is often the basis for a management accounting system. The term cost accounting and management accounting are often used to mean the same thing, although strictly there are differences.

3.0 FINANCIAL ACCOUNTING AND COST AND MANAGEMENT ACCOUNTING

3.1 Financial accounting is the classification and recording of the monetary transaction of an entity in accordance with established concepts, principles, accounting standards and legal requirements and their presentation by means of profit and loss accounts, balance sheet and cash flow statements, during and at the end of an accounting period.

3.2 Many businesses have a financial accounting system with a nominal ledger, sales ledger and purchases ledger and books of prime entry for recording transaction that have occurred during a given period.

3.4 Comparison of financial accounting and management accounting

Financial accounts	Management accounts
• Limited companies are required by law to prepare financial accounts.	• There is no legal requirement to prepare management accounts.
• The law and financial reporting standards prescribe formats of published financial statements.	• Management accounting formats are entirely at the discretion of management.
• Most financial accounting information is of a monetary nature.	• Management accounts incorporate both monetary and non-monetary measures.
• Financial accounts present an essentially historic picture of past operations.	• Management accounts are both historical record and future planning tool.

4.0 INTERNAL REPORTING STRUCTURES

When costs are recorded, analysed and reported, it is important they are reported to the managers or departments responsible for the spending. In other words, the reporting of cost information should ideally be based on a system of responsibility accounting and responsibility centres.

4.1 Responsibility accounting

A system of providing financial information to management where the structure of the reporting system is based on identifying individual parts of a business which are a responsibility of a single manager.

4.2 Responsibility centres

A responsibility centre is an individual part of a business whose manager has personal responsibility for its performance.

Many businesses are structured into a hierarchy of responsibility centres. These might be cost centres, revenue centres, profit centres and investment centres.

At the lowest level of the hierarchy is the cost centre and at the highest is the investment centre.

4.3 Cost centre

A cost centre can be defined as production or service location, function, activity or item of equipment whose costs may be accumulated and attributed to cost units.

4.4 Revenue centre

A revenue centre is part of the organization that earns sales revenue. its manager is responsible for the revenue earned but not for the cost of the operation.

4.5 Profit centre

A profit centre is a part of the business for which both the costs and revenues earned are identified. The manager is responsible for both costs and revenues.

4.6 Investment centre

An investment centre is a profit centre with additional responsibilities for capital employed and possibly investment decisions. Managers of investment centres are responsible not just for decisions affecting costs and revenues but also investment decisions.

5.0 ALLOCATION OF COSTS

Costs are incurred in business on the following:

- Direct materials.
- Direct labour.
- Direct expenses.
- Production overheads.
- Administrative overheads.
- General overheads.

When costs are incurred, they are generally allocated to costs centres. Cost centres are simply collection points for costs for further analysis.

5.1 Cost units

Once costs have been traced to cost centres, they can further be analysed in order to establish cost per unit.

A cost unit is a unit of production or unity of activity in relation to which cost is measured. The cost unit is a basic control unit for costing purposes.

5.2 Cost units are measured for several reasons:

- To establish how much it has cost to produce an item or perform an activity.
- To measure profit or loss on an item.
- To value closing stocks.
- To compare costs with budgeted costs.

Examples of cost units

- Student in a college
- Barrel in the brewing industry
- Room in a hotel

5.3 **Cost object**

A cost object is any activity for which a separate measurement of costs is desired.

If the users of management accounting want to know the cost of something this something is known as cost object. Examples of cost object include:

- The cost of a product
- The cost of a service
- The cost of operating a department

6.0 SOURCES OF DATA FOR A COST AND MANAGEMENT ACCOUNTING SYSTEM

6.1 THE ROLE OF ACCOUNTING TECHNICIAN

As part of the cost accounting team, the accounting technician is likely to be included in gathering and processing data to measure the costs of an organisation's activities, products and services.

6.2 For example, in a manufacturing business, the accounting technician could be involved in measuring and analysing:

- The cost of raw materials used in manufacturing
- The value of stocks of unused raw materials
- The cost of labour used in production
- The costs of other expenses incurred in production
- Overhead costs for each product
- Total cost for each product made by the business
- The profitability of each product.

6.3 Measuring costs and revenues is an important step in providing management with information to assist them with planning, control and decision making.

CHAPTER SUMMARY

- Cost centres are collection pools for costs before they are further analysed into cost unit.
- A cost unit is a unit of product or service to which costs can be related.
- A cost object is any activity for which a separate measure of cost is desired.
- A responsibility centre is a department or organisational function whose performance is the direct responsibility of a specific manager.
- Profit centres are responsibility centres that are responsible for both costs and revenues.
- Revenue centres are responsibility centres responsible for only revenue generation.
- An investment centre is profit centre that is also responsible for capital investment and possibly financing.

SELF REVIEW QUESTIONS

SELF TEST QUESTIONS

1. Define management accounting (1.1)
2. Define cost accounting (1.2)
3. Highlight key differences between management accounting and financial accounting (3.4)
4. Define responsibility accounting (4.1)

EXAMINATION TYPE QUESTIONS

1. Which of the following describes a cost unit?

A. Cost per unit of output

B. Direct cost

C. Unit of product

D. Production department

2. A profit center is:

A. The profit attributed to a business unit

B. A business unit whose manager is responsible for operating costs and revenues from the activities of the unit

C. A unit of product or service for which costs and revenues are measured

D. A business unit whose manager is responsible for investment decisions within the unit.

Check for answers at the end of the text

CHAPTER 2

COST CLASSIFICATION

Introduction

This chapter explains that costs can be classified in different ways according to the purpose for which the cost information is required. Various methods of classifying costs will now be described.

Contents

1. Total product/service costs.
2. Direct cots and indirect costs.
3. Functional costs.
4. Fixed costs and variable costs.
5. Product costs and period costs.
6. Other cost classifications.

Learning objectives

After studying this chapter you should be able to:

- Outline reasons for cost classification.
- Describe different methods of classifying costs.

1.0 CLASSIFICATION OF COSTS

1.1 Cost classification is the analysis of costs into logical groups so that they may be summarised into meaningful information for management.

1.2.1 Management in organisations requires information concerning a variety of issues which require different types of cost summaries. Costs are thus classified in different ways according to the purpose for which they are to be used. The main classifications include:

1.3

- Cost by element
- Direct and indirect costs
- Functional costs
- Fixed and variable costs
- Other categories

2.0 CLASSIFICATION BY ELEMENT

The initial cost classification basis is according to the elements on which expenditure is incurred:

- Materials
- Labour
- Expenses

2.1 Within costs elements, costs can be further classified according to the nature of expenditure. For example material costs may be further classified according to whether they are raw materials, components, cleaning materials, maintenance materials etc.

2.20 DIRECT AND INDIRECT COSTS

Each cost element namely materials, labour and expenses can be classified as either a direct cost or indirect cost.

A direct cost is a cost that can be traced in full to the product, service or department that is being costed.

An indirect cost or overhead is a cost that is incurred in the course of making a product, providing a service or running a department, but which cannot be traced directly and in full to the product or service or department.

2.21 Total expenditure may therefore be analysed as follows:

Materials	=	Direct Materials	+	Indirect Materials
+		+		+
Labour	=	Direct Labour	+	Indirect Labour
+		+		+
Expenses	=	Direct Expenses	+	Indirect Expenses
Total cost	=	Direct cost	+	Indirect Costs

2.22 Direct material

Direct material is all material that becomes part of the product (unless used in negligible amounts and/or having negligible costs)

Examples of direct materials are:

- Raw materials used in a product e.g. flour used in baking a loaf of bread.
- Bought in parts and assemblies e.g tyres in car manufacturing.
- Primary packing materials e.g a cooking oil container.

2.23 Direct wages

Direct wages are all wages paid for labour (either as basic hours or overtime) expended on work on the product itself e.g salary paid to an audit clerk in a firm of accountants.

2.24 Direct expenses

Direct expenses are expenses which are incurred on a specific product other than direct material costs and direct wages. Examples would include royalties paid per unit for a copyright design, plant or tool hire charges for a particular job or batch.

2.25 Indirect costs

All material, labour and expense costs which cannot be identified as direct costs are termed indirect costs. The three elements of indirect costs; indirect materials, indirect labour and indirect expenses are collectively known as overheads.

2.30 FUNCTIONAL ANALYSIS OF COSTS

In financial accounting, costs or expenses are commonly classified as cost of sales, administrative expenses or sales and distribution costs. This is a method of analysing costs by function or according to the type of activity for which the costs were incurred.

In cost accounting costs are often analysed by function and categories of functional analysis commonly used are:

- Production costs.
- Administration costs.
- Selling costs.
- Distribution costs.
- Research and development costs.
- Financing costs.

2.4 FIXED AND VARIABLE COSTS

A different way of analysing and classifying costs is into fixed and variable costs.

A fixed cost is a cost which is incurred for a particular period of time and which within a certain activity levels is unaffected by changes in the levels of activity e.g rent paid by a business.

A variable cost is a cost which tends to vary with the level of activity. Eg materials used in manufacturing.

2.5 PRODUCT COST AND PERIOD COSTS

Product costs are costs identified with a finished product. Such costs are initially identified as part of the value of stock. They become expenses only when the stock is sold.

Period costs are costs that are deducted as expenses during the current period without ever being included in the value of stock held.

2.6 OTHER COST CLASSIFICATIONS

Avoidable costs

Avoidable costs are specific costs of an activity or business which would be avoided if the activity or business did not exist.

Unavoidable costs

Unavoidable costs are costs which would be incurred whether or not an activity or sector existed.

Controllable cost

A controllable costs is a cost which can be influenced by management decisions and actions

An uncontrollable costs

An uncontrollable costs is any cost which cannot be affected by management within given time span

Discretionary costs

Discretionary costs are costs incurred at the discretion of a manager and examples of discretionary costs include advertising, research and development and training.

CHAPTER SUMMARY

- Cost classification is the analysis of costs into logical groups so that they may be summarised into meaningful information for management.

- The main classifications include:

    - Cost by element
    - Direct and indirect costs
    - Functional costs
    - Fixed and variable costs
    - Other categories Such as ; controllable/uncontrollable and avoidable/unavoidable

SELF REVIEW QUESTIONS

SELF TEST QUESTIONS

1. What is cost classification (1.1)
2. Mention various cost classification categories (1.3)
3. Define direct cost (2.2)
4. Distinguish fixed cost from variable cost (2.4)

EXAMINATION TYPE QUESTIONS

1. DIRECT OR INDIRECT COST

Classify the following expenses as direct or indirect

a) Factory rental.
b) Insurance of machinery used for one product only.
c) Warehouse rental.
d) Insurance of office buildings.
e) Costs of canteen for employees.
f) Petrol for delivery vehicles.

2. COST CLASSIFICATION

Distinguish between and provide information to illustrate:

a) Avoidable and unavoidable costs
b) Cost centres and cost units

Check for answers at the end of the text

CHAPTER 3

COST BEHAVIOUR

Introduction

In the last chapter, we looked at various ways of classifying costs. In particular, we covered the classification of costs into those that vary directly with changes in activity levels (variable costs) and those that do not change (fixed costs). This chapter examines further this two way split of cost behaviour and explains methods of splitting semi-variable costs into fixed and variable components. This information is important for management, who will use it in setting budgets, carrying out variance analysis and decision making.

Contents

1. Introduction to cost behaviour.
2. Cost behavior pattern.
3. Determining the fixed and variable elements of semi-variable costs.

Learning objectives

After studying this chapter you should be able to:

- Explain the importance of cost behavior in relation to decision-making.
- Explain the nature of fixed, variable and semi variable costs
- Describe other cost behavior patterns for individual items of cost.
- Identify, describe and illustrate graphically different types of cost behavior
- Provide examples of semi variable costs
- Analyse semi-variable costs into their fixed and variable cost elements using the high-low method.

1.0 DEFINITION AND APPLICATION OF COST BEHAVIOUR CONCEPT

Cost behaviour is the way in which costs are affected by the changes in the volume of output. Management decisions are often based on how costs and revenues vary at different activity levels.

1.1 Cost behaviour and levels of activity

Although there are many factors which may influence costs, the major influence is the volume of output or the level of activity. The term level of activity may refer to one of the following:

- Number of units produced.
- Value of items sold.
- Number of items sold.
- Number of invoices issued.
- Number of units of electricity consumed.

1.2 Application of cost behavior information

Management may use knowledge of cost behaviour pattern in the following management tasks:

- Controlling costs.
- Preparing budgets or forecasts.
- Deciding on output levels.
- Adjusting selling prices.
- Deciding whether to accept or reject a contract.
- Making decision to Subcontract.

1.3 Cost behavior principles

The basic principle of cost behaviour is that as the level of activity rises, costs will usually rise. It will cost more to produce 2000 units of output than it will cost to produce 1000 units.

However not all items of cost will incur higher costs as the output level rises. This creates a problem for the management accountants who have to ascertain how each item of cost varies with increases or indeed decrease in activity levels.

2.0 COST BEHAVIOUR PATTERNS

Cost behaviour analysis is concerned with how costs change with level of activity and by how much. Individual items of cost can be classified according to their cost behaviour. There are many cost behavior patterns but many costs can be classified according to behaviour as:

- Fixed costs.
- Variable costs.
- Semi-variable costs.
- Step costs.

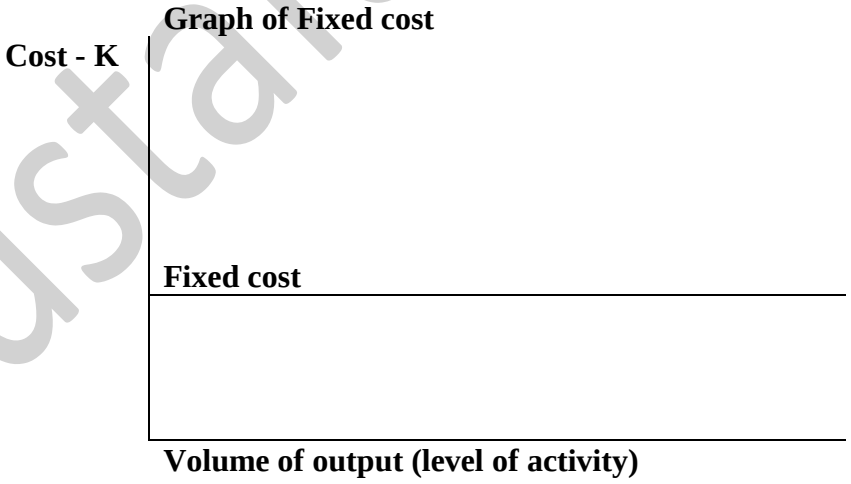
2.1 FIXED COSTS

A fixed cost is a cost which tends to be unaffected in total by increases or decreases in the volume of output.

An example of fixed cost is the rent of a factory which is a constant amount each period regardless of how much or how little is manufactured inside it. The factory rent will be 10 million whether you produce 2 units or 100 units of a product.

In reality there must be a level of activity at which more than one factory would be required for production. At that point rent is no longer a fixed cost. Therefore, fixed costs are constant within a reasonable range of activity.

A sketch of a fixed cost would look like this:

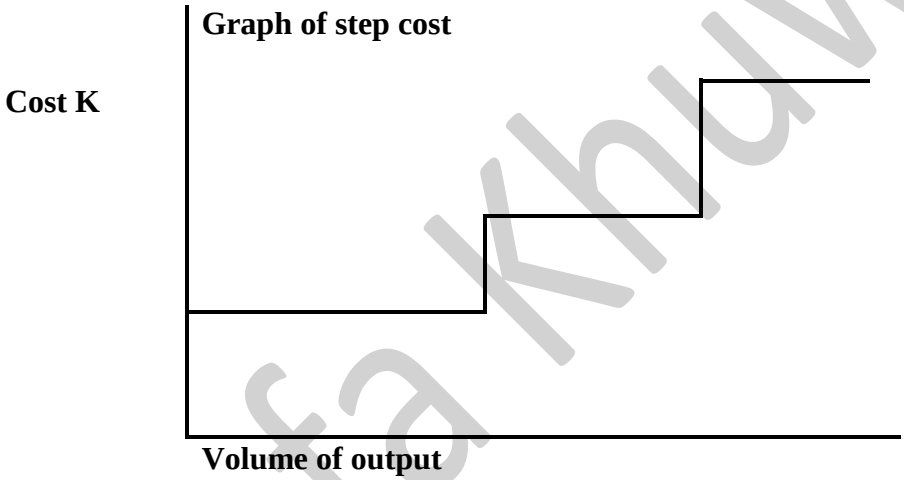


Examples of fixed costs would be:

- The salary of a managing director per year.
- The rent of a single factory building per year or month.
- Straight-line depreciation of a single machine.

2.2 STEP COSTS

A step cost is a cost that is fixed in nature but only within certain levels of activity. Consider the rent of a building whose maximum capacity is 1000 units. Such a cost would be fixed if production remains below 1000 units per month. If production exceeds 1000 units a second factory would be required and the rental costs would go up.



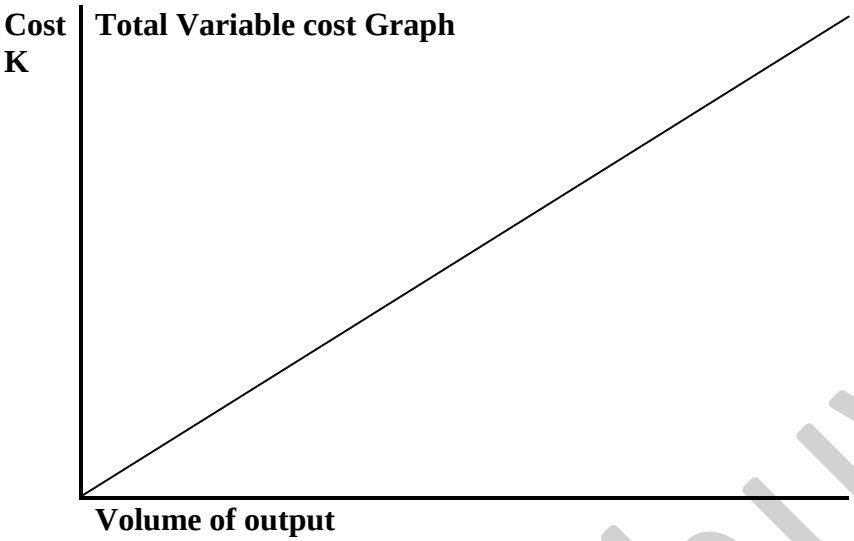
2.3 VARIABLE COSTS

A variable cost is a cost which tends to vary directly with the volume of output. The variable cost per unit is the same amount for each unit produced.

A constant variable cost per unit implies that the price per unit of say, material purchased is constant and that the rate of material usage is also constant.

2.31 EXAMPLES OF VARIABLE COSTS

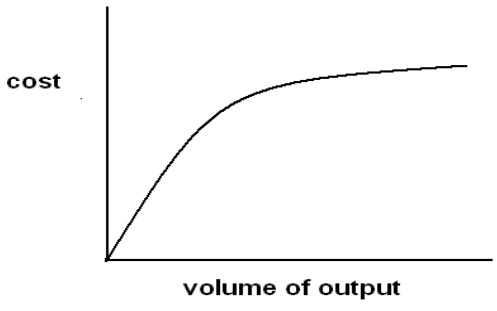
- Cost of raw materials.
- Direct labour costs.
- Sales commission.
- Bonus payment.

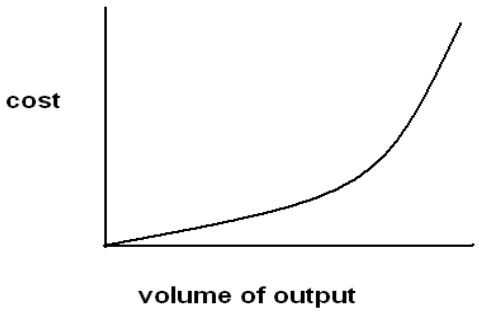


2.4 NON-LINEAR OR CURVILINEAR COSTS

If the relationship between total variable costs and volume of output can be shown as a curved line on a graph, the relationship is said to be curvilinear.

Two typical relationships are as follows:





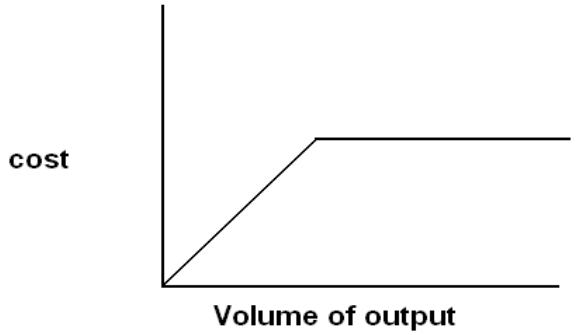
2.5 SEMI-VARIABLE COSTS

A semi-variable cost is cost which contains both fixed and variable components and so is partly affected by changes in the level of activity.

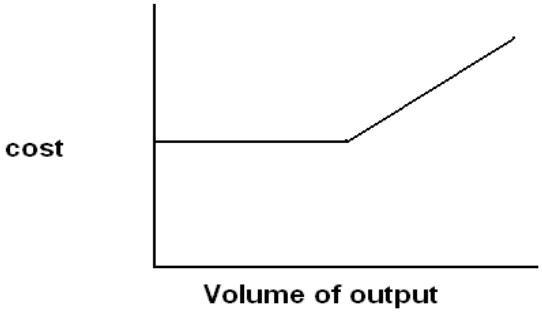
Examples of semi-variable costs include:

- Electricity bills
- Salesman's salary
- Costs of running a car

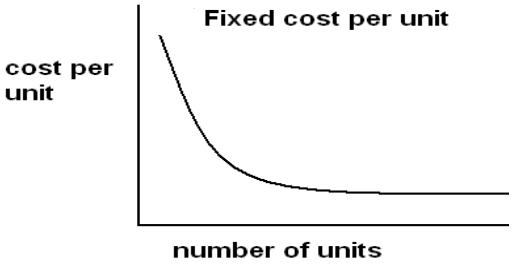
2.6 Other cost behaviour patterns



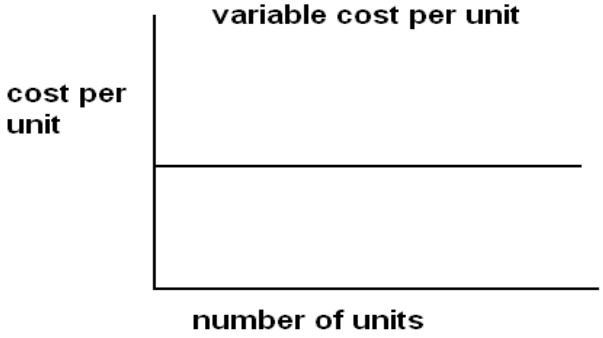
This graph illustrates a***n item of cost which is variable with output up to a certain level and then becomes constant thereafter.***



*This graph illustrates a**n item of cost which is variable with output subject to a minimum.***



Fixed cost per unit decrease with the increase in activity



Variable cost per unit remains constant at all levels of activity

3.0 DETERMINING THE FIXED AND VARIABLE ELEMENTS OF SEMI-VARIABLE COSTS.

It is generally assumed that costs are one of the following:

- Variable
- Fixed
- Semi-variable

Semi-variable costs are often separated into fixed and variable components. One of the methods used to split the cost is the high-low method which works as follows:

Step 1. Review records the costs in the past periods

- Select the period with the highest activity level
- Select the period with the lowest activity level

Step 2. Determine the following

- Total cost at high level of activity
- Total cost at low level of activity
- Total units at high level of activity
- Total units at low level of activity

Step 3. Calculate the variable cost per unit by dividing the difference between the total cost at the lowest activity and total cost at high activity by the difference between the highest and lowest activity.

Step 4. Calculate the fixed cost by subtracting variable costs from the total cost at either the lowest or highest activity

Example

Dolfin Ltd has recorded the following total costs during the last five years

Year	Output (000)	Total cost (K'000)
2000	65,000	145,000
2001	80,000	162,000
2002	90,000	170,000
2003	60,000	140,000
2004	75,000	160,000

Required

Calculate the total costs that should be expected in 2005 if output is 95,000 units.

SOLUTION

Step 1 Period with highest activity 2002
Period with lowest activity 2003

Step 2 Total cost at high activity 170,000
Total cost at low activity 140,000
Total units at high activity 90,000
Total units at low activity 60,000

Step 3 Variable cost per unit

$$\frac{\text{Total cost at high activity - total cost at low activity}}{\text{Total units at high activity - total units at low activity}}$$

$$\frac{\text{K170,000 - K140,000}}{\text{90,000 - 60,000}} = \frac{\text{K30,000}}{\text{30,000units}}$$

Step 4 Fixed cost = Total cost @ high activity - total units @ high activity x variable cost per unit

K170,000 - K(90,000 x 1) = **K 80,000**

Therefore total cost at 95,000 units are as follows

	K
Variable cost = 95,000 x 1	95,000
Fixed costs	80,000
Total costs	175,000

CHAPTER SUMMARY

Key points covered include the following:

- Costs which are not affected by the level of activity are fixed costs or period costs
- Step fixed costs are fixed with a certain range of activity
- Variable costs increase or decrease with the level of activity and they are assumed to be constant per unit
- Semi-variable costs are costs that are part fixed and part variable.
- The fixed and variable elements of semi-variable costs can be determined by the high-low method

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. What does the term cost behaviour refer to? (1.0)
2. How is the knowledge of cost behaviour used in cost and management accounting? (1.2)
3. Outline some expected cost behavioural patterns (2.0)
4. outline steps involved in using the high-low method (3.0)

EXAMINATION TYPE QUESTIONS

Kapiri Glass Ltd

Kapiri Glass Ltd recorded the following costs for the past six months

Month	Activity level Units (000)	Total cost K'000
1	40	6,586
2	30	5,826
3	36	6,282
4	38	6,396
5	42	6,700
6	33	6,052

Required

Estimate the fixed cost per month

(4 marks)

Estimate the total costs for the following activity levels in a month

i) 75 units
ii) 90 units

(6 marks)

Check for answers at the end of the text

CHAPTER 4

COSTING OF MATERIALS

Introduction

This is the first of several chapters that deals with the accounting and costing of the elements of costs namely materials, labour and expenses. These could either be direct or indirect costs.

CONTENTS

1. Direct and indirect materials
2. Procedures and documentation of materials
3. Purchasing of materials
4. Pricing of issues
5. Accounting for material costs

Learning outcomes

After studying this chapter you should be able to:

- Explain the distinction between direct and indirect material costs.
- Describe the documentation used for recording of materials.
- Calculate the costs of materials used in production and the values of closing stocks using the FIFO, LIFO and weighted average cost methods of stock valuation.
- Account for material costs in the ledger accounts.

1.0 DIRECT AND INDIRECT MATERIALS

In cost and management accounting, materials are commonly classified as either direct or indirect. Direct materials are the materials that can be directly attributed to a unit of production, or specific job or service provided directly to a customer.

In a manufacturing business direct materials include:

- Raw materials
- Components

Indirect materials are other materials that cannot be directly attributed to a unit of production. An example of indirect materials might be the oil used for the lubrication of production machinery or other consumable such as cleaning materials.

2.0 STOCK CONTROL

As the cost of purchasing stock is usually one of the largest costs faced by a business it is important that an effective stock control system is established within an organization.

Stock control for a business should cover the following functions:

- The ordering of stock.
- The purchase of stock.
- The receipt of the ordered items.
- Storage of stock items.
- The issue of stock items.
- The maintenance of sufficient stocks.

3.0 PROCEDURE AND DOCUMENTATION FOR MATERIALS

3.1 Purchase procedure

As bought in materials and services normally represent a large proportion of a firm's cost, it is essential that the materials purchased are most suitable from the utility and cost basis.

3.2 Purchase requisition

Any request for material purchase should be made on a purchase requisition. The purchasing manager will verify that requisitions are authorised in accordance with established policy before placing orders. An example of a purchase requisition is shown below:

PURCHASE REQUISITION Req. No: …….

Department/Job no

Suggested supplier : Date requested :

Requested by :

Latest date required :

Quantity	Code number	Description	Estimated costs	
			Unit	K

Authorised signature :

3.3 Ordering

The purchase order is the basis for a legal contract between the firm and the supplier. The issue of a purchase order must be closely controlled and signing restricted to a few senior people.

Upon receipt of a duly authorized purchase requisition, the purchasing department will place a purchase order with one of the selected suppliers. Copies of the order are sent to the accounts, goods reception and progress chasers.

Purchase order/ confirmation

Purchase order ref:

To

Address of supplier

Please deliver to the above address
Ordered by……..
Passed and checked by……..
Total order value K……..

		Subtotal		
		Vat @17.5%		
		Total		

3.4 Reception and inspection procedure

When materials are received from suppliers, they are normally delivered to the stores department. The stores personnel must check that the goods delivered are the ones that have been ordered, in the correct quantity, of the correct quality and in good condition

The stores department raises a Goods Received Note (GRN) from the delivery note details. The GRN is used to update the stores record with the quantities of goods received.

3.5 Purchase invoices

A copy of the GRN will be sent to the purchasing department attached to the copy purchase order. When the supplier's invoice is received, the three documents will be passed to the appropriate individual to approve payment of the invoice.

GOODS RECEIVED NOTE

Date : Time:

WAREHOUSE COPY

Our order No……..

Supplier and suppliers advice note No…….

QUANTITY	CAT NO	DESCRIPTION

RECEIVED IN GOOD CONDITION

Name……..

Signature……

3.6 Storage

In any stock control system, there should be a continual record of the current quantities of each of the stock item held in store. Receipt into store and issues from store must be recorded, so that the current balance in stock can be kept up-to-date.

Storekeeping involves storing materials to achieve the following objectives

- Speedy issue and receipt of materials
- Full identification of materials at all time
- Correct location of all materials at all times
- Protection of materials from damage and deterioration
- Provision of secure stores to avoid pilferage, theft and fire
- Efficient usage of storage space
- Maintenance of correct stock levels
- Keeping correct and up-to-date details of receipts, issues and stock levels

When the stores control system is a paper-based system, there could be two separate stock records

- Bin card system
- Stock ledger system

Bin card						
Part code no…… Location……. Bin Number…… stores Ledger no…….						
Receipts			Issues			Stock balance
Date	Quantity	GRN	Date	Quantity	Req No	

Stores Ledger Card											
Materials……. Maximum Quantity Code …… Minimum Quantity											
Date	Receipts				Issues				Stock		
	GRN No	Quantity	Unit price	Amount	Stores Req No	Quantity	Unit Price	Amount	Quantity	Unit price	Amount

4.0 MATERIAL ISSUES AND PRICING

4.1 Material issues

The issue of materials must be appropriately authorized and amount issued recorded so that the appropriate charge can be made to production or to the receiving cost center. The usual way this is done is by a material requisition. This document performs two functions-it authorizes the stock keeper to release the goods and acts as a posting medium to the stores ledger and bin card.

Materials Requisition Note			
Date required……. Cost centre no/ job No……			
Quantity	Item code	Description	K
Signature of requisitioning Manager/foreman……. Date……..			

4.2 Pricing issues

When materials are purchased, they are valued based on the price charged by the supplier plus any carriage inward costs. The cost should be net of any trade discount given.

When materials are issued from stores, a cost or price has to be attached to them.

When a quantity of materials is purchased in its entirety for a specific job, the purchase cost can be charged directly to the job.

4.3 A business might use any of several valuation methods for pricing stores issued such as:

- First in First Out (FIFO)
- Last In First Out (LIFO)
- Weighted Average Cost (AVCO)

4.4 Example

The following data will be used to illustrate the three common methods of stock valuation namely:

1. First in First Out (FIFO)
2. Last In First Out (LIFO)
3. Weighted Average Cost (AVCO)

Date	Details	Units	Unit Price K'000	Values K'000
1-Jan	Balance b/f	100	50	5,000
9-Jan	Issue	40		
15-Jan	Receipt	50	55	2,750
20-Jan	Receipt	50	60	3,000
29-Jan	Issue	70		

4.41 First In First Out (FIFO)

Using this method material issues are priced at the unit price of the oldest batch in stock until all the units of the batch have been exhausted after which the price of the next oldest batch is used.

Stores Ledger Card										
Date	Details	Receipts			Issues			Balance		
		units	Price K'000	Values K'000	units	Price K'000	Values K'000	units	Price K'000	Values K'000
1-Jan	Balance Bf							100	50	5,000
9-Jan	Issues				40	50	2,000	60	50	3,000
15-Jan	Receipts	50	55	2,750				60	50	3,000
								50	55	2,750
20-Jan	Receipts	50	60	3,000				60	50	3,000
								50	55	2,750
								50	60	3,000
29-Jan	Issues				60	50	3,000			
	Issues				10	55	550	40	55	2,200
								50	60	3,000

4.42 Last In First Out (LIFO)

Using this method, issues are charged out at a price of the most recent batch received and continue to be charged thus until a new batch is received.

Date	Details	Receipts			Issues			Balance		
		Units	Price K'000	Values K'000	Units	Price K'000	Values K'000	Units	Price K'000	Values K'000
1-Jan	Balance Bf							100	50	5,000
9-Jan	Issues				40	50	2,000	60	50	3,000
15-Jan	Receipts	50	55	2,750				60	50	3,000
								50	55	2,750
20-Jan	Receipts	50	60	3,000				60	50	3,000
								50	55	2,750
								50	60	3,000
29-Jan	Issues				50	60	3,000			
	Issues				20	55	1,100	30	55	1,650
								60	50	3,000

4.43 Weighted Average Cost (AVCO)

With this method all quantities of stock are valued at Weighted Average Cost. A new Weighted Average Cost is calculated each time there is a new delivery into stock.

Stores Ledger Card										
Date	Details	Receipts			Issues			Balance		
		units	Price K'000	Values K'000	units	Price K'000	Values K'000	units	Price K'000	Values K'000
1-Jan	Balance Bf							100	50	5,000
9-Jan	Issues				40	50	2,000	60	50	3,000
15-Jan	Receipts	50	55	2,750				110	52	5,750
20-Jan	Receipts	50	60	3,000				160	55	8,750
29-Jan					70	55	3,828	90	55	4,922

4.5 COMPARISON OF ISSUE METHODS

Provided that the system is used consistently and suits operating conditions of the firm, any of the system could be used. While FIFO and Weighted Average Cost are acceptable for financial reporting purposes, LIFO is not. However, in cost accounting, the rules of financial reporting do not apply, and businesses can use LIFO if they wish.

Differences between valuation methods are only significant in the times of inflation. The relative advantages and disadvantages of FIFO, LIFO and AVCO are, therefore discussed below in relation to inflationary situations.

METHODS	ADVANTAGES	DISADVANTAGES
FIFO	▪ Produces Current values for closing stock.	▪ Produces out-of-date production costs and therefore potentially overstates profit ▪ Complicates stock records as stock must be analysed by delivery
LIFO	▪ Produce realistic production costs and therefore more realistic/prudent profit figures	▪ Produces unrealistically low closing stock values. ▪ Complicates stock records as stock must be analysed by delivery
AVCO	▪ Simple to operate-calculations within stock records are minimized	▪ Produces both stock values and production costs which are likely to differ from current values

5.0 ACCOUNTING FOR MATERIAL COSTS

In cost accounting we are concerned not only with the cost of individual items of stock, but with the total costs of all raw material stocks used and the total costs of all finished goods sold during the year. These total costs, which are the sum of all the costs on individual stores ledger records, are recorded as follows:

- In raw materials stores account for raw material stocks.
- In work in progress all materials under production.
- In finished good stocks account for finished goods.

5.1 Example

At 1 January 20X5, the total value of items held in stock was K50 million. During the month the following transactions occurred.

Detail	K' Million
Materials purchase from suppliers on credit	60
Materials returned to suppliers	3
Materials purchased for cash	8
Direct materials issued to production	55
Materials issued to the maintenance services department	20
Direct materials returned to stores from production	4

Required

Enter the above transaction in a stores ledger account, balancing off the account.

SOLUTION

Stores Account

	K'000		K'000
Balance b/f	50,000	Work In Progress	55,000
Creditors	60,000	Production Overhead	20,000
Cash	8,000	Returns to suppliers	3,000
Returns from WIP	4,000		
		Balance c/f	44,000
	122,000		122,000
Balance b/f	44,000		

Chapter summary

- Direct materials are materials that can be directly attributed to a unit of production or a specific job or service provided directly to a customer.
- Indirect material are materials that cannot be directly attributed to a unit of production
- FIFO- First in First out method of stock pricing
- LIFO- Last in First out method of pricing
- AVCO-Weighted average method of stock pricing
- The total cost of all raw materials stocks used during the accounting period is recorded in the raw materials stock account.
- The total cost of stocks manufactured in the production department is recorded in the work in progress
- The total cost of finished goods sold in an accounting period are recorded in the finished goods account

SELF REVIEW QUESTIONS

SELF TEST QUESTIONS

1. Outline the functions of stock control (2.0)
2. Mention 3 commonly used methods for pricing material issues (3.0)
3. Outline key documents used in stock handling (3.0 – 3.7)
4. What are the advantages and disadvantages of the following methods for pricing issues (4.5)
   - FIFO
   - LIFO
   - AVCO
5. What is the function of the purchase requisition note (3.2)
6. Who raises the Goods Received Note – GRN (3.4)
7. What is the function of the materials Requisition note (4.1)

EXAMINATION TYPE QUESTIONS

The following information relates to questions 1, 2 and 3.

The stock record for component BXY for the month of January showed:

Date	Receipts Units	Value K ' 000	Issues Units
Opening stock	500	1,250	
5 January	1,000	2,750	
12 January	1,600	4,480	
18 January	1,200	3,480	
19 January			2,100
25 January	1,500	4,350	
31 January			1,800

1 Using the FIFO method of pricing issues, the cost of issues (in K'000) during the month was:

A. K11,250
B. K10,800
C. K10,855
D. K11,300

2. Using the LIFO method of pricing issues, the value of stock at 31st January issues (in K'000) is:

A. K4,100
B. K3,720
C. K5,120
D. K3,950

3. Using the AVCO method of pricing issues, at what price would the issues on 31st January be made (calculate to two decimal places)

A. K3.00
B. K2.95
C. K2.90
D. K2.83

Check for answers at the end of the text

CHAPTER 5

MATERIALS STOCK CONTROL

The previous chapter looked at how transactions involving materials are recorded and valued. This chapter looks at the monitoring of stock levels as a means of controlling the stock costs.

Contents

Learning outcomes

After studying this chapter you should be able to:

- Describe the procedures required to monitor stock and minimise stock discrepancies and losses.
- Explain the costs of stockholding and stock-outs.
- Explain and illustrate minimum stock levels, maximum stock levels and stock reorder levels.
- Calculate and interpret optimal order quantities.

1.1 Why stock control?

The costs of purchasing stock are usually one of the largest costs faced by an organisation and once obtained, stock has to be carefully controlled and checked.

1.2 The benefits of stock holding

The main reasons for holding stock can be summarized as follows:

- To take care of possible future shortages.
- To ensure sufficient goods are available to meet expected demand.
- To absorb seasonal fluctuation and any variations in usage and demand.
- To allow production processes to flow smoothly and efficiently.
- As a deliberate investment policy, especially in times of inflation.

1.3 Holding costs

Though beneficial, holding stocks can be an expensive business. The objective of a stock policy should be to minimize the total annual costs associated with stock holding. Such costs include:

- Storage costs
- Interest costs
- Insurance costs
- Risk of obsolescence
- Deterioration

1.4 Order costs

These are costs that are incurred every time stock is purchased from a supplier and they are high when stocks are ordered in smaller quantities but more frequently. Such costs include:

- Clerical and administrative.
- Transport costs.
- Production runs costs.

1.5 Stock out costs

An additional type of cost which may arise if stocks are kept too low is the type associated with running out of stock. These include:

- Lost contribution from lost sales
- Loss of future sales due to disgruntled customers
- Loss of customer goodwill
- Cost of production stoppages
- Labour frustrations over stoppages
- Extra costs of urgent orders

2.0 MONITORING STOCKS AND STOCK LOSSES

Stocks can be monitored using stocktaking.

Stocktaking involves counting the physical stock on hand at a certain date and then checking this against the balance shown on the stock records.

There are two methods of carrying out this process. These are periodic stock taking and continuous stock taking.

2.1 Periodic stocktaking

> 'A process whereby all stock items are physically counted and valued at a set point in time, usually at the end of an accounting period.'
>
> *CIMA Official Terminology*

2.2 Continuous stocktaking

> 'The process of counting and valuing selected items at different times on a rotating basis'
>
> *CIMA Official Terminology*

This involves a specialist team counting and checking a number of stock items each day so that each item is checked at least once a year. Valuable items or items with a high turnover could be checked more frequently.

2.3 The advantages of continuous stocktaking compared to periodic stock taking are as follows:

There will be occasions when stock checks disclose discrepancies between the physical amount of an item in stock and the amount shown in the stock records. When this occurs, the cause of the discrepancy should be investigated and appropriate action taken.

2.4 Objective of stock control

The overall objective of stock control is to ensure that the total of the following costs is minimised:

- Holding costs.
- Ordering costs.
- Stock out costs.

3.0 Re-order level system

This is a more sophisticated version of the two bin system, which involves the setting of three control levels based on an analysis of past stock usage and delivery times. These levels are:

- Re-order level
- Minimum stock level
- Maximum stock

3.1 Re-order level

The reorder level is the level of stock at which a replenishment order should be placed.

Reorder Level = Maximum Usage x Maximum Lead time

3.2 Minimum stock level

The minimum stock level for an item of stock is a warning level at which management should check to ensure that a new delivery of the item will be received from the supplier before stock out occurs. This may call for emergency action to replenish stocks.

Minimum stock level = Reorder level – (average usage x average lead time)

3.3 Maximum stock

This is the maximum amount of stock that should ever be held in stock. This also acts as a warning level to signal management that stocks are reaching a potentially wasteful level.

Maximum stock = reorder level + reorder quantity – (minimum usage x minimum lead time)

3.4 Average stock level

Although average stock is not a control level itself, you may need it to calculate estimated stock holding costs.

If we assume that a replenishment order arrives at the point at which stock reaches the buffer or safety stock level, and then thereafter stock is used evenly until it reaches reorder level and an order is placed, the average stock level can be calculated as

Average stock = safety stock + ½ reorder quantity

If we assume that no safety stock is held, so that a delivery is received just as stock falls to zero, then the formula for calculating the average stock is

Average stock = ½ of reorder quantity

3.5 Example

Zam Tyre Ltd deals in Good year tyre for which the following information is available:

Average usage	140 tyres per day
Minimum usage	90 tyres per day
Maximum usage	175 tyres per day
Lead time	10 – 16 days
Reorder Quantity	3000 tyres

Required

Based on this information calculate

a. Reorder level
b. Minimum stock level
c. Maximum stock level

3.6 Solution

Reorder level = Maximum Usage x Maximum Lead Time

175 x 16 = 2,800

Minimum stock level = Reorder level – (average usage x average lead time)

2,800 – (140 x 13) = 980

Maximum stock = reorder level + reorder quantity – (minimum usage x minimum lead time)

2,800 + 3,000 – (90 x 10) = 4,900

3.7 ECONOMIC ORDER QUANTITY

Ordering in large quantities reduces the annual costs of ordering. On the other hand, large orders increase storage requirements which increases stock holding costs. The economic order quantity minimises the combined costs of stock ordering and stock holding.

Definition

Economic Order Quantity (EOQ) is the order quantity for a stock item that will minimise the combined costs of stock ordering plus stock holding over a given period, say a year.

EOQ is based on the following assumptions:

- There should be no stock-out of the item.
- There is no buffer stock.
- A new delivery of the stock item is received from the supplier at the exact time that existing stocks run out.
- The stock item is used up at an even rate and predictable rate over time.
- The delivery lead-time from the supplier is predictable and reliable.

Formula

Square root of

$$\frac{2CoD}{Ch}$$

4.0 Other systems of stock control

4.1 Two-bin system

This is a system whereby each stores item is kept in two storage bins, say A and B. When bin A is emptied, an order must be placed for re-supply; bin B will contain sufficient stocks to last until the fresh delivery is received.

4.2 Periodic review system

Under this system the stock levels are reviewed at fixed intervals e.g every four weeks.

4.3 ABC inventory analysis

This is a selective approach to stock control whereby materials are classified under A, B and C according to their expense group, A being the most expensive, group B the medium cost and group C the inexpensive material. High valued items are more carefully monitored compared to less valued ones.

4.4 JIT systems

Some manufacturing companies have sought to reduce their inventories of raw materials and components by using the Just-In-Time philosophy. This is a system

where raw materials are bought for production and not for stocking. Components are also made when there is readily available customer demand

JIT philosophy is only possible when suppliers can be relied upon to deliver fresh supplies of an item at the required time and to the required quality standard. Such a system can be successfully adopted where the following features are present:

- Stable high volume of stock consumption.
- Coordination of the daily production programmes of the suppliers and the consumer.
- Co-operation of suppliers.
- A convenient reliable transport system, or the supplier being in close proximity to the consumer.

The relative costs and benefits of JIT are as follows:

- Warehousing costs are almost eliminated.
- The quality control function has been made the responsibility of the supplier.
- Problems of obsolescence, deterioration, theft, cost tied up and all other costs associated with holding stock have been avoided.

However, it should be noted that the JIT systems expose a business to huge costs such as unfulfilled customer orders when there is breakdown in the supply chain network.

Chapter summary

- Perpetual inventory refers to stock recording system whereby the records (bin card and stores ledger card) are updated for each receipt and issue of stock as it occurs.

- Stocktaking - counting and recording physical quantities of stock

- Lead time - the time between when an order is placed and the receipt of stock
- Stock control levels can be calculated in order to maintain stocks at the optimum level. The three critical levels are reorder level, minimum level and maximum level

- Stock costs include purchase costs, holding costs, ordering costs and stock-out costs.

- Economic order quantity - the order quantity that minimizes ordering and holding costs and can be computed using a table, a graph or formula.

SELF REVIEW QUESTIONS

SELF TEST QUESTIONS

1. Why do organisations hold stock (1.2)
2. Give examples of stockholding costs (1.3)
3. Give examples of stock-out costs (1.5)
4. What is stock taking (2.0)
5. State the formula for reorder level (3.1)
6. State the formula for minimum stock level (3.2)
7. State the formula for maximum stock level (3.3)
8. State the EOQ formula (3.7)
9. What are some of the benefits of operating a JIT system (4.4)

EXAMINATION TYPE QUESTIONS

A large retailer with multiple outlets maintains a central warehouse from which the outlets are supplied. The following information is available for part number Zed525.

Average usage	350 per day
Minimum usage	180 per day
Maximum usage	420 per day
Lead time for replenishment	11 – 15 days
Reorder quantity	7000 units
Reorder level	6500 units

1. Based on the data above what is the maximum level of stock?

   A. 5,250
   B. 6,500
   C. 11,320
   D. 12,800

2. What is the minimum stock level?

   A. 200
   B. 1750
   C. 2450
   D. 4520

3. Mozdo uses the economic order quantity formula (EOQ) to establish its optimal reorder quantity for its single raw material. The following data relates to the stock costs

Purchase price	K15,000 per unit
Carriage costs	K50,000 per order
Ordering costs	K5,000 per order
Storage costs	10 % of purchase price plus K200 per unit per annum
Annual demand	4000 units

What is the EOQ to the nearest whole unit?

A. 4690 units
B. 1414 units
C. 426 units
D. 509 units

Check for answers at the end of the text

CHAPTER 6

LABOUR COSTING

Introduction

In this chapter we look at labour costs. We begin by looking at a number of remuneration methods and will consider the various types of incentive schemes that exist. We will also examine the procedures and documents required for the accurate recording of labour. The procedure for accounting for labour costs will then be described and finally certain aspects of labour cost control will be explained such as monitoring labour turnover and productivity.

CONTENTS

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Describe and illustrate different remuneration methods.
- Explain how labour time might be recorded and traced to individual products, jobs or activities.
- Distinguish between direct and indirect labour costs.
- Explain the cause and costs of labour turnover and calculate turnover.
- Describe and illustrate measures of labour efficiency and utilisation.

1.0 REMUNERATION METHODS

There are three basic groups of remuneration method:

- Time related
- Output related
- Bonus/incentive schemes

1.20 Time based systems

Basic system

At the simplest level workers would be paid for the number of hours worked at a basic rate per hour up to say 40 hours per week using the following formula.

FORMULA

Wages = Hours worked x Rate of pay per hour

1.21 EXAMPLE

An employee is paid K5,500 per hour and is expected to work at least a 48 hour week. What would he be paid for a standard 48 hour week?

SOLUTION

48 hours x K5,500 = K264,000

1.22 OVERTIME PAY

If an employee works more than the number of hours set by an organization as daily or weekly requirements, the additional hours worked are known as overtime. In many organizations employees who work overtime are paid an additional amount per hour for those extra hours that they work.

When the rate per hour for overtime is higher than the basic rate of pay in normal working hours, the additional pay per hour is known as overtime premium. For example if the day rate is K30,000 and overtime is paid at time and half, eight hours of overtime would be paid

		K
Basic pay	(8 x K30,000)	240,000
Overtime premium	(8 x K15,000)	120,000
		360,000

The over time premium is the extra rate per hour which is paid and not the whole of the payment for the overtime hours.

1.23 HIGH DAY RATE SYSTEMS

This is a time based system which is designed to provide a strong incentive by paying rates well above normal basic rates in exchange for above average output and performance. For its successful application it is necessary to ensure that the output levels are the result of detailed work studies and that there is agreement from labour force and the unions involved on the required production level.

2.0 PIECEWORK

Piece work is also known as payment by results or output related pay. It is an alternative to time related pay.

Piece work is where a fixed amount is paid per unit of output achieved irrespective of the time spent.

2.1 EXAMPLE

If an amount paid to an employee is K3,000 per unit produced and that an employee produces 80 units in a week, how much should be paid in wages?

SOLUTION

80 units x K3,000 = K240,000

2.2 Variations of piecework

2.1 Piece rate with guaranteed minimum

Piece rate with guaranteed minimum operates to give the employees some security where they may suffer loss of earnings when production is low through no fault of their own.

The way the system works is that if an employee's earnings for the amount of units produced in the period are lower than guaranteed amount, then the guaranteed amount is paid instead.

2.2 EXAMPLE

Jonasi is paid K3,000 for every unit that he produces but he has a guaranteed minimum wage of K28,000 per eight-hour day. In a particular week he produces the following number of units:

Day	Units
Monday	12
Tuesday	14
Wednesday	9
Thursday	14
Friday	8

Required

Calculate Jonasi' wage for this week.

2.3 SOLUTION

Day	K'000
Monday (2 x K3000)	36
Tuesday (14 x K3000)	42
Wednesday (guarantee)	28
Thursday (14 x K3000)	42
Friday (guarantee)	28
Total	**176**

2.4 A DIFFERENTIAL PIECEWORK SYSTEM

One objection to straight piece work system is that because a flat rate per unit is paid, the incentive effect at higher production levels declines. Differential piece work seeks to overcome this by increasing the rate progressively at various production levels e.g

2.5 EXAMPLE

Payment by results rates for an organization are as follows:

Output per week	Rate per unit K'000
1 – 100	15
101- 123	17
Above 123	20

Required

If an employee produces 135 units in a week, how much will he be paid?

2.6 SOLUTION

Units	Rate K'000	Total K'000
100	15	1500
23	17	391
12	20	240
135		**2131**

2.7 BONUS AND INCENTIVE SCHEMES

Bonuses are payments to employees on top of their basic pay and any overtime payments. They may be paid to employees for a variety of reasons. An individual employee, a department, a division or indeed the entire organisation may have performed particularly well and it is felt by management that a bonus is due to some or all of the employees.

2.8 The features of any bonus or incentive scheme are as follows:

- Employees are paid more for their efficiency.
- Additional profits are shared between employer and employee.
- The extra pay motivates employees.

3.0 LABOUR TURNOVER

Labour turnover is a measure of the number of employees leaving/being recruited in a period of time expressed as a percentage of the total labour force.

$$\textbf{LABOUR TURNOVER} = \frac{\textbf{Average number of leavers who are replaced}}{\textbf{Average number of employees}} \times 100$$

The reasons for labour turnover include:

- Illness or accidents.
- A family moves away from the locality, marriage, pregnancy or difficulties with child care provision.
- Retirement or death.
- Paying a lower wage rate.
- Unsafe working conditions.
- Lack of opportunity for career development.

3.1 Example

At the beginning of the year, a company employed 4,600 individuals. During the year, 1,800 individuals were recruited and at the end of the year, the company employed a total of 5,500 individuals.

Required

What was the labour turnover during the year, to the nearest 1%?

Employees

	No of employees
At start of year	4,600
Recruited during the year	1,800
	6,400
At end of year	5,500
Therefore leavers during the year	900

Average number of employees = (4,600 + 5,500)/2 = 5050
Labour turnover = (900/5050) x 100% = 17.8% or 18%

3.2 People leave jobs for a variety of reasons, some of which are avoidable, and it is normal to analyse the reasons for leaving so as to take corrective action where possible. Typical reasons for labour turnover include:

- Redundancy
- Dissatisfaction over prospects, pay, hours and other conditions
- Personal advancement
- Lack of career structure
- Lack of training
- Marriage, pregnancy
- Discharge
- Move from locality
- Changes in domestic circumstances

3.3 Costs of labour turnover

The costs of labour turnover can be large and management should attempt to keep labour turnover as low as possible so as to minimize these costs. The costs arise in the following areas:

- Leaving costs - interviews, preparation of documentation, disruption of output
- Replacement costs - advertising, selection, personnel Human resource department procedure

- Training costs - costs of required internal and external courses
- Learning costs - slower initial production, high scrap rate, tool breakages, increased accident rate, poor service.

3.4 The prevention of high labour turnover

Following actions could reduce labour turnover:

- Paying satisfactory wages
- Offering satisfactory hours and conditions of service
- Creating good informal relationship between members of staff
- Offering good training schemes and a well understood career or promotional ladder
- Improving the content of the job to create job satisfaction
- Improving human resource planning to avoid redundancies

4.0 ACCOUNTING FOR LABOUR COSTS

Accounting for the labour costs involves identifying and dealing with the following:

- Direct labour costs
- Indirect labour costs
- Net pay
- Deductions

4.1 Journal entries involved in accounting for labour costs

Accounting for direct labour cost
DR WIP
CR Wages Control account

Accounting for indirect labour cost
DR Production Overhead
CR Wages control

Accounting for Net Pay
DR Wages control
CR Bank account

Accounting for deductions
DR Wages control
CR Deduction control

5.0 DIRECT AND INDIRECT LABOUR COSTS

Employees can be classified as either direct labour or indirect labour. Direct labour means employees who are directly involved in producing goods or services for customers.

Indirect employees refer to employees who are not directly involved in this work. Examples of indirect employees in a manufacturing business are:

- Staff working in administration, selling or distribution
- Employees in production support departments such as maintenance and planning

The aim of cost accounting is to identify direct labour costs and indirect labour costs which is not the same thing as the cost of direct labour and indirect labour employees.

5.1 Identifying direct and indirect labour costs

- All costs of indirect labour employees are indirect labour costs.
- Not all the costs of direct labour employees are treated as direct. Costs of direct labour employees that are usually treated as indirect costs are:
  - The cost of idle time
  - The cost of overtime premium
  - Costs of labour time not spent in production such as when one is on training, sick or holiday.

5.2 EXAMPLE: DIRECT AND INDIRECT LABOUR COST ANALYSIS AND ACCOUNTING ENTRIES FOR LABOUR

The following details are extracted from a monthly payroll for 50 employees at a small-scale farm for the month of June.

	Paid to direct Labour K'000	Paid to Indirect Labour K'000	Total
Ordinary time	62,965	29,750	92,715
Overtime			
Basic Pay	13,600	8,750	22,350
Premium	3,400	2,190	5,590
Shift Allowance	6,750	3,495	10,245
Sick Pay	3,450	650	4,100
Total	90,165	44,835	135,000
Net pay	**78,340**	**32,660**	**111,000**

Required

a) What is the direct wages for the month?
b) Prepare the wages account for the week

5.3 SOLUTION

a) K62,965 + 13,600 = K76,565 (K'000)

b)

Wages control account

	K'000		K'000
Bank: net wages paid	111,000	Work In Progress	76,565
Deduction control account	24,000	Production Overhead	
		Indirect Labour	38,500
		Over time premium	5,590
		Shift allowance	10,245
		Sick pay	4,100
	135,000		135,000

6.0 DOCUMENTATION OF LABOUR TIME

The task of separating the total labour cost into direct and indirect is complicated, because of idle time, overtime premium and other non productive time. In addition, in order to measure the costs of different products or jobs it is necessary to establish how much time the employee has spent on each job.

To do this there has to be a system for recording direct labour times and allocating the time spent to individual products or jobs.

6.1 The most common methods of recording how much time has been spent on particular activities, products or jobs are:

- Time sheets
- Job sheets
- Cost cards

6.2 TIME SHEETS

A time sheet is a record of how a person's time at work has been spent.

The total hours that an employee has worked in a day or week are known from the employee's clock card but a breakdown of how those hours were spent will be shown on time sheet.

The employee fills out his or her own time sheet daily, weekly or monthly basis depending upon the policies of the organization.

The employee will enter his name, clock number and department at the top of the time sheet together with details of the work he has been engaged on in the period and the hours spent on that work.

6.3 TIME SHEET

Time sheet					
Name: Bernard Phiri				**Clock Number: 825734**	
Department: Maintenance					
Week commencing: 28 March 20X6					
Date	Job	Start	Finish	Hours	Overtime
28-Mar	Machine X	09 30	17 30	7	
29-Mar	Machine Y	08 30	11 30	3	3
30-Mar	Sick leave	09 30	17 30	7	
31-Mar	Machine L	09 30	17 30	7	2
1-Apr	Holiday	09 30	17 30	7	
Total Hours				31	5
Foreman's signature :					

6.4 JOB SHEET

Job sheets take are important for employees who are paid on results basis or time basis. In these situations the sheet is a record of the products produced and it is also used to calculate the payment due to the employee.

Job sheet					
Name: Sheba Phiri				**Clock Number: 825734**	
Department: Factory					
Week commencing: 28 March 20X6					
Product	Units	Code	Price K'000	Bonus K'000	Total K'000
Dresses	23	DRE	3.2	10	73.6
Trousers	14	TRO	4.1	0	57.4
Shirts	21	SHI	2.5	9	52.5
Gross Wages				19	183.5
Foreman's signature:					

7.0 MEASURING LABOUR ACTIVITY

Measures of labour activity include:

- Efficiency ratio
- Capacity ratio
- Production volume ratio

7.1 EFFICIENCY RATIO

This is a ratio that compares the standard hours of work produced with actual hours worked

7.2 CAPACITY RATIO

A capacity is used to measure the utilisation of labour. Labour utilisation refers to how much labour time is used, compared to how much available time was expected.

The capacity ratio is expressed as a percentage and compares the actual number of hours actively worked with the budgeted labour hours for the period.

7.3 PRODUCTION VOLUME RATIO

The production/volume ratio assesses how the overall production level compares to planned levels and is the product of the efficiency ratio and the capacity ratio.

7.4 Example

The following information relates to a small production unit during a period

Budgeted hours	9,500
Actual hours worked	9,200
Standard hours of work produced	9,300

Required

Calculate the following ratios

a) Efficiency ratio
b) Capacity ratio
c) Volume ratio

7.5 Solution

A Efficiency ratio $= \frac{\text{Standard Hours}}{\text{Actual Hours}} = \frac{9300}{9200}$ 101%

B Capacity $= \frac{\text{Actual Hours}}{\text{Budgeted Hours}} = \frac{9200}{9500}$ 97%

C Volume $= \frac{\text{Standard Hours}}{\text{Budgeted Hours}} = \frac{9300}{9500}$ 98%

Chapter summary

- There are three basic groups of remuneration methods time based, piece work and bonus/incentive schemes.
- Labour attendance time is recorded on for example an attendance record or clock card. Job time may be recorded on time sheets or job sheets
- Overtime is time that is paid for usually at a premium, over and above the basic hours for the period
- Labour turnover is the rate at which employees leave a company and this rate must be kept as low as possible. The cost of labour turnover can be divided into preventative and replacement costs
- Direct labour cost is the cost of labour that is directly attributable to a cost unit. It consist of the cost of direct labour spent actively working on production, but usually excludes any over time premium payments
- Indirect labour cost or labour overheads consist of the labour cost of indirect workers plus indirect labour costs of direct workers
- The wages control account acts as a collecting place for wages before they are analysed to work in progress and production overhead control account.
- Efficiency ratio compares the expected time for producing output compared with the actual time expressed as a percentage.
- Capacity ratio compares the actual time worked with budgeted time for the period expressed as a percentage.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. Mention 3 remuneration methods (1.0)
2. What is overtime premium (1.22)
3. What is the high day rate systems (1.23)
4. What is differential piece work system (2.4)
5. What is labour turnover (3.0)
6. Mention some costs of labour turnover (3.3)
7. Mention 3 ratios used to measure labour activity (7.0)

EXAMINATION TYPE QUESTIONS

Boot Ltd

Boot Limited a manufacturer of industrial safety shoes operates a labour bonus payment system in its factory with bonus being paid at 75% of the base for all standard hours saved.

The following is a summary of the labour information for month 6 for three employees:

	Chila	Cheta	Chulu
Work issued and completed (Pairs)	72	188	432
Standard time allowed - mins/ pair	40	15	7
Basic Hourly rate (Kwacha)	920	960	940
Total hours worked	45	46	44
Hours worked on indirect work	5		2

The basic working week is 40 hours; the first three hours overtime is paid at time plus one third and the remainder at time plus one half.

Required

a) Compute the individual employee's gross wages payable

b) Compute the net wages payable for each of the three employees

c) Prepare journal entries for the above data taking into account the following additional factors:
    - Taxation is at the rate of 30% of gross pay
    - Each employee pays K3000 as NAPSA
    - Each employee is a member of Mukuba Pension Scheme to which they contribute K2,500 monthly

---

Check for answers at the end of the text

CHAPTER 7

OVERHEADS AND ABSORPTION COSTING

INTRODUCTION

In the previous two chapters we have demonstrated how to attribute material and labour costs to units of production or services provided by an organization. This chapter proceeds to explain the process involved in attributing indirect costs to products and services using a system known as absorption costing.

CONTENTS

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Explain the reason for using absorption costing
- Describe the process of allocation, apportionment, re-apportionment and absorption to establish product cost in absorption costing
- Calculate overhead absorption rates
- Calculate costs using the absorption costing method
- Explain why predetermined overheads absorption rates are used
- Calculate the under/over absorption costs
- Describe and apply methods of charging administration overheads and sales and distribution overheads to cost unit

1.0 PRODUCT COSTS AND SERVICE COSTS

1.1 Commercial organisations either sell products or provide services and they should know how much it costs them to provide these services and products in order to do the following:

- Carry out product profitability analysis.
- Price products and services.
- Value stocks.

1.2 Costs incurred in business can be recorded as:

- Direct materials
- Direct labour
- Direct expenses
- Overheads

2.0 OVERHEADS

An overhead is the cost incurred in the making of a product, providing a service or running a department, but which cannot be traced directly and in full to the product, service or department.

An overhead is actually the total of the following:

- Indirect material
- Indirect labour
- Indirect expenses

Indirect costs are usually classified by function as shown below:

- Production overhead
- Administration overheads
- Selling and distribution overheads

2.1 PRODUCTION OVERHEADS

Production overheads represent indirect materials, indirect wages and indirect expenses attributable to production and also the service activities associated with production.

2.2 Indirect production costs are incurred in three main ways:

Activity	**Overheads**
Production	e.g Fuel, protective clothing depreciation super vision
Service	The costs of operating non production departments within the factory such as materials handling, production control and canteen
Establishment	General overheads such as factory rent/rates, heating and lighting and production management salaries.

3.0 OVERHEAD COSTING PROCEDURES

To attribute production overheads to cost units, a sequence of procedures is under taken:

i) Establishing cost centers
ii) Collecting overheads by item
iii) Allocation of overheads
iv) Apportionment of overheads
v) Reapportionment of service center costs
vi) Computation of overhead absorption rates
vii) Absorbing of production overheads into cost units
viii) Computation of over/under absorption

3.1 OVERHEAD ALLOCATION

Allocation is the process by which whole cost items are charged direct to a cost unit or cost center.

3.2 OVERHEAD APPORTIONMENT

This is a stage which follows overhead allocation. It is a process of sharing out general overhead costs to beneficiary cost centres on fair basis such as these shown below:

Example of overhead	**Basis of apportionment**
▪ Rent, rates, heating and lighting and depreciation of buildings	▪ Floor area occupied by each cost centre
▪ Depreciation, insurance of equipment	▪ Cost or book value of equipment
▪ Personnel office, canteen, welfare, wages and cost offices, first aid	▪ Number of employees, or labour hours worked in each cost centre
▪ Heating, lighting	▪ Volume of space occupied by each cost centre

3.3 EXAMPLE: OVERHEAD APPORTIONMENT

Buzton Ltd has the following budget for overhead costs:

	K'000
Depreciation of factory	1,000
Factory repairs and maintenance	600
Factory office costs	1,500
Depreciation of equipment	800
Insurance of equipment	200
Heating	390
Lighting	100
Canteen	900
	5,490

Information relating to the production and service centres in the factory is as follows:

	Production centres		Service centres	
	Dept A	Dept B	Dept X	Dept Y
Floor space (square metres)	1,200	1,600	800	400
Volume (cubic metres)	3,000	6,000	2,400	1,600
Number of employees (head count)	30	30	15	15
Book value of equipment (K'000)	30	20	10	20

Required

Determine how the overhead costs should be apportioned between the four departments

3.4 SOLUTION

Item of Cost	Basis of apportionment	Total cost K'000	Production centres Dept A	Production centres Dept B	Production centres Dept X	Production centres Dept Y
Depreciation of factory	Floor area	1,000	300	400	200	100
Factory repairs and maintenance	Floor area	600	180	240	120	60
Factory office costs	Number of employees	1,500	500	500	250	250
Depreciation of equipment	Book value	800	300	200	100	200
Insurance of payment	Book value	200	75	50	25	50
Heating	Volume	390	90	180	72	48
Lighting	Floor area	100	30	40	20	10
Canteen	Number of employees	900	300	300	150	150
		5,490	**1,775**	**1,910**	**937**	**868**

3.5 RE-APPORTIONMENT OF SERVICE CENTRE COSTS

A factory is divided into several production cost centres and also many service cost centres such as stores maintenance and canteen. The third stage in overhead costing concerns the treatment of overheads in service centres.

Because no production cost units pass through the service cost centres, it is necessary to apportion the service department costs to the production cost centres so that all production costs (including those of the service departments) are accounted for.

Typical bases for re-apportionments are shown below.

Service Department	Basis of apportionment
▪ Stores	▪ Number of requisitions ▪ Value of materials issued
▪ Maintenance	▪ Maintenance Hours
▪ Personnel office	▪ Number of employees
▪ Production planning	▪ Direct labour hours per each department

3.6 There are three ways of re-apportionment of service centre costs:

- Continuous allotment
- Direct method
- Elimination method

Each of these methods will be demonstrated using the information given below for an organisation with two production centres and two service centres:

	Production centres		Service centres		
	Dept A	Dept B	Dept X	Dept Y	Total
	K'000	K'000	K'000	K'000	K'000
Overhead costs	10,030	8,970	10,000	8,000	37,000

The service departments are expected to spend their time as follows:

	Dept A	Dept B	Dept X	Dept Y
Department X	30%	50%	-	20%
Department Y	80%	10%	10%	-

a) IGNORING RECIPROCAL SERVICES

		Production centres		Service centres		
	Basis	Dept A	Dept B	Dept X	Dept Y	Total
		K'000	K'000	K'000	K'000	
Overhead costs		10,030	8,970	10,000	8,000	37,000
Dept X	30: 50	3,750	6,250	(10,000)		-
Dept Y	80: 10	7,111	889		(8,000)	-
Total		**20,891**	**16,109**	**-**	**-**	**37,000**

b) ELIMINATION METHOD

The methods works by first apportioning one of the service cost centres to all other centres which make use of its services. When the remaining service center costs is reapportioned, the work done for other service cost centres is ignored.

	Basis	Production centres		Service centres		
		Dept A	Dept B	Dept X	Dept Y	Total
		K'000	K'000	K'000	K'000	K'000
Overhead costs		10,030	8,970	10,000	8,000	37,000
Dept X	3 : 5: 2	3,000	5,000	**(10,000)**	2,000	
Dept Y	8: 1	8,889	1,111		**(10,000)**	
Total		**21,919**	**15,081**	**-**	**-**	**37,000**

c) RECIPROCAL (REPEATED DISTRIBUTION) METHOD OF APPORTIONMENT

	Basis	Production centres		Service centres		Total
		Dept A	Dept B	Dept X	Dept Y	
		K'000	K'000	K'000	K'000	K'000
Overhead costs		10,030	8,970	10,000	8,000	37,000
Dept X	3 : 5 : 2	3,000	5,000	**(10,000)**	2,000	
Dept Y	8 : 1 :1	8,000	1,000	1,000	**(10,000)**	
Dept X	3 : 5 : 2	300	500	**(1,000)**	200	
Dept Y	8 : 1 :1	160	20	20	**(200)**	
Dept X	3 : 5 : 2	6	10	**(20)**	4	
Dept Y		4			**(4)**	
Total		**21,500**	**15,500**	**0**	**0**	**37,000**

4.0 OVERHEAD ABSORPTION

The final stage in the process is overhead is to reflect the cost of overheads in individual cost units. This is known as overhead absorption. To determine the overhead to be absorbed by a cost unit, it is necessary to establish an overhead absorption rate which is calculated as

$$\text{Overhead Absorption Rate} = \frac{\text{Total Budgeted Overhead}}{\text{Total Budgeted Level of Activity}}$$

4.1 ABSORPTION BASES

Overheads can be absorbed into cost units by means of:

- Units produced
- Total prime cost
- Total Material cost
- Total direct wages
- Direct labour hours
- Machine hours

4.2 EXAMPLE

The budgeted production overhead and other budget data for Kampsize Ltd are as follows:

Budget	Cost
Overhead cost (K'000)	72,000
Direct Materials (K'000)	64,000
Direct Labour Cost K'000)	80,000
Machine Hours	10,000
Direct Labour hours	18,000
Units of production	12,000

Required

Calculate the absorption rates using various bases.

4.3 Solution

Percentage of direct material cost $\frac{72,000,000}{64,000,000} \times 100 = 112.5\%$

Percentage of direct labour cost $\frac{72,000,000}{80,000,000} \times 100 = 90\%$

Percentage of prime cost $\frac{72,000,000}{144,000,000} \times 100 = 50\%$

Rate per machine hour $\frac{72,000,000}{10,000} = K7,200$ per hour

Rate per Labour hour $\frac{72,000,000}{18,000} = K\ 4,000$ per hour

Rate per unit $\frac{72,000,000}{1200} = K60,000$ per hour

4.4 Illustration: absorption

Using each of the overhead absorption rates calculated above, estimate production overheads that would be absorbed in Product XYZ which has the following details:

Direct Material cost	K80,000
Direct Labour cost	K85,000
Prime cost	K165,000
Machine Hours	15
Labour Hours	25

4.5 SOLUTION

Absorption base	Overhead Absorption rate	Actual activity	Absorbed
Percentage of direct material cost	112.5%	K80,000	K90,000
Percentage of direct labour cost	90%	K85,000	K76,500
Percentage of prime cost	50%	K1650,00	K82,500
Rate per machine hour	7,200	15	K108,000
Rate per Labour hour	4,000	25	K100,000
Rate per unit	60,000	1	K60,000

Though in theory any basis of absorption can be used, a company should choose a basis for its costs which seems to be fairest.

5.0 PRE-DETERMINED ABSORPTION RATE

The overhead absorption rates used for absorption are calculated prior to the accounting period using budgeted overheads and budgeted activity.

The main reason for this is that the actual overhead and actual activity is not known until the end of the period and the actual overhead absorption rate would not be calculated until then. This would mean that product cost can not be calculated until the end of the period and this would create unacceptable delays for such activities as invoicing and cost estimation.

The only solution is to use predetermined rates.

5.1 UNDER OR OVER ABSORPTION

Overhead absorption rates are based on budgeted overhead costs and the budgeted volume or activity. In practice we should expect that:

- Actual overhead expenditure will differ from budgeted overhead expenditure; and
- The actual volume activity will differ from the budgeted volume of activity

As a consequence the amount of overheads charged to product costs will differ from the actual overhead expenditure.

We might charge more overhead costs to production than the amount of overheads expenditure actually incurred. If so there is **over absorption or over recovery** of overheads.

Alternatively, we might charge less overhead costs to production than the amount of overheads expenditure actually incurred. If so there is **under absorption or under recovery** of overheads.

5.2 EXAMPLE

Pemba Ltd has budgeted production overheads of K50 million and a budgeted activity of 10,000 machine hours. The overhead absorption rate is thus K5,000 per hour.

5.3 Required

Calculate the under/over absorbed overhead under each of the following circumstances:

Outcome	Actual Overhead Cost K'000	Actual Machine Hours
a)	47,000	10,000
b)	50,000	8,500
c)	47,000	8,500

5.4 SOLUTION

a)

		K'000
Actual Overheads		47,000
Absorbed Overheads	(10,000 X K5)	50,000
Over absorption		**3,000**

b)

Actual Overheads		50,000
Absorbed Overheads	(8,500 X K5)	42,500
Under absorption		**(7,500)**

c)

Actual Overheads		47,000
Absorbed Overheads	(8,500 X K5)	42,500
Under absorption		**(4,500)**

6.0 TREATMENT OF NON-MANUFACTURING OVERHEADS

For financial reporting purposes, it is not necessary to allocate non-manufacturing overheads to products. This is because many of the overheads are non-manufacturing and are regarded as period costs and are written off as a charge to the profit and loss account.

For internal reporting purpose and for a number of industries which base the selling price on their product on estimate of total cost or even actual cost, a total cost per unit output may be require.

For product pricing purposes and for internal management reports it may therefore be appropriate to allocate non-manufacturing overheads to units of output.

6.1 BASES FOR ABSORBING NON MANUFACTURING COSTS

Administration overheads might be absorbed into unit costs as a percentage of full product cost.

Sales and distribution overheads might be absorbed into unit costs as percentage of full production cost.

6.2 EXAMPLE

Bickson Limited has budgeted the following sales and costs for next year

	K
Full Production Costs	240,000
Administration overheads	60,000
Sales and distribution overheads	80,000
Sales revenue	450,000

Production overheads will be absorbed at a rate of K400 per direct labour hour. Administration overheads will be absorbed as a percentage of full production cost. Sales and distribution overheads will be absorbed as a percentage of full production cost.

Required

Calculate the fully absorbed cost of sales for a product that has a direct material cost of K24,000 and a direct labour cost of K16,000 with labour paid at K800 per hour.

6.3 Solution

Administration overhead absorption rate = $\frac{\text{Administration overhead}}{\text{Full production overhead}} \times 100$

$\frac{60{,}000}{240{,}000} \times 100 = 25\%$

Sales and distribution overheads absorption rate = $\frac{\text{Sales \& Dist overheads}}{\text{Full production overhead}} \times 100$

$\frac{80{,}000}{240{,}000} \times 100 = 33.33\%$

	K'000
Direct Materials	24
Direct Labour	16
Production overheads (20** hours X K400)	8
Full production cost	48
Administration overheads (25% X K48)	12
Sales and distribution overheads (33.33% X K48)	16
Full cost of sale	**76**

***** hours per unit = labour cost per unit/ labour rate per hour.***

Chapter summary

- Overhead is the cost incurred in the course of making a product, providing a service or running a department, which cannot be traced directly and in full to the product, service or department.

- The main reasons for absorbing overheads into products are for stock valuations, pricing decisions and product profitability analysis.

- The three main stages in absorption costing are:
    - Allocation
    - Apportionment
    - Re-apportionment
    - Absorption

- Apportionment is the process by which whole cost items are charged directly to a cost unit or cost centre.

- Apportionment is a procedure whereby indirect costs are spread fairly between costs centres.

- Re-apportionment is a procedure where service center costs are spread fairly to production centres using one of the following methods:
    - Direct method
    - Reciprocal method
    - Step method

- Overhead absorption is the process whereby costs of production cost centres are added to a unit, job or batch costs. Overhead absorption is called overhead recovery.

- Under absorption occurs when the overheads absorbed into the product is less than overheads incurred. It is charged as an expense in the profit and loss account.

- Overhead absorption occurs when the overheads absorbed in the product is greater than overheads incurred. This amount is credited to the profit and loss account.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. What are overheads? (2.0)
2. List steps involved in overhead costing (3.0)
3. Mention some bases for overhead apportionment (3.2)
4. Mention three methods for re-apportionment of service center costs (3.6)
5. On what bases can overheads be absorbed into products or services (4.1)
6. Why is a predetermined overhead absorption rate used? (5.0)
7. What causes under or over absorption of overheads (5.1)
8. How are non- manufacturing overheads absorbed into products or services (6.1)

EXAMINATION TYPE QUESTIONS

QUESTION ONE

1.1 The process of cost apportionment is carried out so that:

A. Cost may be controlled
B. Cost units gather overheads as they pass through cost centres
C. Whole cost items of cost can be charged to cost centres
D. Common costs are shared among costs centres

1.2 An overhead absorption rate is used to

A. Share out common costs over benefiting cost centres
B. Find the total overheads for a cost centre
C. Charge overheads to products
D. Control overheads

1.3 A company absorbs overheads on machine hours which were budgeted at 11,250 with overheads of K258,750,000. Actual results were 10,980 hours with overheads of K254,692,000. Overheads were:

A. Under absorbed by K2,152,000.
B. Over-absorbed by K4,058,000.
C. Under absorbed by K4,058,000.
D. Over-absorbed by K2,152,000.

1.4 A firm absorbs overheads on labour hours. In one period 11,500 hours were worked, actual overheads were K138 million and there were K 23 million over absorption. The overhead absorption rate per hour was:

A. K10,000
B. K14,000
C. K12,500
D. K17,000

QUESTION TWO

Moombo Limited is a manufacturing company and has the following budgeted overhead costs for two production departments (Machining and Assembly departments) and two service departments (Stores and Maintenance) for the next financial year.

Indirect Materials		
Machinery department	100,000	
Assembly department	80,000	
Stores department	50,000	
Maintenance department	15,000	
		245,000
Indirect wages		
Machinery department	90,000	
Assembly department	60,000	
Stores department	70,000	
Maintenance department	55,000	
		275,000
Managers Salaries		70,000
Depreciation of machinery		150,000
Heating and Lighting		50,000
Building insurance		25,000
Insurance of Machinery		100,000
Rent and rates		75,000
Total		**990,000**

The following additional information is provided:

Details	Production departments		Service departments	
	Machining	Assembly	Stores	Maintenance
Area occupied (M2)	500	7,500	7,000	5,000
Number of employees	15	20	8	7
Value of machines (Kwacha)	2,000,000	500,000		
Materials issued from stores (Kwacha)	50,000	20,000		
Machine hours	45,000	30,000		
Direct labour hours	100,000	80,000		
Maintenance hours	4,500	4,300	1,200	

Required

a) Prepare an overhead analysis sheet showing clearly the basis of apportionment used for each item of expense.

b) Calculate appropriate overhead absorption rates for the two production departments to two decimal places.

c) Job X passes through two production departments and uses the following hours:

	Machining	Assembly
Labour hours	1000	800
Machine hours	400	500

Direct material cost K200,000
Labour rate per hour K5,000

Calculate the total cost for job X.

CHAPTER 8

ABSORPTION AND MARGINAL COSTING

Introduction

This chapter defines marginal costing and absorption costing system. As you will learn, absorption costing recognizes fixed costs as part of a product cost, whereas in marginal costing fixed costs are treated as period cost. We shall be looking at the arguments in favour of and against each method. As each method produces a different profit figure, we shall demonstrate how to reconcile the profit figures.

CONTENTS

1. Full cost and marginal costing.
2. Contribution concept.
3. Profit statements under absorption and marginal costing.
4. Advantages and disadvantages of marginal costing.
5. Advantages and disadvantages of absorption costing.

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Define marginal costing.
- Explain the concept of contribution.
- Prepare profit statements using absorption and marginal costing principles.
- Reconcile the profits reported by absorption and marginal costing.
- Discuss advantages and disadvantages of absorption and marginal costing systems.

1.0 MARGINAL COST AND MARGINAL COSTING

Marginal cost is the part of the cost of one unit of product or service which would be avoided if the units were not produced, or which would increase if one extra unit were produced.

1.1 The marginal production cost per unit of an item usually consists of the following:

- Direct materials.
- Direct labour.
- Variable production overheads.

1.2 Marginal costing

Marginal costing is the accounting system in which variable costs are charged to cost units and fixed costs of the period is written off in full against the total contribution.

1.3 Marginal cost of sales

Marginal cost of sales usually include marginal cost of production adjusted for stock movement plus variable selling costs, which would include items such as sales commission and possibly some variable distribution costs.

2.0 Principles of marginal costing

The principles of marginal costing are that:

- Fixed costs are the same for any volume of activity.
- By producing and selling an extra unit or service only the variable cost increases.
- By producing and selling the additional unit, the total profit increase by the amount of contribution from that unit.

2.1 Based on the above points marginal costing argues that:

- The valuation of stock should be at variable production costs (direct materials, direct labour and direct expenses).

- Profit measurement should be based on contribution analysis

3.0 Absorption costing

Under absorption costing both variable and fixed costs are absorbed into cost units. The fundamental difference between marginal and absorption costing is one of timing. In marginal costing fixed costs are written off in the period incurred. In

absorption costing fixed production costs are absorbed into units and written off in the period in which they are sold.

Marginal costing	Absorption costing
▪ Closing stocks are valued at marginal production cost	▪ Closing stocks are valued at full production cost
▪ Fixed costs are treated as period costs are written off in full to the profit and loss account	▪ Fixed costs are treated as part of product costs
▪ Cost of sales does not include a share of fixed overheads	▪ Cost of sales does not include a share of fixed overheads

3.1 Product cost under marginal and absorption costing

Example:
A company produces a single product and has the following budget

	K
Selling	10,000
Direct materials	3,000
Direct wages	2,000
Variable overheads	1,000

Fixed production overhead is K10 million per month; production volume is 5,000 units per month.

Required

Calculate the cost per unit to be used for stock valuation under:

a) Absorption costing
b) Marginal costing

3.2 SOLUTION

Full absorption cost per unit

	K
Direct materials	3,000
Direct wages	2,000
Variable overheads	1,000
Absorbed fixed overhead K10M/5000	2,000
Full cost	**8,000**

Marginal cost per unit

	K
Direct materials	3,000
Direct wages	2,000
Variable overheads	1,000
Marginal cost per unit	**6,000**

3.3 Contribution Concept

Contribution is the difference between sales value and the marginal cost of sales. The term contribution is really short for contribution towards covering fixed overheads and making a profit.

3.4 WHY IS CONTRIBUTION SIGNIFICANT

Contribution is an important concept in marginal costing. Changes in the volume of sales, or in sales price, or in variable costs will all affect profit by altering the total contribution. Marginal costing techniques can be used to help management to assess the likely effect on profits of higher or lower sales volume, or the likely consequences of reducing the sales price of a product in order to increase demand and so on. The approach to any such analysis should be to calculate the effect on total contribution.

Format for Marginal cost statement

		K
A	Sales	XXX
	Opening Stock @ variable cost	XX
	Variable production cost	XX
	Closing stock@ variable costs	XX
	Variable production cost of sales	XX
	Variable selling expenses	XX
B	Total variable costs	XX
A - B	Contribution	**XX**
	Fixed costs	X
	Production	X
	Selling and administration	X
	Profit / (Loss)	**XX**

Format for Absorption cost statement

		K
A	Sales	XXX
	Opening Stock@ full cost	XX
	Production cost	XX
	Closing stock @full cost	(XX)
B	Cost of Sales	XX
A - B	Gross Profit	XX
	Under/ (over) absorption	(X)
	Variable selling expenses	(X)
	Fixed selling and Admin costs	(X)
	Profit / (Loss)	**XX**

3.5 EXPLANATION OF THE DIFFERENCE IN PROFIT

The difference in profits reported under the two costing systems is due to the different stock valuation methods used.

If stock levels increase between the beginning and end of a period, absorption costing will report the higher profit. This is because some of the fixed production overhead incurred during the period will be carried forward in closing stock (which reduces cost of sales) to be set against sales revenue in the following period instead of being written off in full against profit in the period concerned. On the hand marginal costing will report a lower profit if the stock increase.

If stock levels decrease, absorption costing will report the lower profit because as well as the fixed overhead incurred, fixed production overhead which had been carried forward in opening stock is released and is also included in cost of sales. In this case, marginal costing will report higher profit.

3.6 EXAMPLE: COMPREHENSIVE ILLUSTRATIVE QUESTION ON MARGINAL AND ABSORPTION COSTING

X Limited commenced business on 1st January making one product only, with the following costs:

	K'000
Direct Labour	5
Direct Material	8
Variable production overhead	2
Fixed production overhead	5
Total cost	**20**

The fixed production overheads figure has been calculated on the basis of a budgeted normal output of 36,000 units per annum.

You are to assume that there is no expenditure or efficiency variance and that all budgeted expenditure is incurred evenly over the year.

Selling, distribution and administration expenses are:

Fixed	K120 million
Variable	15% of the sales value

The selling price per unit is K35,000 and the number of units produced and sold were:

	March Units	April Units
Production	2,000	3,200
Sales	1,500	3,000

Required

Prepare profit statement for each of the months of March and April using:

a) Marginal costing; and
b) Absorption costing principles

3.7 SOLUTION

W1 Production Overhead

	Per year	Per month
36,000 X 5 =	180,000	15,000

W2 Selling and admin overhead (K'000)

	Per year	Per month
	120,000	10,000

Marginal cost statement		March		April
	Workings	K'000	**Workings**	K'000
Sales	K35 X 1,500	52,500	K35 X 3,000	105,000
Opening Stock		-		7,500
Variable production cost	K15 X 2,000	30,000	K15 X 3,200	48,000
Closing stock	K15 X 500	(7,500)	K15 X 700	(10,500)
Variable production cost of sales		22,500		45,000
Variable selling expenses	15% X 52,500	7,875	15% X 105,000	15,750
Total variable costs		30,375		60,750
Contribution		22,125		44,250
Fixed costs				
Production (W1)		(15,000)		(15,000)
Selling and admin (W2)		(10,000)		(10,000)
Profit / (Loss)		(2,875)		19,250

Absorption cost statement		March		April
	Workings	K'000	**Workings**	K'000
Sales	K35 X 1,500	52,500	K35 X 3,000	105,000
Opening Stock		-		10,000
Production cost	K20 X 2,000	40,000	K20 X 3,200	64,000
Closing stock	K20 X 500	(10,000)	K20 X 700	(14,000)
Cost of Sales		30,000		60,000
Gross Profit		22,500		45,000
Under/ (over) absorption		(5,000)		1,000
Variable selling expenses		(7,875)		(15,750)
Fixed selling and Admin costs		(10,000)		(10,000)
Profit / (Loss)		**(375)**		**20,250**

W3

Under/ over absorption	March		April	
Actual	K180,000/12	15,000	K180,000/12	15,000
Absorbed	2000 X 5	10,000	3200 X 5	16,000
(Under)/Over		**(5,000)**		**1,000**

3.8 RECONCILITION OF THE DIFFERENCE BETWEEN MARGINAL AND ABSORPTION COST PROFITS.

		March		April
Profit as per Absorption costing Profit		(375)		20,250
Less: Fixed costs in the closing stocks	500 X 5	(2,500)	700 X 5	(3,500)
Add: Fixed costs in the opening stock		-	500 X 5	2,500
Profit as per Marginal costing Profit		(2,875)		19,250

4.0 ARGUMENTS IN FAVOUR OF MARGINAL COSTING AND ABSORPTION COSTING

ABSORPTION	MARGINAL COSTING
▪ It is fair to share fixed production costs to units of production as such costs are incurred in production	▪ Absorption costing encourages management to produce goods in order to absorb allocated overheads instead of meeting market demands
▪ Closing stocks are valued in accordance with SSAP 9	
▪ It is easier to determine product profitability where a company produces more than one product	▪ No apportionment of fixed assets
▪ Where stock building is necessary , fixed costs should be included as product costs to avoid fluctuation in reported results	▪ Fixed costs are period costs that do not change with output.
▪	▪ Marginal costing is useful in decision making ▪ Under/over absorption of overheads is avoided. ▪ Simple to operate.

Chapter summary

- Marginal cost is the variable cost of one unit of product or service.
- Contribution is an important measure in marginal costing, and it is calculated as the difference between sales value and marginal or variable costs.
- In marginal costing, fixed production costs are treated as period costs and are written off as they are incurred.
- In absorption costing, fixed production costs are absorbed into cost units and are carried forward in stock to be charged against sales for the next period. Stock values using absorption costing are therefore greater than those calculated using marginal costing.
- SSAP 9 recommends the use of absorption costing for the valuation of stocks in financial accounts

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. Define marginal costing. (1.0)
2. State principles of marginal costing (2.0)
3. What are the differences between marginal and absorption costing? (3.0)
4. What is contribution? (3.3)
5. State the arguments in favour of marginal and absorption costing (4.0)

EXAMINATION TYPE QUESTIONS

Information relates for the question that follows below:

Munyaule develops musical CDs for which the budgeted profit per unit is as follows:

	K
Materials	2,000
Labour	3,000
Variable Production overhead	3,000
Fixed Production overhead	4,000
Variable selling cost	1,000
Fixed Selling expenses	2,000
Profit	5,000
Sales Price	**20,000**

Both types of fixed overheads were based on a budget of 10,000 CDs a year. In the first year of production, the only difference from the budget was that Munyaule produced 11,000 musical CDs and sold 9,000.

Required

Prepare:

a) Profit statement made under absorption costing?
b) Profit statement made under Marginal costing?
c) A statement reconciling the profit figures in (a) and (b)

CHAPTER 9

ACTIVITY BASED COSTING

Introduction

We have so far seen how to incorporate indirect costs into cost objects using the traditional approach referred to as absorption costing. This chapter will introduce you to an alternative approach to dealing with overheads known as Activity Based Costing (ABC). ABC was developed in the 1970s and 1980s as alternative to absorption costing. Absorption costing was found to be limited in the modern manufacturing environment where indirect costs were becoming a significant proportion of the product cost. This chapter will give a full background to the development of ABC and will demonstrate the application of the concept.

Contents

1. Background to ABC.
2. Identification of activities.
3. Identification of cost drivers.
4. Accounting for overheads using ABC.
5. Contrasting ABC and the traditional approach.
6. Other uses of ABC.

Learning outcomes

After studying this chapter you should be able to:

- Explain the limitation of the traditional approach to costing.
- Understand the concept of activities and cost drivers.
- Contrast the ABC approach and the traditional approach.
- Explain other uses of ABC.

1.0 BACKGROUND TO ABC

ABC was developed in the 1970s and 1980s as an alternative to absorption costing. Since the time when absorption costing was initially developed (at the time of the Industrial Revolution), many aspects of manufacturing have changed and it was felt that absorption cost was not providing information of sufficient quality and accuracy. Some of these changes observed by the advocates of ABC are:

1.1 Product range

The traditional cost accumulation systems of absorption costing were developed at a time when most organisations produced only a narrow range of products, so that products under went similar operations and consumed similar proportions of overheads.

1.2 Level of indirect costs

The traditional cost accumulation systems of absorption costing was developed at a time when overheads were only a very small fraction of total costs, direct labour and direct material costs accounted for the largest proportion of the cost. As such the benefit of more accurate systems of overhead allocation would probably have been relatively small.

1.3 Information processing costs

The traditional costing systems were developed at a time when information processing costs were so high that on a cost benefit analysis basis, the introduction of ABC would not be approved in most organisations.

1.4 Labour costs.

Traditional costing mainly allocated costs on the basis of labour component in a cost object. With the advent of Advanced Manufacturing Technology, labour has drastically declined (to as low as 5% of a product cost in some cases) and cannot be justified as a correct absorption base.

2.0 DEFINITION OF ABC

Activity Based Costing is an approach to costing and monitoring of activities which involves tracing resource consumption and costing final output. Resources are assigned to activities and activities to cost objects based on consumption estimates. The later utilizes cost drivers to attach activity costs to outputs

(CIMA Official Terminology)

The major ideas behind ABC are as follows:

- Activities cause costs
- Producing products creates demand for the activities
- Costs are assigned to a product on the basis of the products consumption of the activities

2.1 Designing an ABC system

Four steps involved in the design of ABC are to:

- Identify major activities that take place within an organisation.
- Assign costs to cost pools/cost centres for each activity.
- Determine the cost driver for each major activity.
- Assign costs to products according to products demand for activities.

2.2 IDENTIFICATION OF MAJOR ACTIVITIES

Activities are composed of the aggregation of units of work or tasks and are described by verbs associated with tasks. For example activities in a stores department include such tasks as:

- Receiving a purchase request.
- Identifying suppliers.
- Preparing purchase orders.
- Mailing purchase orders.
- Performing follow-ups.

The number of activities to include in the system is a matter of judgment by management.

2.3 ASSIGNING COSTS TO EACH ACTIVITY

After the activities have been identified the cost of resources consumed over a specified period must be assigned to each activity. The aim is to determine how much the organisation is spending on each of its activities. Costs shared by several activities have to be apportioned on some fair bases.

2.4 IDENTIFICATION OF COST DRIVERS

In order to assign costs attached to each activity to products, a cost driver must be selected for each activity.

Definition of cost driver

A cost driver is any factor that causes a change in the cost of an activity.

(CIMA Official Terminology)

2.5 EXAMPLES OF COST DRIVERS

Costs	Possible cost drivers
Ordering costs	Number of orders
Materials handling	Number of production runs
Production scheduling costs	Number of production runs
Despatching costs	Number of dispatches

2.6 ASSIGNING COSTS TO PRODUCTS

Costs are charged to products on the basis of their usage of the activity. A product's usage of an activity is measured by the number of the activity's cost driver it generates.

2.7 QUESTION: ABSORPTION COSTING VERSUS ABC

Having attended a ZICA conference on activity Based Costing you decide to experiment by applying the principles of ABC to the four products currently made and sold by your company. Details of the four products and relevant information are given below for one period:

Product	A	B	C	D
Output in units	120	100	80	120
Costs per unit:				
Direct materials	8,000	10,000	6,000	12,000
Direct Labour	5,600	4,200	2,800	4,200
Machine hours per unit	2	1.5	1	1.5

The four products are similar and are usually produced in production runs of 20 units and sold in batches of 10 units.

The production overhead is currently absorbed by using a labour hour rate and the total of the production overhead for the period has been analysed as follows:

Product	**K'000**
Assembly department cost (rent, rates depreciation and supervision)	8 430
Set up costs	5 250
Stores receiving	3 600
Inspection/Quality control	2 100
Material handling and despatch	4 620
Total	24 000

You have ascertained that the cost drivers to be used are as listed below for the overhead costs shown:

Cost	Cost Driver
Set up costs	Number of production runs
Stores receiving	Requisition raised
Inspection/Quality control	Number of production runs
Material handling and despatch	Orders executed

The number of requisitions raised on the stores was 20 for each product and the number of orders executed was 42, each order being for a batch of 10 of a product.

Required

Calculate the total costs for each product if overheads using:

a) Traditional costing
b) ABC system.

SOLUTION

Traditional Costing

Products	A	B	C	D	Total
Direct Material	8,000	10,000	6,000	12,000	36,000
Direct Labour	5,600	4,200	2,800	4,200	16,800
Prime Cost	13,600	14,200	8,800	16,200	52,800
Overheads	9,000	5,250	3,000	6,750	24,000
Total cost	22,600	19,450	11,800	22,950	76,800
Units	120	100	80	120	
Cost per unit	**188.33**	**194.50**	**147.50**	**191.25**	

WORKINGS FOR TRADITIONAL COSTING

W1

$$\text{Overhead Absorption Rate} = \frac{\text{Budgeted Overhead}}{\text{Budgeted Activity}} = \frac{24{,}000{,}000}{6{,}400} = 3{,}750$$

W2

Budgeted Hours	Units	Hours per unit	Total Hours
A	120	20	2,400
B	100	14	1,400
C	80	10	800
D	120	15	1,800
Total			**6,400**

W3

Products	Units	Hours	OHAR	Absorbed OH
A	120	20	3,750	9,000,000
B	100	14	3,750	5,250,000
C	80	10	3,750	3,000,000
D	120	15	3,750	6,750,000
Total				**24,000,000**

ABC SOLUTION

ABC statement

Products	A	B	C	D
Assembly	3,120	1,820	1,040	2,340
Set up	1,500	1,250	1,000	1,500
Stores	900	900	900	900
Inspection	600	500	400	600
Materials Handling	1,320	1,100	880	1,320
Total	**7,440**	**5,570**	**4,220**	**6,660**
Prime Cost	13,600	14,200	8,800	16,200
Total Cost	**21,040**	**19,770**	**13,020**	**22,860**
Units	120	100	80	120
Cost per unit	**175.33**	**197.70**	**162.75**	**190.50**

WORKINGS

W1

ACTIVITY	Overhead cost	Drivers	Cost Per Driver
Assembly	8,430	6,500	1.30
Set up	5,250	21	250
Stores	3,600	80	45
Inspection	2,100	21	100
Materials Handling	4,620	42	110

3.0 ADVANTAGES OF ABC

- ABC facilitates a good understanding of what drives overheads and assists companies to remain cost competitive and also help in the accurate assessment of product profitability.

- ABC recognizes the complexity of the modern manufacturing environment by using multiple cost drivers.

- Unlike absorption costing which concentrates on factory overheads, ABC does account for non factory overheads and this takes management accounting beyond its traditional factory floor boundaries.

3.1 CRITICISMS OF ABC

- Not all arbitrary cost apportionment is eliminated, some of it still remains e.g rent may still have to be apportioned to various activities.

- It is still doubtful whether a single cost driver can explain the cost behaviour of all items within a cost pool.

- ABC is sometimes introduced because it is fashionable, not because it will be used to provide meaningful product costs or extra information.

- The cost of implementing and maintaining an ABC system can exceed the benefits of improved accuracy.

3.2 Implementation of ABC can be problematic due to such factors as:

- The incorrect belief that ABC can solve all organisations problems.
- Lack of correct type of data.
- Difficulty in determining appropriate cost drivers.

3.30 OTHER USES OF ABC

Information which is gathered in the process of designing and implementing ABC can be used in the management functions of planning, control and decision making.

3.31 Planning

One of the critical steps in the design of an ABC system is the analysis of the organisation's activities, cost drivers and the relation ship between the activities, products/services and their costs. This type of information would be very relevant for the budgeting exercise.

3.32 Control

ABC clearly identifies what causes costs for an organisation in the service and support departments. This makes it possible to control costs by managing the activities which underlie the support departments.

3.33 Decision making

By providing accurate and reliable cost information ABC information can be used to make the following decisions:

- Pricing
- Promotion or discontinuing products or parts of the business
- Redesigning products and developing new products or new ways to do business.

Chapter summary

- Activity Based Costing is an alternative costing method to absorption costing.
- ABC was developed to remedy weaknesses inherent in the absorption costing approach such as the reliance on labour for cost allocation and absorption when labour is a declining as a proportion of product cost.
- ABC involves the identification of the factors which cause costs (cost drivers) of an organisation's major activities and charging support overheads to products on the basis of usage of an activity.
- Steps involved in ABC are:
    - Identification of major activities within an organisation.
    - Assigning overheads to the activities.
    - Identifying cost drivers for each cost pool.
    - Finding cost per driver and assigning the cost to cost objects.
- One of the key advantages of ABC is that it recognizes the complexity of the modern manufacturing environment by using multiple cost drivers
- Information from ABC can be used by management for planning, control and decision-making.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. What developments have led to the introduction of ABC? (1.1-1.4)
2. Define ABC (2.0)
3. Mention four steps involved in the development of ABC? 2.1
4. What is a cost driver (2.4)
5. What are the advantages of ABC? 3.0
6. Mention the major criticisms of ABC (3.1)

EXAMINATION TYPE QUESTIONS

Falcon limited uses a single plant and production process to manufacture its candle and matches for its mainly rural market. An extract of production data for these products for the period ending 31st March 20X5 has been given as follows:

	Matches	Candles
Quantities produced (Units)	5000	7000
Direct Labour hours per unit	1	2
Machine hours per unit	3	1
Set-ups in the period	10	40
Orders handled in the period	15	60

Overhead costs	**K'000**
Relating to Machine activity	220,000
Relating to production run set ups	20,000
Relating to handling of orders	45,000
	285,000

Required

Calculate the production overheads to be absorbed by one unit of each of the products using:

i) Traditional costing
ii) Activity Based Costing approach

CHAPTER 10

JOB AND BATCH COSTING

INTRODUCTION

In this chapter, we look at the first costing method, known as job costing. We will see circumstances in which job costing should be used and how the costs of jobs are calculated. We shall proceed to consider batch costing. These costing systems are usually associated with absorption costing methodology and the costs calculated for each batch or each job produced are normally a fully absorbed costs.

CONTENTS

1. Costing methods.
2. Job costing.
3. Batch costing.

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Describe the characteristics of job costing and batch costing.
- Identify situations where the application of job costing or batch costing is appropriate.
- Discuss and illustrate the treatment of direct, indirect and abnormal costs.
- Complete cost records and accounts in job and batch costing situation.
- Estimate job costs from given information.
- Apply cost-plus pricing in job costing.

1.0 Costing methods

A costing method is designed to suit the way goods are processed or manufactured or the way services are provided. Each organisation's costing method will therefore have unique features but costing methods of firms in the same line of business will more than likely have common aspects.

1.1 There are five costing methods to be considered in two categories:

Specific order costing

- Job costing.
- Batch costing.
- Contract costing.

Continuous operational costing

- Process costing.
- Service costing.

1.2 We will be considering two important costing methods in this chapter.

- Job costing.
- Batch costing.

2.0 JOB COSTING

Job costing is a costing method applied where work is undertaken to customers' specific requirements and each order is of comparatively short duration.

The work relating to a job moves through processes and operations as a continuously identifiable unit. Job costing is most commonly applied within a factory or workshop, but may also be applied to property repairs and internal capital expenditure.

3.0 PROCEDURES FOR THE PERFORMANCE OF JOBS

The normal procedure in jobbing concerns involves:

- The prospective customer approaches the supplier and indicates the requirements.
- A representative sees the prospective customer and agrees with him the precise details of the items to be supplied.
- The estimating department of the organization then prepares an estimate for the job. This will be based on the cost of materials to be used, the labour

expense expected, the cost of overhead, the cost of any additional equipment needed specially for the job and finally the supplier's profit margin.

- If the estimate is accepted the job can be scheduled. All the required resources are arranged for the job.

3.00 JOB COST INFORMATION

3.10 Materials

When material is requisitioned for a job then the issue of materials will be recorded in the stock ledger account. They will also be recorded at their issue price in the job cost card as they are used as input into the particular job.

Materials that have to be specially purchased for the job in question will need to be priced by the purchasing department.

3.11 Direct labour costs

As the job card travels with each job, the hours worked by each grade of labour are logged onto the card. The relevant hourly labour rate is then applied to each grade of labour to give a cost for each grade and a total cost for the job.

3.12 Direct expenses

Direct expenses are any cost that can be directly attributed to that particular job. The details of these costs are can be obtained from invoices and the cost accountant is responsible for recording these.

3.13 Production overheads

The estimated production overheads to be included in the job cost will be calculated from predetermined overhead absorption rates and the actual hours worked.

3.14 Other overheads and job costs

In order to arrive at the total costs for a particular job, any non-production overheads such as administration, selling and distribution should be included in the job costs. A variety of methods such as percentage of full product costs etc could be used to estimate overheads to include in the job.

4.0 JOB PRICING

The common method of fixing prices for jobs is cost plus pricing where a required profit mark-up is added to the total cost in order to arrive at a selling price.

4.1 Example

A company has had two jobs in the current month called job X and job Y which were carried out in three production departments namely cutting, assembly and finishing. Production overheads rates based on labour hours for these departments are K1,286, K1,240 and K 1,403 respectively. Products X and Y have the following estimated costs.

		Job X	Job Y	Labour rates per Hour
Direct Materials		K154,000	K108,000	
Direct Labour		Hours	Hours	
Department	A	20	16	K3,800
	B	12	10	K3,500
	C	10	14	K3,400

Required

Assuming a profit mark-up of 20%, calculate the price quoted for each job.

Solution

		Job X		**Job Y**
Materials		154,000		108,000
Direct Labour				
Department A	(20 x K3, 800)	76,000	(16 x 3,800)	60,800
Department B	(12 x K3, 500)	42,000	(10 x 3,500)	35,000
Department C	(10 x K3, 400)	34,000	(14 x 3,400)	47,600
Prime Cost		**306,000**		**251,400**
Overheads				
Department A	(20 x 1286)	25,720	(16 x 1286)	20,576
Department B	(12 x 1240)	14,880	(10 x 1240)	12,400
Department C	(10 x 1403)	14,030	(14 x 1403)	19,642
Total Cost		**360,630**		**304,018**
Profit mark up		72,126		60,804
Quoted Selling Price		**432,756**		**364,822**

The focal point of job costing system is the cost sheet. Each job will be given a unique job number and a separate sheet will be opened for each job, on which will be recorded:

- Materials
- Labour
- Direct expenses
- Overheads

5.0 BATCH COSTING

A batch is a group of identical but separately identifiable products that are made together.

Batch costing is a form of specific order costing in which costs are attributed to batches of products.

Each batch is very similar to a job and in exactly the same way as job costing. The costs of that batch are gathered together on a batch cost card. These costs are materials, labour, expenses and a batch's share of overheads.

5.1 UNIT COST OF A BATCH

As a batch is made up of a number identical products or cost units, the cost per unit computation differs from the job. In order to find the cost of each product or cost unit the total cost of the job is divided by the number of products in that batch.

5.2 Example

Batch number X002 has the following inputs:

01 May	Material X: 30kg @ K10,000 per kg. 40 hours of grade II labour at K6,000 per hr.
15 May	Material Y: 20kg @ K30,000 per kg. 60 hours of grade III labour at K5000 per hr.

Production overheads are to be absorbed into the cost of each batch on the basis of labour hours at a rate of K500 per labour hour.

Required:

Calculate the cost per unit in the batch.

Solution

		Kg	Price	Total-Kwacha
Material costs	X	30	10,000	300,000
	Y	20	30,000	600,000
		Hours	Rate	
Labour	Grade II	40	6,000	240,000
	Grade III	60	5,000	300,000
Production overheads		100	500	50,000
Total				**1,490,000**

Cost per Product	K	1,490,000 / 100	14,900

CHAPTER SUMMARY

- Job costing is the costing method used where each unit is separately identifiable
- Costs of each job are collected on a job cost card
- Materials for each job are determined from the material requisition note
- Labour times on each job are recorded on a job ticket, which is then costed and recorded on the job cost sheet.
- Overheads are absorbed into the into the cost of jobs using predetermined overhead absorption rates.
- The common method of fixing prices within the jobbing industry is cost plus pricing.
- Batch costing is similar to job costing in that each batch of similar articles is separately identifiable. The cost per unit manufactured in a batch is the total batch cost divided by the number of units in the batch.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. Mention five types of costing methods (1.1)
2. What is job costing? (2.0)
3. How are jobs priced (4.0)
4. What is batch costing (5.0)

EXAMINATION TYPE QUESTIONS

QUESTION ONE

A small management consultancy firm has prepared the following information:

Overhead absorption rate per consulting hour	K1,250
Salary cost per consulting hour (senior)	K2,000
Salary cost per consulting hour (Junior)	K1,500

The firm adds 40% to total cost to arrive at selling price.
Assignment number 256 took 86 hours of a senior consultants time and 220 hours of junior time

What price should be charged for assignment number 256?

A. K1,834,100
B. K 1720,000
C. K1,910,000
D. K1,500,300

QUESTION TWO

A company manufactures carpets for the hotel industry. No finished stocks are carried as the company only manufactures specifically to customer order. At the end of month 6, one incomplete job (Job x124) remained in progress. Production costs incurred on the job to the end of month 6 were as follows:

Direct materials	722,000
Direct Labour	607,600
Production overhead	1,041,600
Total	2,371,200

During month 7, the company accepted two further jobs (Jobs X125 and Job X126) and incurred prime costs as follows:

	Job X124	Job X125	Job X125
Direct Material issued from stores	697,800	1,899,400	1,222,100
Direct returned to stores		(700,000)	217,000
Direct Material transfers		86,000	(86,000)
Direct Labour hours	780	2,364	1,510

Direct labor is paid at a rate of K700 per hour. Production overheads are absorbed at a rate of K1,200 per direct labour hour.

During month 7 Jobs X124 and X125 were completed. On completion of a job, 20% of the total production cost is added in order to recover distribution, selling and administration costs. The amounts invoiced to customers during month 7 for the completed jobs were:

Job X124	K6,000,000
Job X125	K7,900,000

Required

1. For each of the jobs calculate the following total costs

   a) Direct materials
   b) Direct labour
   c) Production overhead

2. Calculate the total costs and profit/ (loss) of each job X124 and X125

CHAPTER 11

CONTRACT COSTING

Introduction

We now turn attention to a third specific order costing method called contract costing. Contracts are basically large long term jobs. Most of the costing principles covered under job costing are also applicable to contract costing. The main difference is the recognition of attributable profit part way through the contract.

CONTENTS

1. What is contract costing?
2. Features of contracts.
3. Contract account.
4. Profit taking.
5. Accounting entries.

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Know the characteristics of contract costing.
- Be able to prepare a contract account.
- Calculate profits on completed and incomplete contracts.
- Prepare balance sheets entries relating to long-term contracts.
- Be able to summarise standard accounting requirements regarding profits, losses and contract balances.

1.0 DEFINITION

Contract costing is a form of specific order costing in which costs are attributable to individual contracts.

1.1 Contract costing has many similarities to job costing and is usually applied to work which is:

- Undertaken to customer's special requirements.
- Relatively long duration.
- Site based and sometimes overseas.
- Frequently of a constructional nature.

The main difference between a job and a contract is one of **size** and **time span**. Contract costing is used by firms, which undertake building or other constructional work that takes years or months to complete.

1.2 Characteristics of contract costing

Although details vary, certain characteristics are common to most contracts costing systems:

- Higher proportion of direct costs
- Low indirect costs
- Difficulties of cost control
- Surplus materials

2.0 TREATMENT OF COSTS

Each contract is a separately identifiable cost unit, against which cost are collected and later used in profit computations. The various elements of cost are dealt with as follows.

2.1 Direct materials

Materials charged to a contract include materials specifically purchased for the contract, materials transferred from other contracts and materials issued from the stores. At the end of an accounting period, the contract account should be credited with:

- Unused materials.
- Materials transferred to other projects.
- Materials returned to stores.

2.2 Direct wages

The direct wages include work done by the design and drawing office, work done on the site. All labour employed on the site of the contract is direct. Time sheets may be used to disclose time spent by workers at different sites. All such labour costs are debited to the contract account.

2.3 Direct expenses

Direct contract costs other than materials and labour are often very significant and the two major items falling within this category are plant and subcontracted work. Plant used on a contract could come from the following sources:

- Plant specifically purchased for the project.
- Plant transferred from other contracts.
- Plant hired from outside the company.

The contract account should be debited with the cost of using the plant and this is done as follows:

- For plant hired, the hire charge is the cost of using the asset and is charged to the contract.

- For the assets owned by the company, depreciation represents the cost of using the plant and is therefore charged to the contract.

- Subcontracted work – it is common in contract operation to find that the main contractor hires subcontractors to undertake some of the activities on a contract. The cost of any subcontracted work is a direct expense of a contract and is debited to the contract account.

3.0 TERMINOLOGY RELATING TO THE OPERATION OF A CONTRACT.

For contracts a price is agreed between the company and customer. For large companies where work is spread over a number of months or years, the contractor will receive progress payments. Such interim payments are based on the work done involving certain procedures:

Architects certificates- the architect issues a certificate showing the value of the work completed on the contract. Based on the certificates the contractor issues an invoice to the customer as a demand for progress payment.

Retention monies- this refers to monies which a client withholds from the total invoice amounts as he makes progress payments to the contractor. Retention monies act as motivation for possible future rectification work by the contractor.

Such retention monies are therefore paid upon the completion of the contract when any faulty work has been done.

4.0 TAKING PROFITS ON LONG TERM CONTRACTS

- Where a contract extends over a long period, IAS11 allows the contractor to take credit for part of the attributable profit to the contract in each year's contract.

- This provision avoids inconsistency of having a number of years with no profit from a particular contract and then suddenly making a huge profit in the year when the contract is completed.

- In deciding to what extent profit can be taken on uncompleted contract, the following matters should be considered:

    - The successful outcome of the contract should be certain before any interim profit is taken.
    - Any profits should only be taken in proportion to the work completed to date on the contract.
    - Any anticipated overall loss on the contract should be provided for as soon as it is recognized.

4.1 Guidelines on calculating interim profit

Various possibilities exist for estimating the profit on incomplete contracts and several options are shown here below. The overriding principle is that a prudent view must always be taken and the profit taken should reflect the degree of completion.

If the contract is at an early stage (say less than 30% complete) no profit should be taken. Interim profits however calculated, should only be taken when the final contract outcome of the contract can be assessed with reasonable certainty.

4.2 Options for estimating interim profits

Exam focus

Note that in the exam the approach you should adopt in estimating profit should be based on the requirements of the question and the available information.

Option 1

When substantial costs have been incurred (say 30% - 80% complete) a formula which has been traditionally used in the construction industry is:

Profit taken = 2/3 or 3/4 of the notional profit X $\frac{\text{Cash received from progress payments}}{\text{Value of work certified}}$

Where notional profit = Value of Work Certified – Cost of Work Certified

Option 2

This approach involves the following five steps:

Step 1

Determine the total sales value of the contract - for fixed price contracts; this is simply the agreed contract price. Call this (a)

Step 2

Compute the total expected costs to complete the contract which consists of two elements:

- The actual costs incurred to date on the contract, plus
- The estimated future costs necessary to complete the contracts

Call this (b)

Step 3

The expected overall profit on the contract is given by (a) – (b)

Step 4

The attributable profit to date on the contract should reflect the amount of work that has been completed so far. It can be calculated as follows:

$$\text{Estimated overall profit} \times \frac{\text{Value of work certified to date}}{\text{Total contract price}}$$

It is important to realize that the attributable profit calculated in the above formula is the cumulative figure.

Step 5

The profit to be taken this year is the cumulative attributable profit calculated at step 4 less the profit on the contract recognized in the previous year.

4.3 EXAMPLE: TAKING PROFITS ON INCOMPLETE CONTRACTS

Contract 214 commenced during 2004 and has a fixed contract price of K200million. The cost incurred during the year 2004 for materials, wages and subcontractors charges totaled K90 million. Plant costing K20 million was purchased during 2004 specifically for the contract.

At the end of 2004:

The plant was valued at K15 million
Unused materials on the site were valued at K19 million
Value of architects' certificate issued were K100 million

It is estimated that further costs totaling K74 million would be incurred in order to complete the contract. The figure includes the appropriate cost of plant and subcontractors in the future.

Retention monies representing 20% of the certified value of the work completed has been held back by the client. The balance of the money has been paid. The contractor credits the contract account with the full value of the architects' certificates as they are received.

Required

Compute estimated profit for 2004

4.4 SOLUTION

Actual cost to date	**K'000**
Materials, Labour and sub contractors' costs	90,000
Less : Materials on site at end of 2004	(19,000)
	71,000
Add : Plant depreciation (20,000 - 5,000)	5,000
Contract cost to date	**76,000**

Project costs to completion	
Contract cost to end of 2004	76,000
Estimated future costs	74000
Total estimated contract price	**150,000**

Estimated total contract price	K'000
Contract Price	200,000
Contract Cost	(150,000)
Estimated profit	**50,000**

Estimated overall profit X $\frac{\text{Value of work certified to date}}{\text{Total contract price}}$

Profit taken in 2004 = $\frac{100,000}{200,000}$ X K 50,000,000 = K25,000,000

As this contract commenced in 2004 and, the whole cumulative profit computed is attributable to 2004.

4.5 CONTRACT COST ACCOUNTING ENTRIES

The additional requirement in the contract costing questions is to account for the entries relating to the contracts in the profit and loss account and balance sheet. The following question will be used to show entries in the profit and loss account and the balance sheet.

Question

At the end of the year, NHA construction has three contracts in progress and their details are as follows:

Contract	NH 10	NH 11	NH 12
	K'000	**K'000**	**K'000**
Contract price	150,000	275,000	185,000
Cost to date	35,000	144,000	154,000
Estimated costs to completion	88,000	96,000	7,000
Value of work certified	40,000	165,000	172,000
Progress payments received	34,000	140,250	146,200
Cost of work certified	28,000	138,000	150,000

Required

a) By assessing the degree of completion, decide on which contracts profits should be taken and by how much.
b) Show the profit and loss entries.
c) Show the balance sheet entries.

4.6 SOLUTION

a) Projects on which to take profit

Approximate degree of completion

	NH10	NH11	NH12
Cost to date	35,000	144,000	154,000
Total costs	123,000	240,000	161,000
Percentage completion	**28%**	**60%**	**96%**

NH10 - As NH 10 is still in its very early stages, no profit will be taken based on the prudence concept.

NH11- As contract NH11 is 2/3 complete profit will be taken on this contract using the traditional notional profit formula.

NH12- As the contract is almost complete, profit will be taken using the total profit approach.

b) AMOUNT OF PROFIT

CONTRACT NH11

$$\text{Profit taken} = 2/3 \times \text{Notional profit} \times \frac{\text{Cash received from progress payments}}{\text{Value of work certified}}$$

Where notional profit = Value of Work Certified – Cost of Work Certified

Profit taken = 2/3 x (165,000-138,000) x 140,250/165,000

15,300 (K'000)

CONTRACT NH12

$$\text{Estimated overall profit} \times \frac{\text{Value of work certified to date}}{\text{Total contract price}}$$

$$\text{Profit taken in 2004} = \frac{172,000}{185,000} \times 24,000 = \mathbf{22,314}$$

c) PROFIT AND LOSS ACCOUNTING ENTRIES

The amount of turnover and cost of sales to be taken to profit and loss account will be those that will produce the profits computed above.

Contract NH10

No entries will be made in the profit and loss account as no profit will be computed.

Contract NH11

Entries made in the P & L for this contract should give a profit of K15,300 (000)as computed above. This is achieved as follows:

$$\text{Turnover} = 2/3 \times \text{Value of work certified} \times \frac{\text{Cash received from progress payments}}{\text{Value of work certified}}$$

Turnover (K' 000) = 2/3 x K165,000 x 140,250/165,000 = **K93,500**

$$\text{Cost of sales} = 2/3 \times \text{Cost of work certified} \times \frac{\text{Cash received from progress payments}}{\text{Value of work certified}}$$

Cost of sales (K'000) = 2/3 x 138,000 x 140,250/165,000 = **K78,200**

Profit and loss extract

Profit and Loss entries	K'000
Turnover	93,500
Cost of sales	78,200
Profit	**15,300**

CONTRACT NH12

$$\text{Turnover} = \text{Contract price} \times \frac{\text{Value of work certified to date}}{\text{Total contract price}}$$

$$\text{Turnover ('K000)} = \frac{172{,}000}{185{,}000} \times 185{,}000 = 172{,}000$$

$$\text{Cost of sales} = \text{Total cost} \times \frac{\text{Value of work certified to date}}{\text{Total contract price}}$$

$$\text{Cost of sales ('K000)} = \frac{172{,}000}{185{,}000} \times 161{,}000 = 149{,}686$$

Profit and loss extract

Profit and Loss entries	K'000
Turnover	172,000
Cost of sales	149,686
Profit	**22,314**

Summary of P & L entries for the 3 contracts

Contract	NH10 K'000	NH11 K'000	NH12 K'000	Total K'000
Turnover	-	93,500	172,000	265,500
Cost of sales	-	(78,200)	(149,686)	(227,886)
Profit	**-**	**15,300**	**22,314**	**37,614**

4.7 BALANCE SHEET ENTRIES

Entries in the balance sheet relating to contracts are of two types:

i) Straightforward entries such as:

- Unused materials which is reported as stocks
- Plant on site which is reported under Fixed assets

ii) Complicated entries which are:

- Stocks: Long term-contract balances

Long-term contract balances refers to work which is done but not yet allocated to the profit and loss account.

Long term contract balances		
i)	Cost incurred to date	XX
ii)	Less costs allocated to cost of sales	(XX)
Net difference		XX

Debtors: Amounts recoverable on long-term contracts

This constitutes amounts taken as turnover in the profit and loss account less progress payments received;

Amounts recoverable on long-term contracts		
i)	Amounts taken as turnover	XX
ii)	Progress payments received	XX
**Net difference		XX

*** Should a negative balance arise it is set off against the long- term contract balances.*

BALANCE SHEET ENTRIONS USING THE DATA ABOVE

	Contract	NH10 K'000	NH11 K'000	NH12 K'000	Total K'000
	Amounts taken as turnover	-	93,500	172,000	265,500
	Less progress payments	34,000	140,250	146,200	320,450
1	Net difference	(34,000)	(46,750)	25,800	- (54,950)
	Cost to date	35,000	144,000	154,000	333,000
	Costs allocated to cost of sales	-	78,200	149,686	227,886
2	Costs not allocated to cost of sales	35,000	65,800	4,314	105,114

Any negative balances under 1 are recovered from 2 and as such there would be no debtors

Balance sheet entries:

Net of 1&2	Stocks: Long-term contract balances	1,000	19,050	30,114	50,164

Chapter summary

- Contract costing is similar to job costing and is used on relatively large scale, long-term contracts which are frequently site based.
- Because of the separate nature of most site work, more costs can be identified as direct, including many which are normally indirect.
- The cost for use of plant bought for a contract is charged as depreciation. For hired plant the cost charged is the hire fee.
- The contractor is paid interim amounts known as progress payments (less retention monies) based on the surveyors certificates.
- Retention monies represent amounts deducted by the customer and are paid after the contract has ended.
- Profit on incomplete contracts should be undertaken using conservative estimates.
- If a loss is expected for the contract as a whole the whole loss is recognized in full in the accounts.
- Accounting entries must be made in the P & L and balance relating to long term contracts.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. Define contract costing (1.0)
2. State some characteristics of contract costing (1.2)
3. How is the cost of using assets charged to contracts (2.3)
4. What are retention monies in relation to contract costing? (3.0)
5. State the overriding principles in the computation of profit on contracts? (4.0)
6. State one recommended method for computing profit in contract costing? (4.2)

EXAMINATION TYPE QUESTIONS

CONTRACT COSTING QUESTION

A business has a contract that is due to run from 1st January 20X5 to 30 June 20X6. The information about the contract at 31st December 20X5 is as follows:

Contract Price	K450 million
Work certified at 31st December 20X5	K300 million
Cost incurred to 31st December 20X5	K295 million
Further costs expected until end of contract	K70 million

REQUIRED

The attributable profit for the year ended 31st December 20X5 based upon the proportion of cost incurred to date is K……..

The attributable profit for the year ended 31st December 20X5 based upon the proportion of the contract price completed is K……..

CHAPTER 12

PROCESS COSTING

Introduction

Having looked at job costing and batch costing in the previous chapter, we shall proceed to consider a third costing method called process costing. This chapter starts by considering the basics of the topic which are preparation of basic process accounts and later moving on to accounting for process losses and finally the valuation of work in progress. The next chapter will deal with the accounting for by products and joint products.

CONTENTS

1. Process costing.
2. Process losses.
3. Scrap value.
4. Abnormal gain.
5. Equivalent units.
6. Closing Work in progress.
7. Opening Work in progress.

LEARNING OUTCOMES

After reading this chapter you should be able to:

- Know the features of process costing and the situation where the use of process costing is appropriate.
- Learn how to prepare a process account.
- Know the treatment of normal losses.
- Know the treatment of abnormal losses and abnormal gains.
- Learn how to account for scrap value of losses.
- Understand the concept of equivalent units for the valuation of work in progress.

1.0 INTRODUCTION TO PROCESS COSTING

Process costing is a costing method used where production follows a series of sequential processes. It is used in a variety of industries including:

- Oil refining
- Food processing
- Paper making
- Brewing
- Chemical and drug manufacture

1.2 FEATURES OF PROCESS COSTING

Process production has the following features which make it different from other types of manufacturing operations:

- Process operations are continuous i.e. they never stop, materials are continually being added to operations and output is continually being produced e.g brewing and paint making.

- Due to the continuous nature of operations, there is normally opening work in progress at the beginning and closing work in progress at the end of the accounting period.

- The output of one process becomes input to the next until the finished product is made in the final process.

- There is often a loss in process due to spoilage, wastage evaporation and so on.

- There could be more than one product produced from a common input. For example oil refinery may produce petrol, diesel, tar, etc. These products may be joint products or by products.

1.3 The main problems in process costing are:

- Preparation of process account
- Treatment of losses
- Valuation of work in progress
- Costing of joint and by products

2.0 PREPARATION OF PROCESS ACCOUNTS

The following example will be used to illustrate the preparation of a basic process account for a company operating a single process operation.

Information for the Process

In put to a process is 2000 kg of materials costing K2 million
Labour cost was K1 million
Production overheads are absorbed at 75% of labour cost
The process out put of 2000 kg was transferred to the warehouse for sale.

Required

Prepare a process account using the above information.

PROCESS 1 ACCOUNT					
	Units	K'000		Units	K'000
Direct materials	2,000	2 000	Output to process 2	2,000	3 750
Direct Labour		1 000			
Production overheads		750			
Totals	**2,000**	**3 750**	**Totals**	**2,000**	**3 750**

2.0 PROCESS LOSSES

During a production process, a loss may occur due to wastage, spoilage, evaporation and so on. These losses are dealt with as follows:

2.1 Normal loss

Normal loss is the expected amount of loss in a process. It is the level of loss or waste that management would expect to occur under normal operating conditions.

Normal loss is not given a cost. The cost of producing these units is borne by the good units.

2.2 Abnormal loss

Abnormal loss is the amount by which the actual loss exceeds the expected or normal loss in a process. It can also be defined as the amount by which actual production is less than normal production.

Abnormal loss is given a cost like good units.

2.3 Abnormal Gain

Abnormal gain is the amount by which actual output from a process exceeds the expected output. It is the amount by which actual loss is lower than expected loss.

Abnormal gain is given a value. The value of abnormal gain is calculated in the same way we calculate the cost per unit of abnormal loss. It is calculated as the cost of production divided by the expected units of output.

2.4 ILLUSTRATION – NORMAL LOSS

The following example will be used to demonstrate the accounting for normal loss, abnormal loss and abnormal gain.

In put to a process is 2,000 kg of materials costing K2 million
Labour cost was K 1million
Production overheads are absorbed at 75% of labour cost
The process out put of 1,800 kg was transferred to process 2
Normal loss is 10% of input

Required

Show the process account.

$$\text{Unit cost computation} = \frac{\text{Process cost}}{\text{Expected out (taking into account normal loss)}}$$

PROCESS ACCOUNT

	Units	K'000		Units	K'000
Direct materials	2,000	2 000	Output to process 2	1,800	3 750
Direct Labour		1 000	Normal loss	200	0
Production overheads		750			
Totals	**2,000**	**3 750**	**Totals**	**2,000**	**3 750**

2.5 ACCOUNTING FOR SCRAP

Loss may have a scrap value. The following basic rules are applied in accounting for this value in the process accounts.

(a) Revenue from scrap is treated, not as an addition to sales revenue, but as a reduction in process costs.

(b) The scrap value of normal loss is used to reduce the material costs of the process as follows

DEBIT Scrap account
CREDIT Process account
with the scrap value of the normal loss.

(c) The scrap value of abnormal loss is used to reduce the cost of abnormal loss as follows

DEBIT Scrap account
CREDIT Abnormal loss account
with the scrap value of abnormal loss, which therefore reduces the write-off of cost to the profit and loss account?

(d) The scrap value of abnormal gain arises because the actual units sold as scrap will be less than the scrap value of normal loss. Because there are fewer units of scrap than expected, there will be less revenue from scrap as a direct consequence of the abnormal gain. The abnormal gain account should therefore be debited with the scrap value.

DEBIT Abnormal gain account
CREDIT Scrap account
with the scrap value of abnormal gain.

(e) The scrap account is completed by recording the actual cash received from the sale of scrap as follows

DEBIT Cash received
CREDIT Scrap account
with the cash received from the sale of the actual scrap.

2.6 ILLUSTRATION – ABNORMAL LOSS

Input to a process is 2,000 kg of materials costing K2 million
Labour cost was K 1million
Production overheads are absorbed at 75% of materials cost
The process output of 1,700 kg was transferred to process 2
Normal loss is 10% of input

Required

Show the process account.

$$\text{Unit cost} = \frac{\text{Process cost}}{\text{Expected output}} = \frac{\text{K4,500,000}}{\text{1800 units}} = \text{K 2,500 per unit}$$

Valuation statement

Element of output	Units	Unit cost	Values
		K	K
Finished goods	1,700	2,500	4,250,000
Abnormal loss	100	2,500	250,000
Total			**4,500,000**

PROCESS ACCOUNT

	Units	K'000		Units	K'000
Direct materials	2,000	2,000	Output to process 2	1,700	4,250
Direct Labour		1,000	Normal loss	200	0
Production overheads		1,500	Abnormal loss	100	250
Totals	**2,000**	**4,500**	**Totals**	**2,000**	**4,500**

2.7 ILLUSTRATION – ABNORMAL GAIN

Input to a process is 2,000 kg of materials costing K2 million
Labour cost was K 1million
Production overheads are absorbed at 75% of materials cost
The process output of 1,900 kg was transferred to process 2
Normal loss is 10% of input

Required

Show the process account.

$$\text{Unit cost} = \frac{\text{Process cost}}{\text{Expected output}} = \frac{\text{K4,500,000}}{\text{1,800 units}} = \text{K2,500 per unit}$$

Valuation statement

Statement of valuation

Element of output	Units	Unit cost	Values
Finished goods	1,900	2,500	K4,750,000
Abnormal gain	100	2,500	K250,000
Total			K5,000,000

PROCESS ACCOUNT

	Units	K'000		Units	K'000
Direct materials	2,000	2,000	Output to process 2	1,900	4,750
Direct Labour		1,000	Normal loss	200	0
Production overheads		1,500			
Abnormal gain	100	250			
Totals	**2,100**	**4,750**	**Totals**	**2,100**	**4,750**

2.8 TREATMENT OF SCRAP VALUE

In order to illustrate the treatment of scrap value in process costing, the information in the above two illustrations (see paragraphs 2.6 and 2.7) will be used.

2.8.1 SCRAP VALUE AND ABNORMAL LOSS

All information as in paragraph 2.6 except that the loss has scrap value of K900 per unit. All the relevant accounts will appear as shown below.

$$\text{Unit cost} = \frac{\text{Process cost less scrap from normal loss}}{\text{Expected output}} = \frac{\text{K4,500,000} - \text{K180,000}}{\text{1800 units}} = \text{K 2,400 per unit}$$

Element of output	Units	Unit cost	Values
Finished goods	1,700	K 2,400	K4,080,000
Abnormal loss	100	K 2,400	K240,000
Total			**K4,320,000**

PROCESS ACCOUNT

	Units	**K'000**		Units	**K'000**
Direct materials	2,000	2,000	Output to process 2	1,700	4,080
Direct Labour		1,000	Normal loss	200	180
Production overheads		1,500	Abnormal loss	100	240
Totals	**2,000**	**4,500**	**Totals**	**2,000**	**4,500**

ABNORMAL LOSS ACCOUNT

	Units	**K'000**		Units	**K'000**
Process account	100	240	Cash/Bank	100	90
			P & L		150
Totals	**100**	**240**	**Totals**	**100**	**240**

NORMAL LOSS ACCOUNT					
	Units	**K'000**		Units	**K'000**
Process account	200	180	Cash/Bank	200	180
Totals	**200**	**180**	**Totals**	**200**	**180**

2.8.2 SCRAP VALUE AND ABNORMAL GAIN

All information as in paragraph 2.7 except that the loss has scrap value of K900 per unit. All the relevant accounts will appear as shown below.

$$\text{Unit cost} = \frac{\text{Process cost less scrap from normal loss}}{\text{Expected output}} = \frac{\text{K4,500,000} - \text{K180,000}}{\text{1800 units}} = \textbf{K 2,400 per unit}$$

STATEMENT OF VALUATION

Element of output	Units	Unit cost	Values
		K	K
Finished goods	1,900	2,400	4,560,000
Abnormal gain	100	2,400	240,000
Total			**4,800,000**

PROCESS ACCOUNT					
	Units	**K'000**		Units	**K'000**
Direct materials	2,000	2,000	Output to process 2	1,900	4,560
Direct Labour		1,000	Normal loss	200	180
Production overheads		1,500			
Abnormal gain	100	240			
Totals	**2,100**	**4,740**	**Totals**	**2,100**	**4,740**

ABNORMAL GAIN ACCOUNT					
	Units	**K'000**		Units	**K'000**
N/Loss	100	90	Process account	100	240
P & L		150			
Totals	**100**	**240**	**Totals**	**100**	**240**

NORMAL LOSS ACCOUNT					
	Units	**K'000**		Units	**K'000**
Process	200	180	Cash/Bank	100	90
			Again	100	90
Totals	**200**	**180**	**Totals**	**200**	**180**

3.0 COSTING OF WORK IN PROGRESS

At the end of a period there may be some units that have been started but have not been completed. These are called closing work-in-progress. The costing problem to be dealt with is how to attribute costs to such incomplete units. The process account below will help to highlight the problem.

PROCESS ACCOUNT					
	Units	K'000		Units	K'000
Direct materials	2,000	2,000	Finished goods	1,500	?
Direct Labour		1,000	Closing WIP	500	?
Production overheads		1,500			
Totals	**2,000**	**4,500**	**Totals**	**2,000**	**4,500**

As shown above, we have to apportion costs between finished output and the closing work in progress. Apportioning costs in proportion to the number of units of finished output and closing WIP would not be fair because the closing WIP units are still incomplete.

3.1 EQUIVALENT UNITS

To apportion costs fairly, we make use of the concept of equivalent units of production. Equivalent units are notional whole units which represent incomplete work, and which are used to apportion costs between WIP and complete output.

Example

Assume that in a given period production was 2,000 complete units and 600 partly complete. The partly complete units are deemed to be 75% complete.

Total equivalent production = Completed units + Equivalent units in W-I-P
= 2000 + ¾ x 600 = 2,450
= 2,450

3.2 EXAMPLE – CLOSING WORK-IN-PROGRESS

In a given period production and cost data were as follows:
Materials 3,200 units costing K10.23 million
Labour costing K7.904 million
Overheads costing K 6 million

Production was 2,800 fully complete units and 400 partly complete units. The degree of completion of the 400 units WIP was as follows:

Materials 75% complete
Labour 60% complete
Overheads 50% complete

Required

Calculate the total equivalent production, cost per unit and the value of WIP and the finished output.

	Equivalent Units			**Total Costs K'000**	**Cost Per Unit K'000**
Cost Element	Finished Output	Closing WIP	Total		
Material	2,800	300	3,100	10,230	3.30
Labour	2,800	240	3,040	7,904	2.60
Overheads	2,800	200	3,000	6,000	2.00
Total					**7.90**

Valuation of Closing Work-In-Progress

Cost Element	**Equivalent Units – WIP**	**Cost per unit K'000**	**Value K'000**
Material	300	3.3	990
Labour	240	2.6	624
Overheads	200	2.0	400
Total			**2,014**

Valuation of Finished Goods

Cost Element	Equivalent Units – WIP	Cost per unit K'000	Value K'000
Material	2,800	3.3	9,240
Labour	2,800	2.6	7,280
Overheads	2,800	2.0	5,600
Total			**22,120**

PROCESS ACCOUNT

	Units	K'000		Units	K'000
Direct materials	3,200	10,230	Finished goods	2,800	22,120
Direct Labour		7,904	Closing WIP	400	2,014
Production overheads		6,000			
Totals	**3,200**	**24,134**	**Totals**	**3,200**	**24,134**

3.3 OPENING WORK-IN-PROGRESS

Having dealt with closing WIP, it follows that there will be opening working in progress at the beginning of the subsequent period.

This opening WIP will be partially complete and have a value brought forward from the previous period sometimes broken down into various cost elements namely materials, labour and overheads each having a given level of completion and value.

There are basically two approaches for dealing with situations involving opening WIP which are:

- The weighted average cost method
- FIFO method

3.4 FIFO METHOD VALUATION

This method assumes that units are dealt with on a first-in-first out basis so that the first work to be done in a period is the completion of the opening WIP.

The effect of this is that the closing WIP is valued at current period costs and part of the previous period's costs brought forward in the opening WIP is attached to the cost of completed units.

3.5 THE WEIGHTED AVERAGE METHOD

Under this method the opening WIP values are added to the current costs to provide an overall average cost per equivalent unit.

The effect of this is that both closing WIP and completed units are valued using the same average cost.

Neither of the valuation methods can be said to be incorrect or correct, they are simply two different cost attribution methods used to value work in progress and completed output.

3.6 EXAMPLE

The following information relates to process 2 of a three stage process for the month of December 20X5. At the beginning of period 2 there was 800 units partly completed which had the following values:

Cost Element	Degree of Completion	K'000
Material transfer from Process 1	100%	24,600
Added Materials	55%	16,800
Labour	60%	9,600
Production Overheads	45%	7,200
Total		**58,200**

During the period 12 600 units were transferred from process 1 at a value of K139.5 million. The costs for the resources used in the current period were as follows:

Material	72,000
Labour	58,500
Overheads	54,600
Total	**185,100**

At the end of the period, the closing WIP was 1,800 units which were at the following stages of completion:

Cost Element	Degree of Completion
Material transfer from Process 1	100%
Added Materials	50%
Labour	45%
Production Overheads	40%

The balance of 13,500 was transferred to finished goods.

Required

Calculate the value of units transferred to finished goods and the value of closing WIP and prepare process account using:

i) Average cost method
ii) The FIFO method

AVERAGE COST METHOD

PROCESS ACCOUNT

	Units	**K'000**		Units	**K'000**
Opening WIP	2,400	58,200	Finished goods	13,500	350,960
Transfer from P1	12,900	139,500			
Direct materials		72,000	Closing WIP	1,800	31,840
Direct Labour		58,500			
Production overheads		54,600			
Totals	**15,300**	**382,800**	**Totals**	**15,300**	**382,800**

Cost Element	**Equivalent Units**			**Total Costs**			
	Finished Output	Closing WIP	**Total**	Current Period	Opening WIP	**Total Costs**	**Cost Per Unit**
Transfer from P1	13,500	1,800	**15,300**	139,500	24,600	**164,100**	10.73
Material	13,500	900	**14,400**	72,000	16,800	**88,800**	6.17
Labour	13,500	810	**14,310**	58,500	9,600	**68,100**	4.76
Overheads	13,500	720	**14,220**	54,600	7,200	**61,800**	4.35
Total					**58,200**	**382,800**	**15.27**

Valuation of Closing Work-In-Progress

Cost Element	Equivalent Units - WIP	Cost per unit	Value
Transfer from P1	**1,800**	**10.73**	19,306
Material	**900**	**6.17**	5,550
Labour	**810**	**4.76**	3,855
Overheads	**720**	**4.35**	3,129
Total			**31,840**

Valuation of Finished Goods

Cost Element	Equivalent Units - WIP	Cost per unit	Value
Transfer from P1	**13,500**	**10.73**	144,794
Material	**13,500**	**6.17**	83,250
Labour	**13,500**	**4.76**	64,245
Overheads	**13,500**	**4.35**	58,671
Total			**350,960**

FIFO METHOD

PROCESS ACCOUNT

	Units	K'000		Units	K'000
Opening WIP	2,400	58,200	Finished goods	13,500	351.707
Transfer from P1	12,900	139,500			
Direct materials		72,000	Closing WIP	1,800	31,093
Direct Labour		58,500			
Production overheads		54,600			
Totals	**15,300**	**382,800**	**Totals**	**15,300**	**382,800**

Cost Element	Equivalent Units			Total Units	Total costs K'000	Cost Per Unit K'000
	Finished Output	Closing WIP	Opening WIP			
Transfer from P1	13,500	1,800	(2,400)	**12,900**	**139,500**	10.81
Material	13,500	900	(1,320)	**13,080**	**72,000**	5.50
Labour	13,500	810	(1,440)	**12,870**	**58,500**	4.55
Overheads	13,500	720	(1,080)	**13,140**	**54,600**	4.16
Total					**324,600**	**14.21**

Valuation of Closing Work-In-Progress

Cost Element	Equivalent Units - WIP	Cost per unit K'000	Value K'000
Transfer from P1	**1,800**	**10.81**	19,465
Material	**900**	**5.50**	4,954
Labour	**810**	**4.55**	3,682
Overheads	**720**	**4.16**	2,992
Total			**31,093**

Valuation of Finished Goods

Cost Element	Equivalent Units - finished goods	Cost per unit K'000	Value K'000
Transfer from P1	**11,100**	**10.81**	120,035
Material	**12,180**	**5.50**	67,046
Labour	**12,060**	**4.55**	54,818
Overheads	**12,420**	**4.16**	51,608
Total			**293,507**

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. Give examples of industries which use process costing (1.0)
2. What are the key features of process operations (1.2)
3. What is normal loss (2.1)
4. What is abnormal loss (2.2)
5. What is abnormal gain (2.3)
6. How is scrap value treated in process costing (2.81)
7. Define equivalent units (3.1)
8. Mention two approaches for dealing with opening WIP (3.3)

EXAMINATION TYPE QUESTIONS

Dude Kings Limited produces a detergent paste by putting it through a single process. You are given the following details for period 2:

Input costs were 50,000 kilos at K496 per kilo
Labour costs for 16,000 hours at K1,100 per hour
Over heads costs were K12,600,000

You are also informed that:

i) Normal loss is 4%
ii) Scrap value of normal loss is K400 per kilo
iii) Finished output amounted to 30,000 units
iv) Closing WIP amounted to 12,000 units and was fully complete for materials, ⅔ complete for labour and ½ complete for overheads.
v) There was no opening WIP

REQUIRED

a) Prepare the process account for period 2 detailing the value of the finished units and the work-in-progress. **(10 marks)**

b) Prepare an abnormal loss account. **(2 marks)**

CHAPTER 13

PROCESS COSTING – BY PRODUCTS AND JOINT PRODUCTS

INTRODUCTION

The previous chapter introduced the process costing method including the treatment for losses and work in progress. This chapter will deal with further complications in process costing where two or more products are output from the same process. When this happens the output items are called joint products or by products. In this chapter, attention will be focused on how to apportion the common process costs between joint products and by-products.

CONTENTS

1. The nature of joint products and by-products.
2. Joint costs.
3. Costing joint products.
4. Costing by products.
5. Further processing decisions.

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Distinguish between joint products and by-products.
- Explain the treatment of joint products and by-products at the point of separation.
- Value by-products and joint products at the point of separation.
- Discuss the usefulness of the cost and profit data for joint products.
- Decide whether to further process products or not.

1.0 CONTRASTING JOINT PRODUCTS AND BY-PRODUCTS

A single process might produce a number of different products. For example a chemical process such as oil refining might produce several products such as diesel, petrol, paraffin and lubricants from a single process. Some of these products could be classified as joint products while others would be by-products.

1.1 Before going further, the following key terms would be defined:

- Joint products.
- By-products.
- Joint costs.
- Split-off point.

1.2 Joint products

Joint products are two or more products which are output from the same processing operation, but which are indistinguishable from each other up to their point of separation. They have significant or material sales value in relation to by-products.

1.3 By-products

A by-product is a supplementary or secondary product whose value is small relative to that of the principal product.

1.4 Split-off point

Split-off point in a manufacturing operation is the point during manufacture where two or more products are produced from a common process. Items produced at the split-off point are either sold in their current form or put through further processing before sale.

1.5 Joint costs

Joint costs or pre-separation costs are the costs incurred in a process up to the split-off point and must be apportioned amongst the products produced by the process.

1.6 WHAT EXACTLY SEPARATES A JOINT PRODUCT FROM A BY-PRODUCT?

Joint products have substantial sales value. They are regarded as important saleable items which should be costed separately and whose profitability should be analysed in the cost accounts.

The distinguishing feature of **a by-product** is its relatively low sales value in comparison to the main product. By-products are not an important saleable item and whatever revenue it earns is a bonus for the organization. Because of their relative insignificance, by products are not separately costed.

2.0 PROBLEMS IN ACCOUNTING FOR JOINT COSTS

The problems in accounting for joint products relate to two main issues, namely:

- How common costs should be apportioned between products in order to put value on closing stocks and the cost of sales for each product.

- Whether it is more profitable to sell a joint product at one stage of processing or to process the product further and sell it at a later stage

2.1 DEALING WITH COMMON COST

The problem of costing joint products concerns common costs, i.e. those processing costs shared between the units of eventual output up to their split-off-point.

Some method needs to be devised for sharing the common costs between the individual joint products for the following reasons:

- To put a value to closing stocks of each joint product.
- To record the costs and therefore the profit from each joint product
- To assist in pricing

2.2 Various methods might be used to establish the basis for apportioning or allocating common costs to each product including:

- Physical measurement
- Sales value at split-off-point
- Net realizable value

2.3 Example

A process produces three joint products with the following volume and sales values at the split-off point:

Product	Quantities in Kg	Selling price per Kg (Kwacha)
X	100,000	5,000
Y	20,000	10,000
Z	80,000	4,500

The cost incurred in the process prior to the separation point of these three products were K240 million.

Required

Show how the joint costs would be apportioned to each product on the basis of:

a) Physical quantities.
b) Relative sales value at the point of separation.

Solution: physical measures

a)	Product	Proportions		K'000
	X	100,000 / 200,000	X K240 million =	120,000
	Y	20000 / 200,000	X K240 million =	24,000
	Z	80,000 / 200000	X K240 million =	96,000
	Total			**240,000**

The sales values based on which the common cost is shared is determined as follows:

Workings for sales values at the split-off-point

Product	Quantities in Kg	Selling price per Kg Kwacha	K'000
X	100,000	5,000	500,000
Y	20,000	10,000	200,000
Z	80,000	4,500	360,000
Total sales value at split-off-point			1,060,000

b)

Product	Proportions		K'000
X	500/1,060	X K240 million =	113,208
Y	200/1,060	X K240 million =	45,283
Z	360/1060	X K240 million =	81,509
Total			240,000

2.4 THE NET REALIZABLE VALUE METHOD OF COST ALLOCATION

The net realizable value of a joint product is its sales value minus its further processing costs after the point of separation.

This is really a sales based method of apportionment which is used in situations where products are not sold at split-off-point but they are further processed.

2.5 EXAMPLE

Three joint products are produced from a common process:

Product	Quantities
X	20,000 Kilos
Y	5,000 Litres
Z	10,000 Litres

The joint costs of processing up to the point of separation are K166 million.

Product Z can be sold immediately after separation for K15,000 per litre. Product X needs further processing at a cost of K8,000 per kilo, before it is sold for K20,000 per kilo. Product Y also needs further processing at a cost of K2,000 per kilo, before it is sold for K7,000 per kilo.

Required

a) Using the net realizable value method apportion the joint process cost to the three products.

b) Calculate the profit or loss per unit for each joint product.

2.6 SOLUTION

a)

Step 1: Determination of net realisable values

		Product			
		X	Y	Z	Total
	Units	20,000	5,000	10,000	
	Final selling Price	20,000	7,000	15,000	
A	Final sales revenue (K'000)	400,000	35,000	150,000	
	Units	20,000	5,000	10,000	
	Further process cost per unit	8,000	2,000	-	
B	Total Further process costs (K'000)	160,000	10,000	-	
A - B	**Net realisable value (k'000)**	**240,000**	**25,000**	**150,000**	**415,000**

Step 2: Apportionment of joint costs using net realisable value

			K'000
X	240/415	X K160 000 =	92,530
Y	25/415	X K160 000 =	9,639
Z	150/415	X K160 000 =	57,831
Total costs apportioned			K160,000

b)

Profit Statement

Product	X	Y	Z
	K'000	K'000	K'000
Final sales revenue	400,000	35,000	150,000
Pre-separation costs	(92,530)	(9,639)	(57,831)
Further processing costs	(160,000)	(10,000)	
Profit	**147,470**	**15,361**	**92,169**
Units	20,000	5,000	10,000
Profit per unit (K'000)	**K7.37**	**K3.07**	**K9.22**

3.0 ACCOUNTING FOR BY-PRODUCTS

Since by products have very little sales value, it is pointless to try working out a cost and a profit for units of by products. By-products are incidental output, not main products.

3.1 Accounting treatment of revenue from by-products:

Method 1

Income from the sale of by-product may be added to the sales of the main product, there by increasing sales turnover for the period.

Method 2

Instead of adding the income from by-product sales to total sales income in the profit and loss account, deduct the sales value of the by-product from the common processing costs. The pre separation costs for apportioning between joint products is therefore the actual pre-separation costs minus sales value of the by-products.

4.0 EVALUATING THE BENEFIT OF FURTHER PROCESSING

A completely different costing problem arises when management decides what to do with joint products after the point of separation. A joint product might be in a condition to sell at the point of separation, but can also be processed further to sell at a higher selling price. In such cases management have to decide whether to sell the product immediately after the point of separation or whether to sell the product further before selling it.

4.1 Approach to the problem is as follows:

The pre-separation costs of the common processing of the joint products are irrelevant to the further processing decision. The joint costs are not affected by whether individual products are further processed, and are therefore not relevant to the decision under consideration.

In deciding whether to further process the individual product, incremental costs and revenues should be evaluated. Products whose additional revenue exceeds additional costs are the ones that should be further processed on financial grounds.

4.2 EXAMPLE

The following data relates to product X and Y produced from a joint process:

Product	Quantity Produced Kg	Sales at split-off- point	Further processing Costs	Sales price after further processing
A	100	25,000	K1,400,000 plus K10,000 per kg	K42,000
B	200	10,000	K800,000 plus K7,000 per kg	K22,500

Common costs prior to split-off point are K3.75 million.

Required

Should each product be sold at the split-off point or processed further before sale?

4.3 Solution

Products	X	Y
Sales price after further processing	42,000	22,500
Sales at split-off- point	25,000	10,000
Incremental revenue per unit	17,000	12,500
Number of units	100	200
Total incremental revenue	1,700,000	2,500,000
Incremental costs:		
Number of units (Kgs)	100	200
Variable cost per unit (Kwacha)	10,000	7,000
Total variable costs (Kwacha)	1,000,000	1,400,000
Fixed (Kwacha)	1,400,000	800,000
Total incremental costs (Kwacha)	2,400,000	2,200,000
Net revenue (cost) (Kwacha)	**(700,000)**	**300,000**

On the basis of this computation it recommended that Product X is sold at split-off and product Y is further processed.

Chapter summary

- Joint products are two or more products separated in a process, each of which has a significant sales value compared to the other.

- A by-product is an incidental product from a process which has insignificant sales value compared to the main product

- The split-off-point or separation point is the point at which joint and by-products become separately identifiable.

- Joint costs are pre-separation costs incurred up to the separation point

- The main methods of apportioning joint costs, each of which can produce significantly different results.

    - Physical measures
    - Sales value at split off-point
    - Net realisable method
- By-products are not costed, but revenue which they generate can be directly added to sales or be deducted from the process costs.

- Where there is a possibility to further process joint products, the decision must be made by comparing incremental costs and revenue.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. What are joint costs (1.2)
2. What are By products (1.3)
3. What is the split-off point (1.4)
4. What are joint costs (1.5)
5. Mention the methods used apportion common costs (2.2)
6. How is by-product accounted for? (3.1)
7. What is the decision rule for making further processing (4.1)

EXAMINATION TYPE QUESTIONS

Nitrogen Chemicals Ltd manufactures 3 chemicals, X Y and Z from a single joint process. The information below relates to the month of October 20X5:

Input into process	Direct materials 40000 kilos @ K6.4 Million
	Direct Labour @ K5.2 million
	Factory overheads @ 150% of prime cost input
Outputs from process	Chemical X - 2,500Kilos
	Chemical Y - 400Kilos
	Chemical Z - 500Kilos

By-product normally account for 15% of input.

During the month of October, by-products were actually 15% of input. This was sold for K1,500 per kilo and the proceeds from the sale were credited to the process account.

Selling Prices	Chemical X - K10,160
	Chemical Y - K12,645
	Chemical Z - K6,740

Required:

Calculate the total cost of each chemical X, Y and Z using the following methods for splitting joint costs:

a) Volume
b) Relative sales value.

CHAPTER 14

SERVICE COSTING

Introduction

In the previous chapters we have considered costing methods which are relevant to manufacturing operations. In this chapter we turn our attention to service costing, i.e. costing methods which are relevant to service organizations such as hospitals and education establishments. This costing method can also be used to cost output of service departments within an organisation. Service costing is widely used today because more and more entities are operating in the service industry rather than manufacturing.

CONTENTS

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Describe the circumstances in which service costing should be used.
- Explain the practical problems that can arise with the costing of services.
- Illustrate suitable cost units that can be used in a variety of different service operations.
- Carry out service cost analysis in service industry situations.
- Carry out service cost analysis in internal service situations.

1.0 What is service costing?

Service costing is a costing method concerned with establishing the costs, not of products but of services rendered.

1.1 When to use service costing

Service costing is used in the following circumstances:

- A company operating in the service industry will use service costing to cost its output to customers. Examples of service companies are telephone companies, power companies, auditing and management consulting firms.

- A service department such as IT department or repairs and maintenance within an organisation can use service costing methodology to cost the work done for various internal departments.

1.2 Service costing compared with product costing

The cost of direct materials will be relatively small compared with the costs of direct labour, direct expenses and overheads

Indirect costs will generally represent a higher proportion of total costs.

1.3 Comparison of a product and service

Specific characteristics of services that distinguish them from products are intangibility, simultaneity, perishability and heterogeneity.

- Intangibility – a service such as a hair cut is intangible.
- Simultaneity – the production and consumption of a service take place at the same time.
- Perishability – a service cannot be stored for future consumption.
- Heterogeneity – service provided cannot be exactly the same every time.

1.4 Service costs and cost units

A major problem in service industries is the selection of a suitable unit for measuring the service. It is not easy to decide what service is actually being provided and what measures of performance are most appropriate to the control of costs. Frequently a composite unit may be deemed more appropriate.

Some of the cost units used in different activities are given below:

Service	Cost unit
▪ Hotels	▪ Occupied bed-night
▪ Education	▪ Full time student
▪ Hospitals	▪ Patient days
▪ Passenger transport	▪ Passenger miles
▪ Accountancy	▪ Man hour

A service business may use several different units to measure the various kinds of service provided. For example a hotel with a restaurant and function rooms might use a different cost unit for each different service as shown below:

SERVICE	COST UNIT
▪ Restaurant	▪ Meals served
▪ Hotel service	▪ Guest days
▪ Function facilities	▪ Hours rented

2.0 COLLECTION, CLASSIFICATION AND ASCERTAINMENT OF COSTS

2.1 Once the appropriate cost unit has been identified, the next critical step is to design an information system to collect appropriate statistical data. It is the responsibility of the cost accountant to design and manage the system for recording and analyzing these costs.

2.2 In a transport company, this may involve recording kilometers day by day for each vehicle in the fleet. A log sheet is normally used to capture this information. Other relevant information could include fuel usage per vehicle and loads or weight transported.

2.3 For each service, broad cost categories should be designed for the purpose of cost analysis. Suitable cost codes would be required to identify the categories.

2.4 Example

The costs of a transport undertaking can be classified under the following broad headings:

- Operating and running costs
- Repairs and maintenance
- Annual direct expenses
- Administration

2.5 For better cost analysis, there would be a need to have sub-classification of costs. For example the annual fixed costs could be broken down as follows:

- Road licence
- Motor vehicle insurance
- Depreciation
- Vehicle testing

2.6 COST SHEETS

A cost sheet is a record of costs for each service provided. A typical cost sheet for a service would incorporate the following for the current details:

- Cost information under the appropriate headings
- Cost unit statistics
- Cost per unit
- Analyses based on the actual cost units

EXAMPLE – A COST SHEET FOR A RESTAURANT

Cost Sheet

Category	Cost - K
Food and Drink	1,125,000
Labour	1,125,000
Heating and Lighting	187,500
Consumables	112,500
Depreciation	100,000
Apportioned costs	750,000
Cleaners	87,500
Total	**3,487,500**
Number of meals served	375
Cost per meal	**9,300**

3.0 SERVICE COST ANALYSIS IN SERVICE INDUSTRIES

QUESTION

Dar Farms Ltd operates a fleet of trucks whose standard costs have been established as follows:

Item of expenditure	Kwacha
Loading cost :	
Labour (casual per hour)	10,000
Equipment depreciation- per week	160,000
Supervision - per week	160,000
Drivers' wages	500,000
Petrol per Kilometer	500
Repairs per Kilometer	250
Depreciation per week per vehicle	160,000
Supervision - per week	600,000
Other general expenses	1,000,000
Loading time per tonne - hours	1

There are ten drivers and ten trucks in the fleet. During a slack week only six journeys were made and the details are as shown below:

Journey	Tonnes carried One way	Distance KM One way
1	5	100
2	8	20
3	2	60
4	4	50
5	6	200
6	5	300

Required

Calculate the expected average full cost per tonne/kilometer for the week.

3.1 Solution

	Journeys						
Variable costs	1	2	3	4	5	6	Total costs
	K'000	K'000	K'000	K'000	K'000	K'000	K'000
Loading Labour	250	400	100	200	300	250	1,500
Petrol (both ways)	500	100	300	250	1,000	1,500	3,650
Repairs (both ways)	250	50	150	125	500	750	1,825
Total variable costs	1,000	550	550	575	1,800	2,500	6,975
Fixed costs							
Equipment depreciation- per week							160
Supervision - per week							160
Drivers' wages							500
Depreciation per week per vehicle							160
Supervision - per week							600
Other general expenses							1,000
Total costs							**9,555**

Journey	Tonnes carried One way	One way distance KM	Tonne / kilometers
1	25	500	12,500
2	40	100	4,000
3	10	300	3,000
4	20	250	5,000
5	30	1000	30,000
6	25	1500	37,500
Total			**92,000**

A cost per tonne kilometre $\frac{\text{K9,555,000}}{92000} = \boxed{\textbf{K103.86}}$

3.2 SERVICE COSTING FOR INTERNAL SERVICES

The service costing techniques and procedures used by service organizations can be used to cost the output of internal service departments.

But the question is why should we want to establish a cost for internal services provided by one department on behalf of another?

3.3 Service costing for internal services has two basic purposes:

- To control the costs in the service departments
    - Once cost per unit has been established, it can be compared with the target, budget or previous year's figures for the purposes of control.
- To control the costs of the user departments in the following ways:
    - The overhead costs of the user department will be established more accurately.
    - The user department is discouraged to make wasteful use of the service departments.
    - The user department may be prompted to obtain a similar service externally.

4.0 CHAPTER SUMMARY

- Service costing can be used by companies operating in a service industry and by service departments of organizations.
- Characteristics which distinguish a service from a product include:
    - Intangibility
    - Simultaneity
    - Perishability
    - Heterogeneity
- A common problem with service costing is that of identifying a suitable cost unit for costing purposes. As a result composite cost units are normally used.
- Cost per service unit $\dfrac{\text{Total costs for the period}}{\text{Number of service units per period}}$
- Service costing techniques are also used to establish costs for internal services which is a service provided by one department for another.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. What is service costing? (1)
2. How is service costing applied (1.1)
3. Mention some features of services that distinguish them from products (1.3)
4. Give examples of cost units commonly used in the service industry (1.4)
5. Give reasons for costing of internal services (3.3)

EXAMINATION TYPE QUESTIONS

A transport business operates a fleet of 10 vehicles. Operating data are as follows:

Cost Item	**K'000**	**Unit of measurement**
Purchase of vehicles (depreciated on a straight line basis over 4 years	500,000	For 10 vehicles
Vehicle disposal value (after 4 years)	20,000	per vehicle
Road fund licence and insurance	11,450	Per vehicle per year
Tyres (8 per vehicle and renewed every 40,000 km)	1,050	per tyre
Servicing (every 16,000 km)	3,250	per vehicle service
Fuel (consumption of 1 litre per 3.2 km)	5	per litre
Drivers (1 driver per vehicle)	90,000	per driver per year
Vehicle usage (in Kilometres)	80,000	Per vehicle per year

Required

Calculate the total vehicle operating costs per kilometre.

CHAPTER 15

STANDARD COSTING

INTRODUCTION

This chapter introduces you to the concept of standards, an idea which is fairly common to many day to day activities. For instance as a student of accountancy how many times have you heard your fellow students comment on the standard of tuition they are receiving. In a similar vain as a management accountant you can set a standard cost for products and services. This chapter looks at the uses of standard costing, the standard setting process and review of such standards.

CONTENTS

1. Standard cost.
2. Standard costing.
3. Types of standard.
4. Preparation of standard costs.
5. The need to review standards.

LEARNING OUTCOMES

After studying this chapter, you should be able to:

- Define standard cost and standard costing.
- Explain types of operations most suited for standard costing.
- Understand how standards are set.
- Explain why standards should be continuously reviewed.

1.0 INTRODUCTION

We shall start this chapter by defining the following terms:

- Standards
- Standard cost
- Standard costing

1.1 STANDARD

A standard is a benchmark measurement of resource usage, set in defined conditions.

1.2 STANDARD COST

A standard cost is the planned unit cost of the products, components or services produced in a period. The main uses of standard costs are in performance measurement, control, stock valuation and in the establishment of selling prices.
(CIMA *Official Terminology)*

A standard cost is built up using the following elements of cost:

- Labour.
- Materials.
- Variable overheads.
- Fixed overheads.

1.3 STANDARD COSTING

Standard costing involves the establishment of predetermined estimates of the costs of products or services, the collection of actual costs and the comparison of the actual costs with predetermined estimates. The predetermined costs are known as standard costs and the difference between standard and actual costs is known as a variance.

Standard costing was developed primarily for use in the manufacturing industry as a formal method for calculating the expected costs of products. It differs from general budgeting (which is normally concerned with the costs of sections of organisation), because it focuses on the cost of what the organisation produces – the units costs.

1.4 WHERE SHOULD STANDARD COSTING BE USED

Standard costing can be used in a variety of operations such as jobbing manufacture, process manufacture and mass production.

However, the greatest benefit can be gained by operations that are highly repetitive where the average or expected usage of resources can be determined. It is therefore most suited to mass production and repetitive assembly work.

1.5 COMPOSITION OF STANDARD COSTS

The composition of standard costs whether you are calculating the standard cost of a rubber washer, an aeroplane or ship replacement operation can be analysed into common elements. These are the same elements of cost that you have come across before in the earlier chapters:

Direct costs	**Indirect Costs**
Direct materials	Variable overheads
Direct Labour	Fixed overheads
Direct Expenses	

1.6 Traditionally these elements of cost are shown on a standard cost card like the one below:

STANDARD COST CARD

Direct materials		**K'000**
Material X	5kgs @ K20,000/Kg	100
Material Y	3Kgs @ K10,000/Kg	30
Direct Labour		
Grade A	6hrs @ K15,000/Hr	90
Grade B	8hrs @ K20,000/Hr	160
Variable Production overhead	14 Hrs @ 10,000/hr	140
Fixed Production overhead	14 Hrs @ 5,000/hr	70
Total standard cost		590

2.0 DERIVING STANDARDS

The responsibility for deriving standard costs should be shared between managers able to provide the necessary information about levels of expected efficiency, prices and overheads.

2.1 SOURCES OF INFORMATION FOR STANDARD SETTING

Element of cost	Source of information
Materials price	• Data from suppliers • Record of previous prices paid • Anticipated cost inflation • Anticipated demand for scarce supplies • Production schedules and bulk buying discounts • Seasonality of prices • Anticipated currency exchange rates
Material usage	• Product specification • Technical data from suppliers • Historical data on quantities used in the past • Observation of manufacture • Estimates of wastage • Quality of materials • Production equipment
Labour rate	• Current pay rates • Anticipated pay rises • The expected effects of bonus schemes • Equivalent pay rates of other employers • Changes in legislation • Grade of labour
Labour hours	• Data on previous output and efficiency levels • Results of formal observations (work study) • Anticipated changes in work practices or productivity levels • The level of skills of employees to be used
Overheads	• Accounting

2.3 THE USES OF STANDARD COSTING

Although standard costing has several uses, the two principal uses of standard costing are:

- To act as control device.
- To value stocks and production.

Other use of standard costing include

- To assist in budget setting.
- To provide a prediction of future costs to be used in decision making situations.
- To motivate staff and management by the provision of challenging targets.
- To provide guidance on possible ways of improving efficiency.

2.4 TYPES OF STANDARD

- **Ideal standard**- a standard which can be attained under perfect working conditions: no allowance is given for wastage, idle time and break downs.

- **Attainable standard**- a standard which assume efficient levels of operation, but which include allowances for normal losses waste and machine down time.

- **Current standard**- a standards based on current levels of efficiency in terms of allowances for breakdowns, wastage, losses and so on

- **Basic standard**- a standard established for use over a long period of time from which a current standard can be developed.

2.5 IMPACT OF STANDARDS ON EMPLOYEE BEHAVIOR

Type of standard	Impact
Ideal	The employees may feel that the goals are unattainable and so they will not work so hard.
Attainable	The employees are likely to be motivated to work harder as the standards are challenging but achievable
Current	Employees are unlikely to be motivated to do more than they are doing at the moment.
Basic	Employees are unlikely to be motivated by these standards which are easily achievable by employees.

2.6 PROBLEMS OF SETTING STANDARDS

Common problems encountered in the standard setting process include:

- How to deal with inflation
- Who to set efficiency standards
- How to incorporate the need for continuous improvement.

2.7 REVIEWING STANDARDS

Management should not think that once standards are set they would remain useful forever. Standards must evolve to reflect the organisation's changing methods and processes. Comparing out of date standards with actual results will provide misleading information.

Many organizations have adopted the approach of revising standards whenever changes of a permanent and reasonably long-term nature occur.

CHAPTER SUMMARY

- A standard cost is an estimated unit cost built from each element of cost.
- Standard costing is primarily used to value production and stocks and as a cost control tool.
- Standard costing is most suited to mass production and other repetitive operations.
- There are four types of standards namely ideal, attainable, current and basic.
- Standards should be revised when there is change of a permanent nature.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. Define a standard (1.1)
2. Define standard cost (1.2)
3. Define standard costing (1.3)
4. Mention some sources of information for preparing standards (2.1)
5. Mention four types of standards (2.4)

EXAMINATION TYPE QUESTIONS

From the following data prepare the standard cost card for one unit of the single product manufactured:

Direct materials:
10kg of material X @ K1 600 per kg
7.5kg of material Y @ K2 500 per Kg

Direct Labour:
Preparation 14 hours @ K3 750 per hour
Assembly 5 hours @ K5 000 per hour
The budgeted total overheads for one year are:

	K'000	Hours
Preparation department	88	20,000
Assembly department	150	24,000

The fixed overheads (included in the above figures) are K25 000 and K48 000 respectively.

The standard cost card should show sub totals for:

- Prime cost
- Variable production cost
- Total production cost

CHAPTER 16

VARIANCE ANALYSIS

INTRODUCTION

Having introduced the concept of standard costing in the previous chapter, this chapter will deal with the computation of cost variances and explanation of the possible causes of variances.

CONTENTS

1. Variance accounting.
2. Labour variances.
3. Material variances.
4. Overhead cost variances.
5. Causes of variances.

LEARNING OUTCOMES

After studying this chapter you will be able to:

- Know what is meant by variance and variance analysis.
- Understand the relationship between variances.
- Calculate cost variances.
- Explain the causes of variances.

1.0 VARIANCE ANALYSIS

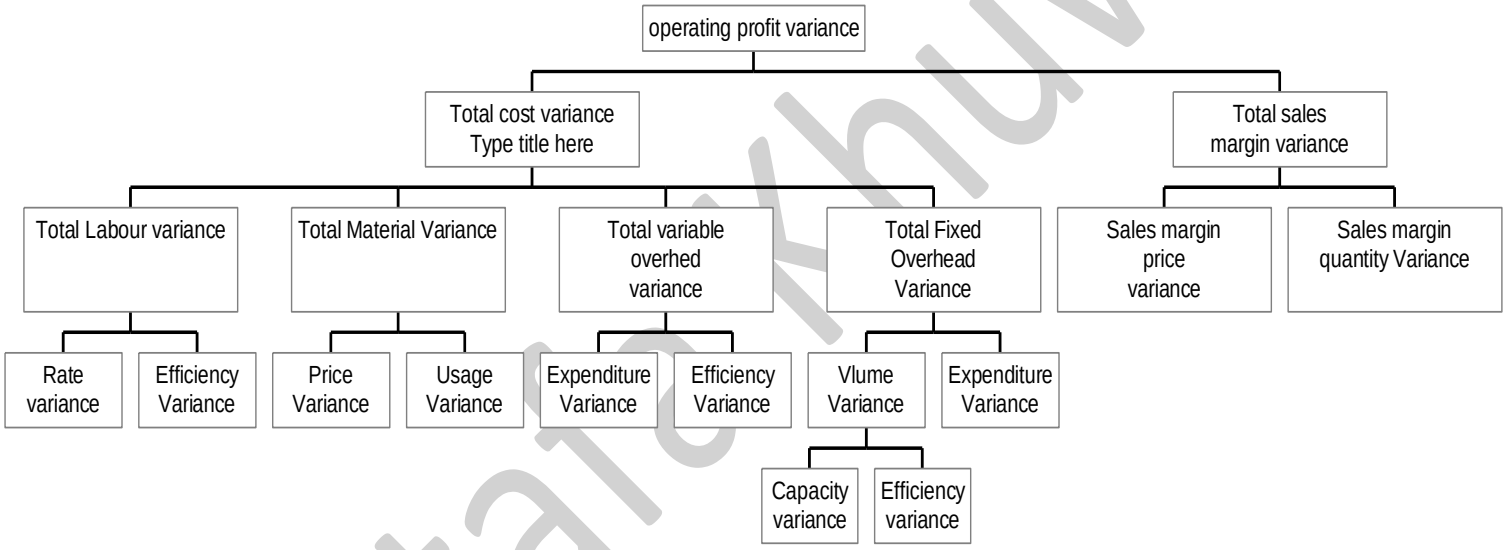
A variance is defined as:

The difference between a planned, budgeted, or standard cost and the actual cost incurred.

1.1 Variance analysis is defined as:

The evaluation of performance by means of variances, whose timely reporting should maximize the opportunity for managerial action.

Chart of common variances



When actual results are better than expected results we have a favourable variance and when the actual results are worse than the expected results, we have an adverse variance

1.2 Variances can be divided into three main groups

- Variable cost variance
- Fixed production overhead variances
- Sales variance (licentiate level material)

1.3 KEY ILLUSTRATION

The following example will be used to illustrate the computation of all cost variances.

Kipata manufacturing company produces a single product which is known as Kiwaya. The product requires a single operation and the standard cost for this operation is presented in the following standard costs card.

STANDARD COST CARD

		K'000
Direct materials		
Material X	0.5kgs @ K40,000/Kg	20
Direct Labour		
Grade A	2 hours @ K20,000/Hr	40
Variable Production overhead	2 hours @ K3,000/Hr	6
Fixed Production overhead	2 Hrs @ K37,000/hr	74
Total standard cost		140
Standard Profit		60
Standard Price		**200**

Budgeted output for June was 5,100 units. Actual results for June were as follows:

Production of 4,850 units was sold for K 1,042.75 million.
Materials consumed in production amounted to 2,300 kilos at a cost of K98.9 million
Labour hours paid amounted to 8,000 hours at a cost of K162 million
Actual variable overheads amounted to K26 million
Fixed over heads amounted to K423 million

REQUIRED

This information will be used to define and calculate the following variances:

1.40 TOTAL DIRECT MATERIAL COST VARIANCES

The direct material cost variance is the difference between what the output actually cost and what it should have cost in terms of materials.

Total direct material cost variances =

(Standard material cost per unit x Actual units produced) – (Actual cost of materials)

Using the data above:

DIRECT MATERIAL VARIANCE CALCULATION	
Standard material cost per unit	K20,000
Number of units produced	4,850 units
Actual cost =	K98,900,000
Total material variance =	(4,850 x K20,000) – (K98,900,000) **K 1,900, 000 (A)**

1.41 DIRECT MATERIAL PRICE VARIANCE

This is the difference between the standard cost and the actual cost of the actual quantity of materials used or purchased. In other words it's the difference between what the material did cost and what it should have cost.

Direct Material Price Variances =

(SP - AP) x QP
where:
SP = Standard Price
AQ = Actual Quantity
QP = Quantity Purchased

Using the data above:

DIRECT MATERIAL PRICE VARIANCE CALCULATION	
Standard material price per Kilo	K20,000
Quantity of materials purchased	4,850 units
Cost of materials purchased	K98,900,000
Material Price Variance =	[40,000 – (98,900,000/2300)] x 2,300 (40,000 – 43,000) x 2,300 **K6,900,000 (A)**

1.42 DIRECT MATERIAL USAGE VARIANCE

This is the difference between the standard quantity of materials that should have been used for the number of units actually produced and the actual quantity of materials used valued at the standard cost per unit of material.

Direct Material Usage Variances =

(SU - AU) x SP
Where:
SU = Standard Usage = Number of units produced x standard usage per unit
AU = Actual Usage
SP = Standard Price

DIRECT MATERIAL USAGE VARIANCE CALCULATION	
Standard Material price per Kilo	K20,000
Actual materials used	2,300 kilos
Standard material usage per unit	0.5 kg
Number of units produced	4,850
Material Usage Variance =	[(4,850 x 0.5)- 2300] x K40,000 (2,425- 2,300) x 40,000 **= K5,000,000 (F)**

1.50 TOTAL DIRECT LABOUR COST VARIANCES

The direct labour cost variance is the difference between what the output actually cost and what it should have cost in terms of labour.

Total direct labour cost variances =

(Standard labour cost per unit x Actual units produced) – (Actual cost of labour)

Using the data above:

DIRECT LABOUR COST VARIANCE CALCULATION	
Standard Labour cost per unit	K40,000
Number of units produced	4,850 units
Actual cost =	K162,000,000
Total material variance =	(4,850 x K40,000) – (162,000,000) **K 32,000, 000 (F)**

1.51 DIRECT LABOUR RATE VARIANCE

This is the difference between the standard cost and the actual cost of the actual number of hours used. In other words it is the difference between what the labour did cost and what it should have cost.

Direct Labour Rate Variances = (SR - AR) x AH
Where:
SR = Standard Rate
AH = Actual Hours
AR = Actual Rate

Using the data above:

DIRECT LABOUR RATE VARIANCE CALCULATION	
Standard Labour rate per hour	K20,000
Labour hours used	8,000 hours

Actual Labour cost	K162,000,000
Labour Rate Variance =	[(K20,000 – (K162,000,000,000/8,000)] x 8,000
	(20,000 – 20,250) x 8000
	K2,000,000(A)

1.52 DIRECT LABOUR EFFICIENCY VARIANCE

This is the difference between the standard of labour that should have been used for the number of units actually produced and the actual number labour hours used valued at the standard labour hour rate.

Direct Labour Efficiency Variances = (SH - AH) x SR
Where:

SH = Standard Hours for actual production = Number of units produced x standard usage per unit
AH = Actual Hours taken to produce the output
SR = Standard Rate per hour

DIRECT LABOUR EFFICIENCY VARIANCE CALCULATION

Standard Labour Hours per unit	K20,000
Actual Labour hours used	8,000 Hours
Standard Labour hours per unit	2 Hours
Number of units produced	4,850
Material Usage Variance =	[(4,850 x 2)- 8,000] x K20,000
	(9,700- 8,000) x K20,000 = **K34,000,000 (F)**

1.60 TOTAL VARIABLE PRODUCTION OVERHEAD VARIANCE

The difference between what the output should have cost and what it did cost in terms of variable production overheads.

TOTAL VARIABLE PRODUCTION OVERHEAD

(Standard Variable overhead cost per unit x Actual units produced) – (Actual cost of Variable production overheads)

Using the data above:

TOTAL VARIABLE PRODUCTION OVERHEAD COST VARIANCE CALCULATION	
Standard VOH cost per unit	K6,000
Number of units produced	4,850 units
Actual cost =	K2,600,000
Total VOH cost variance =	(4,850 x K6,000) – (K26,000,000) **K 3,100, 000 (F)**

1.61 VARIABLE OVERHEAD EXPENDITURE VARIANCE

This is the difference between the amount of variable overheads that should have been incurred in the actual hours actually worked and the actual amount of variable overheads incurred..

Variable production overhead expenditure Variances = (BVOH x AH) - AVOH
Where:
BVOH = Budgeted Variable Overhead Rate
AH = Actual Hours
AVOH = Actual Variable Overhead Rate

Using the data above:

VARIABLE OVERHEAD EXPENDITURE VARIANCE CALCULATION	
Budgeted Variable overhead rate per hour	K3,000
Labour hours used	8,000 hours
Actual Variable overhead Cost	K26,000,000
Variable overhead expenditure Variance =	(3,000 x 8000) – K26,000,000 K24,000,000 – K26,000,000 **K2,000,000 (A)**

1.62 VARIABLE OVERHEAD EFFICIENCY VARIANCE

This is the difference between the standard cost of the hours that should have been worked for the number of units actually produced and the cost for the units actually produced.

Variable Overhead Efficiency Variances = (SH - AH) x BVOH
Where:

SH = Standard Hours for actual production = Number of units produced x standard usage per unit
AH = Actual Hours taken to produce the output
BVOH = Budgeted Variable Overhead Rate

VARIABLE OVERHEAD EFFICIENCY VARIANCE CALCULATION

Budgeted variable overhead rate per hour	K3,000
Actual Labour hours used	8,000 Hours
Standard Labour hours per unit	2 Hours
Number of units produced	4,850
Variable overhead Efficiency Variance =	[(4,850 x 2)- 8,000] x K3,000 (9,700- 8,000) x K3,000 = **K5,100,000 (F)**

1.70 TOTAL FIXED OVERHEAD VARIANCES

The difference between fixed overhead incurred and fixed production overhead absorbed. In other words it is the under or over absorption.

TOTAL FIXED PRODUCTION OVERHEAD=

(Standard Fixed Overhead Cost per unit x Actual units produced) – (Actual cost of Fixed Production Overheads)

Using the data above:

1.71 FIXED OVERHEAD EXPENDITURE VARIANCE

TOTAL FIXED PRODUCTION OVERHEAD COST VARIANCE CALCULATION	
Standard FOH cost per unit	K74,000
Number of units produced	4,850 units
Actual cost =	K423,000,000
Total FOH cost variance =	(4,850 x K74,000) – (K423,000,000) **K64,100, 000 (A)**

This is the difference between the budgeted fixed overhead expenditure and actual fixed overhead expenditure.

Fixed production overhead expenditure Variances = (BFOH - AFOH)
Where:
BFOH = Budgeted Fixed Overhead
AFOH = Actual Fixed Overhead

Using the data above:

FIXED OVERHEAD EXPENDITURE VARIANCE CALCULATION	
Budgeted Fixed Overhead	K74,000 x 5,100 K377,400,000
Actual Fixed Overhead Cost	K423,000,000
Fixed Overhead Expenditure Variance =	K377,400,000 – K423,000,000 **K45,600,000 (F)**

1.72 FIXED OVERHEAD VOLUME VARIANCE

Fixed Overhead Volume Variance is the difference between actual and budgeted production/volume multiplied by budgeted fixed overhead absorption rate per unit.

Fixed production overhead Volume Variances =
(BV - AV) x BFOH
Where:
BV = Budgeted Volume
AV = Actual Volume
BFOH = Budgeted Fixed Overhead per unit

FIXED OVERHEAD VOLUME VARIANCE CALCULATION	
Budgeted Volume	5,100 Units
Actual Volume	4,850 Units
Budgeted Fixed Overhead rate per unit	K74,000
Fixed Overhead Volume Variance =	(4,850 – 5,100) x 74,000 **K18,500,000 (A)**

1.73 FIXED OVERHEAD VOLUME EFFICIENCY VARIANCE

This is the difference between the standard cost of the hours that should have been worked for the number of units actually produced and the cost for the units actually produced.

Fixed Overhead Efficiency Variances = (SH - AH) x BFOH
Where:

SH = Standard Hours for actual production = Number of units produced x standard usage per unit
AH = Actual Hours taken to produce the output
BFOH = Budgeted Fixed Overhead Rate

FIXED OVERHEAD VOLUME EFFICIENCY VARIANCE CALCULATION	
Budgeted Fixed overhead rate per hour	K37,000
Actual Labour hours used	8,000 Hours
Standard Labour hours per unit	2 Hours
Number of units produced	4,850
Fixed overhead Efficiency Variance =	[(4,850 x 2)- 8,000] x 37,000 (9,700- 8,000) x 37,000 = **K62,900,000 (F)**

1.74 FIXED OVERHEAD VOLUME CAPACITY VARIANCE

The difference between budgeted hours of work and the actual hours worked multiplied by the standard absorption rate.

Fixed Overhead volume capacity Variances = (AH - BH) x BFOH
Where:

BH = Budgeted hours to produce budgeted volume
AH = Actual Hours taken to produce the output
BFOH = Budgeted Fixed Overhead Rate

FIXED OVERHEAD VOLUME CAPACITY VARIANCE CALCULATION

Budgeted Capacity	5,100 x 2 10,200 Hours
Actual Labour hours used	8,000 Hours
Budgeted FOH rate per Hour unit	K37,000
Number of units produced	4,850
Fixed overhead Efficiency Variance =	(8,000 – 10,200) x K37,000
	= **K81,400,000 (A)**

2.0 THE REASON FOR VARIANCES

There now follows a list of possible cause of variances. This is not an exhaustive list and in an examination question you should review the information given and use your imagination and common sense to suggest possible reasons for variances.

VARIANCE	FAVOURABLE	ADVERSE
Material Price	Unforeseen discounts received Great care in purchasing Change in material standard	Price increase Careless purchasing Change in material standard
Material Usage	Material used of higher quality than standard More effective use made of	Defective material Excessive waste Theft

	material errors in allocating material to jobs	Stricter quality control Errors in allocating material to jobs
Labour Rate	Use of workers at a rate of pay lower than standard	Wage rate increase
Idle Time	*The idle time variance is always adverse*	Machine breakdown Non-availability of material Illness or injury to worker
Labour Efficiency	Output produced more quickly than expected, because of work motivation, better quality of equipment or materials Errors in allocating time jobs	Lost time in excess of standard allowed Output lower than standard set because of lack of training, sub-standard material etc. Errors in allocating time to jobs
Overhead Expenditure	Saving in costs incurred More economical use of services	Increase in cost of services Excessive use of services Change in type of services used
Overhead Volume	Production or level of activity greater than budgeted	Production or level of activity less than budgeted

Chapter summary

- Variances measure the difference between actual results and expected results.
- The direct material total variance can be subdivided into the direct material price variance and the direct material usage variance. Direct material price variance are extracted at the time of receipt of materials, not time of usage
- The direct labour total variance can be subdivided into direct labour rate variance and direct labour efficiency variance.
- The variable production overhead total variance can be sub divided into variable production overhead expenditure variance and the variable production overhead efficiency variance
- The fixed production overhead total variance can be subdivided into expenditure variance and volume variance. The volume variance can be subdivided into efficiency variance and capacity variance.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

1. What is variance analysis ?(1.0)
2. Mention the sub components of fixed overhead variance. (1.74)
3. Mention some causes of variances (4.0)

EXAMINATION TYPE QUESTIONS

DIRECT MATERIAL COST VARIANCES

1. C Ltd uses a standard costing system. The standard cost card for one of its products shows that the product should uses 4Kgs of material B per finished unit and the standard price per Kg is K4,500.

   For the month of April, the budgeted production level was 1,000 units and the actual units made were 1040 units. The actual material quantity of material B used was 4,100 Kgs. The cost of the material B which was purchased was K14.4 million.

   Required

   Calculate total material variances and analyse it into price and usage variances

DIRECT LABOUR COST VARIANCES

2. Z plc uses a standard costing system and has the following labour cost standard in relation to one of its products:

   4 hours direct labour @ K6,000 per hour = K24,000

   During October 20X5, 3,350 of these products were made which was 150 units less than budgeted. The labour cost incurred was K79,893,000 and the number of direct labour hours worked was 13,450.

   Required

   Calculate total labour variances and analyse it into rate and efficiency variances for the month of October.

FIXED OVERHEAD COST VARIANCES

3. A company budgets to produce 1,000 units of product E during august. The expected time to produce a unit of E is five hours, and the budgeted fixed production overheads is K20 million. The standard fixed production overhead cost per unit of product E will therefore be 5 hours @ K4,000 (=K20,000). Actual fixed production overhead expenditure in august turns out to be K20,450,000. The labour force manages to produce 1,100 units of product E in 5,400 hours of work.

Required

Calculate the following fixed production overhead variances

a) Total variance.
b) Expenditure variance.
c) Volume variance.
d) Volume efficiency variance.
e) Volume capacity variance.

CHAPTER 17

COST BOOKKEEPING

Introduction

This chapter introduces you to the concept of Cost Bookkeeping. This is a systematic way of recording cost accounting transactions in the books of accounts in order to facilitate the preparation of financial statements

CONTENTS

LEARNING OUTCOMES

After studying this chapter you should be able to:

- Understand the theory underlying cost bookkeeping.
- Record systematically cost accounting transactions in cost ledger accounts.
- Effectively carry out the double entry in the cost ledgers using integrated accounts and interlocking accounts.
- Differentiate interlocking accounts from integrated accounts.

1.0 INTRODUCTION

Cost book keeping is a systematic way of recording cost accounting transactions in the books of accounts in order to facilitate the preparation of financial statements relating to the calculation of profits or losses of products or services offered.

The key areas of cost accounting transactions are mainly those that relate to the elements of cost or principles of costing which are materials, labour and overheads. These three elements make up the total cost of a product or service.

1.1 Materials

Materials can be direct and indirect and can be raw materials, work in progress and finished goods. For direct materials we open in the cost ledger, stores control account or materials control account, work in progress account and finished goods account. For indirect materials we open the production overhead control account

1.2 Labour

Labour can be direct and indirect. For direct labour, in the cost ledger we open the wages control account and the work in progress accounts. For indirect labour we open the production overhead control account.

1.3 Overheads

All indirect costs are overheads. Overheads can be production and non-production .all overheads can be absorbed into products using various bases. We determine differences between actual overheads and absorbed overheads the results are over absorption or under absorption which increases or reduces the profits. The full double entry will be shown later.

2.0 THE DICHOTOMY

In the accountancy profession, there are three accounting dimensions: financial accounting, cost accounting and management accounting. In the recent years, the three dimensions have been reduced to only two; that is financial accounting and management accounting. Cost accounting is now part of management accounting.

Most manufacturing businesses adopt one of the following systems of cost accounting:

i) An independent system
ii) A reconciled system
iii) An integrated system
iv) An interlocking system

2.1 Independent System

In this system, no reconciliations are necessary between cost accounts and financial accounts. The two sets of accounts are kept separately. Some manufacturing businesses have adopted this system.

2.2 Reconciled System

In this system, financial accounts are independently kept from cost accounts. Both sets of accounts each produces a profit figure. The profit figures produced must be reconciled just as we reconcile the cashbook balance with a bank statement balance.

The reconciliation can begin from the financial profit figure and end with cost accounts profit figure, additions and subtractions have to be made taking into account items in cost accounts and items not in cost accounts. This system is also common to the interlocking system.

3.0 INTEGRATED SYSTEM

In this system, both financial accounts and cost accounts are linked together and presented as one set of accounts, the system uses one common system of input data. There is no need for the reconciliation since only one profit figure is arrived at. In this system there are resource accounts, accounts which record the cost of production items from the start of production work through to cost of sales as mentioned above, sales account, and profit and loss account.

By using the integrated system, savings in administration are made. The disadvantage is that the system is required to serve two purposes i.e. external reporting and internal reporting and this disadvantage has been overcome by the use of computers.

3.1 EXAMPLE

A LTD manufacturing company operating an integrated system had the following results for the year ended 31st December 2006:

Balances at 1/1/2006:

	K000
Raw materials control	25
Work in progress control	40
Finished goods control	56

Transactions for the year were:

	K000
Materials purchased on credit	100
Materials purchased for cash	10
Direct materials issued to production	80
Indirect materials issued	15
Direct wages incurred	50
Indirect wages incurred	20
Actual Selling and administrative overhead	12
Production completed and transferred to cost of sales	150
Production cost of sales	180
Credit sales	250
Depreciation production equipment	5
Direct and indirect wages paid	70

Production overhead is absorbed at the rate of 80 percent of actual direct wages.

Required

Prepare the following ledger accounts:

1. Raw materials control
2. Work in progress control
3. Finished goods control
4. Production overhead control
5. Wages control
6. Selling and administrative overhead control
7. Cost of sales
8. Trading and profit and loss.

SOLUTION

RAW MATERIAL CONTROL ACCOUNT

	K000		K000
Balance b/d	25	Work in progress control	80
Creditors	100	Production overhead control	15
Cash	10	Balance c/d	40
	135		135

WORK IN PROGRESS CONTROL ACCOUNT

	K000		K000
Balance b/d	40	Finished goods control	150
Raw materials control	80	Balance c/d	60
Wages control	50		-
Production o/head control	40		--
	210		210

FINISHED GOODS CONTROL ACCOUNT

	K000		K000
Balance b/d	56	Cost of sales	180
Work in progress control	150	Balance c/d	26
	206		206

PRODUCTION O/HEAD CONTROL ACCOUNT

	K000		K000
Raw materials control	15	Work in progress control	40
Wages control	20		-
Depreciation	5		-
	40		40

WAGES CONTROL ACCOUNT

	K000		K000
Bank	70	Work in progress control	50
		Production o/head control	20
	70		70

SELLING AND ADMINISTRATIVE O/HEAD CONTROL A/C

	K000		K000
Bank	12	Profit and loss	12
	12		12

COST OF SALES

	K000		K000
Finished goods control	180	Profit and loss	180
	180		180

TRADING AND PROFIT AND LOSS ACCOUNT

	K000		K000
Cost of sales	180	Sales-debtors	250
Gross profit c/d	70		
	250		250
		Gross profit b/d	70
Selling and admin overheads	12		
Net profit for the year	58		---
	70		**70**

4.0 INTERLOCKING SYSTEM

In an interlocking system, cost accounts and financial accounts are kept separately but are put together through the use of a cost ledger control account or are reconciled by other means such as a reconciled system described above. A cost ledger control account is an account that represents financial accounts that are not in the cost ledger such as cash, receivables, payables etc.

This system provides solutions to answers for internal reporting purposes and not external reporting.

STUDENT-SELF TESTING

SELF REVIEW QUESTIONS

6. Define cost book keeping
7. Explain fully the double entry for materials.
8. Describe fully the treatment of production overheads and non production overheads in cost accounts.
9. Define explain and give an example of an integrated system.
10. How are expenses dealt with in cost bookkeeping?
11. Differentiate between cost accounts and financial accounts and also between interlocking accounts and integral accounts.
12. Explain fully the key items that differentiate integral accounts from interlocking accounts.
13. Explain fully the double entry for the wages.

14. Over and under absorption are important to cost book keeping for both integral and interlocking accounts. Explain.
15. Explain how depreciation affects cost book keeping.

EXERCISES

QUESTION ONE – INTEGRATED SYSTEM

Prepare Journal entries without narrations for the following list of transactions:

1. Purchases of raw materials on credit K20 000
2. Raw materials issued to production K12 000
3. Maintenance materials issued K4 000
4. Cash paid for indirect production wages K10 000
5. Depreciation of machinery used for production K6 000
6. Absorption of production overhead K8 000

QUESTION TWO – INTERLOCKING SYSTEM

Given below are incomplete cost accounts for a period for which final accounts are to be prepared.

MATERIALS CONTROL ACOUNT

	K000		**K000**
Balance b/d	6 000	JLCA	19 000
G ledger control	27 000	Balance c/d	?

PRODUCTION WAGES CONTROL ACCOUNT

	K000		**K000**
G.Ledger control	25 000	JLCA	?
P.O.CONTROL	?	PROD O.CONTROL	?

PRODUCTION OVERHEAD CONTROL ACCOUNT.

	K000		**K000**
G.ledger control	26 000	Production wages control	?
P.wages control	?		
M.control	?		

JOB LEDGER CONTROL ACCOUNT

	K000		K000
Balance b/d	20 000	Cost of sales	?
M.control	19 000	Balance c/d	10 000
Wages control	?		
Prod.o/h control	?		

SELLING AND ADMINISTRATION O/HEAD ACCOUNT

	K000		K000
G ledger control	12 000	P&L	?
		Cost of sales	?

COST OF SALES

	K000		K000
JLCA	?	P&L	?
S&A O/H account	?		

SALES ACCOUNT

	K000		K000
P&L	?	G.Ledger control	110 000

GENERAL LEDGER CONTROL ACCOUNT

	K000		K000
Sales	110 000	Balance b/d	26 000
		M.control account	27 000
		Wages control	25 000
		Production o/head control	26 000
		S&A O/head	12 000
Closing balance	22 000	Net profit	?

80% of the production wages incurred are charged directly to jobs. Production overheads are absorbed at a predetermined rate of 150% of direct wages, and selling and administration overheads at 10% of sales.

Required

a. List characteristics of the cost accounting system which identifies the type of system being used.
b. List the missing amounts in the above accounts, determine the profit or loss for the period and list the balances to be carried forward to the following period.
c. What is the purpose of a cost ledger control account in an interlocking system?

ANSWERS TO EXAMINATION TYPE QUESTIONS

Chapter 1

Question 1 C

Question 2 B

Chapter 2

Question one

a) Indirect
b) Direct
c) Indirect
d) Indirect
e) Indirect
f) Indirect

Question two

1.1 Avoidable costs

Avoidable costs are specific costs of an activity or business which would be avoided if the activity or business did not exist.

1.2 Unavoidable costs

Unavoidable costs are costs which would be incurred whether or not an activity or sector existed.

1.3

A cost centre is an area of a business (a department, location, or item of equipment) in relation to which costs may be ascertained for cost control and product costing. Separate production and service departments in a factory may each be a cost centre for example. Alternatively, a department may consist of more than one cost centre where costs may be separately ascertained for each cost centre and an individual held responsible for the costs in each case.

A cost unit is a quantitative unit of a product or service in relation to which costs are ascertained. In manufacturing, cost units will be units of output produced within production cost centres. If the manufacturing unit is on a job order basis, the cost unit will be the individual jobs for the customers. If the manufacturing unit is a continuous process with output of homogeneous product, the cost unit will be a standardised quantity of output expressed in terms of units, weight or

volume. Similarly in a service operation costs may be related to either individual jobs or per unit of service such as cost per hour of service.

Chapter 3

	Activity	Cost(K'000)
High activity	42	6,700
Low activity	33	6,052
Change	9	648

Variable cost per unit $\frac{648}{9} = 72$

Fixed costs = Total cost - variable cost

	K'000
= 6700 - (72 x 42) =	**3,676**

Total cost at 75 units
= 3676 + (72 x 75) = **9,076**

Total cost at 90 units
= 3676 + (72 x 75) = **10,156**

Chapter 4

QUESTION 1: B

Cost of issues under the FIFO method

Issue		Value
500		1,250
1,000		2,750
1,600		4,480
800	=800/1200 x 3480	2,320
3,900		10,800

QUESTION 2: C

Cost of issues under the LIFO method

		K'000
Total Receipts		16,310
Less Issues		
1,200		3,480
900	=900/1600 x 4480	2,520
2,100		
1,500		4,350
300	=300/1600 x 4480	840
		11,190
Closing Stock		**5,120**

QUESTION 3: D

Cost of issues under the AVCO method

	Units	Average price	Value K'000
Receipts	500	2.50	1,250
Receipts	1,000	2.75	2,750
Receipts	1,600	2.80	4,480
Receipts	1,200	2.90	3,480
Total	**4,300**	**2.78**	**11,960**
Issue	(2,100)	2.78	(5,841)
Balance	2,200	2.78	6,119
Receipts	1,500	2.90	4,350
Total	**3,700**	**2.83**	**10,469**

Chapter 5

Question: 1 C

Reorder level = maximum Usage x maximum lead time

420 x 15 = 6,300

2 Maximum stock = reorder level + reorder quantity – (minimum usage x minimum lead time)

6,300 + 7,000 – (180 x 11) = 11,320

Question: 2 B

Minimum stock level = Reorder level – (average usage x average lead time)

6,300 – (350 x 13) = 1,750

Question: 3 B

3

$$\sqrt{\frac{\text{2 x 55,000x 4000}}{\text{200 + 10\% x 200}}}$$

$$\sqrt{\frac{440000000}{220}}$$

1,414

Chapter 6

Question 1a

	Chila		
Basic	(45 x 920)		41,400
Over time Premium - first 3 Hrs	(3 x 1/3 x 920)		920
Over time Premium - next 2 Hrs	(2 x 1/2 x 920)		920
Total			43,240
Bonus			
standard Time allowed (40 min x 72)		48	
Actual Time		45	
Saving		3	
Bonus Pay	(3 x 920 x 75%)		2,070
Total Pay			**45,310**

	Cheta		
Basic	(46 x 960)		44,160
Over time Premium - first 3 Hrs	(3 x 1/3 x 960)		960
Over time Premium - next 3 Hrs	(3 x 1/2 x 960)		960
Total			46,080
Bonus			
standard Time allowed (40 min x 188)		47	
Actual Time		46	
Saving		1	
Bonus Pay	(1 x 960 x 75%)		2,160
Total Pay			**48,240**

	Chulu	
Basic	(44 x 940)	41,360
Over time Premium - first 3 Hrs	(3 x 1/3 x 940)	940
Over time Premium - first 2 Hrs	(2 x 1/2 x 940)	940
Total		43,240
Bonus		
standard Time allowed (40 min x 432)	50.4	
Actual Time	44	
Saving	6.4	
Bonus Pay	(6.4 x 960 x 75%)	4,512
Total Pay		**47,752**

Question 1b

Net pay computation	Chila	Cheta	Chulu
Gross Pay	45,310	48,240	47,752
PAYE	(13,593)	(14,472)	(14,326)
NAPSA	(3,000)	(3,000)	(3,000)
Mukuba Pension	(2,500)	(2,500)	(2,500)
Net Pay	**26,217**	**28,268**	**27,926**

Question 1c

Journal Entry

	DR	CR
Wages Account	141,302	
PAYE		42,391
NAPSA		9,000
Mukuba Pension		7,500
Salaries Control		82,411
Total	**141,302**	**141,302**

Being wages cost for the month

Chapter 7

Solution 1.1

Answer is C

Solution 1.2

Answer is C

Solution 1.3

Answer is A

Solution 1.4

Answer is B

SOLUTION TWO

a)

Overhead Analysis Sheet						
Overhead	Basis of apportionment	Total overhead	Production departments		Service departments	
			Machining	Assembly	Stores	Maintenance
Indirect Material	Direct	245,000	100,000	80,000	50,000	15,000
Indirect Wages	Direct	275,000	90,000	60,000	70,000	55,000
Managers Salaries	No of employees	70,000	21,000	28,000	11,200	9,800
Depreciation of machinery	Value of Machinery	150,000	120,000	30,000	-	-
Heating and Lighting	Area	50,000	1,250	18,750	17,500	12,500
Building insurance	Area	25,000	625	9,375	8,750	6,250
Insurance of Machinery	Value of Machinery	100,000	80,000	20,000	-	-
Rent and rates	Area	75,000	1,875	28,125	26,250	18,750
Totals		990,000	414,750	274,250	183,700	117,300

b)

Overhead Analysis Sheet						
Overhead	Basis of apportionment	Total overhead	Production departments		Service departments	
			Machining	Assembly	Stores	Maintenance
		K'000	K'000	K'000	K'000	K'000
Totals		990,000	414,750	274,250	183,700	117,300
Maintenance		-	52,785	50,439	14,076	(117,300)
Stores		-	141,269	56,507	(197,776)	-
Total		**990,000**	**608,804**	**381,196**	-	-

Machining		Assembly	
	K'000		K'000
Over heads	608,804	Over heads	381,196
Machine hours	100,000	Machine hours	80,000
OHAR	K 6.09 per hour	OHAR	K4.76 per hour

c)

Total costs for Job X

		K'000
Direct Materials		2,000
Direct Labour		
Machining	(K5,000 x 1000 hrs)	5,000
Assembly	(K5,000 x 800 hrs)	4,000
Overheads		
Machining	(400hrs x K 6.09)	2,436
Assembly	(800hrs x K 4.76)	3,808
Total		**17,244**

Chapter 8

Part (a)

Absorption Cost Statement

	K'000
Sales (9,000 X K20)	180,000
Opening Stock	-
Production cost (11,000 x K12)	132,000
Closing Stock (2,000 x K12)	(24,000)
Cost of Sales	108,000
Gross Profit (K180,000 - K108,000)	**72,000**
Other Expenses	
Variable selling costs (K1 X 9,000)	(9,000)
Fixed selling costs (K2 x 10,000)	(20,000)
Under absorption (see working)	4,000
Net Profit	**47,000**

Part (b)

Marginal Cost Statement

	K'000
Sales (9,000 X K20)	180,000
Opening Stock	-
Production cost (11,000 x K8)	88,000
Closing Stock (2,000 x K8)	(16,000)
Variable Cost of Sales	72,000
Variable selling costs (9,000 x 1)	9,000
Total Variable costs	81,000
Contribution (K180,000-K99,000)	**99,000**
Fixed costs	
Production (10,000 x 4)	(40,000)
Selling (10,000 x 2)	(20,000)
Net Profit	**39,000**

Under/Over absorption

Fixed Production OH	K'000
Absorbed overheads	44,000
Actual overheads	40,000
Over absorption	4,000

Part (c)

Profit Reconciliation

	K'000
Absorption Cost Profit	47,000
Less : F/costs in C/stock	(8,000)
Profit as per marginal costing	39,000

Chapter 9

Traditional costing

Product	Units	Labour Hours	Total Hours
Matches	5,000	1	5,000
Candles	7,000	2	14,000
Budgeted Hours			19,000

Overhead Absorption rate = $\frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}}$

Overhead Absorption rate = $\frac{\text{K 285,000,000}}{\text{19,000}}$

= **K15,000 per hour**

Overhead absorbed per unit

Matches	1 x 15	15,000
Candles	2 x 15	30,000

b) Activity Based Costing approach

Cost per driver computation

Overhead costs	K'000	Number of cost drivers	Cost per Driver
Relating to Machine activity	220,000	22000- machine hours	K10,000 per Hr
Relating to production run set ups	20,000	50 - number of setups in the period	K400,000 per setup
Relating to handling of orders	45,000	75 - number of orders in the period	K600,000 per order
	285,000		

Overhead costs per unit

	Matches		Candles	
Relating to Machine activity	10 x 3 x 5,000	150,000	10 x 1 x 7,000	70,000
Relating to production run set ups	400 x 10	4,000	400 x 40	16,000
Relating to handling of orders	600 x 15	9,000	600 x 65	39,000
Total costs		163,000		125,000
Units		5000		7000
Cost per unit (K'000)		32.60		17.86

Chapter 10

Solution 1

		K
Salary cost per consulting hour (senior)	K2,000 x 86hrs	172,000
Salary cost per consulting hour (Junior)	K1,500 x 220hrs	330,000
Total Labour cost		502,000
Overhead absorption rate per consulting hour	K1,250 x 306hrs	382,500
Total cost		**1,386,500**
Profit Mark up	40 % of 1,386,500	554,600
Price for the assignment		**1,941,100**

Solution 2

a)

	Job X124	Job X125	Job X125
Material costs			
	Job X124	Job X125	Job X125
Direct Material issued from stores	697,800	1,899,400	1,222,100
Direct returned to stores		(700,000)	217,000
Direct Material transfers		86,000	(86,000)
Material Cost	697,800	1,285,400	1,353,100
Month 6 costs	722,000		
Total material costs	1,419,800	1,285,400	1,353,100
Labour costs			
Direct Labour hours	780	2,364	1,510
Rate Per hour	700	700	700
Labour cost	546,000	1,654,800	1,057,000
Month 6 costs	600,760		
Total labour cost	1,146,760	1,654,800	1,057,000
Production overhead			
Direct Labour hours	780	2,364	1,510
Overhead absorption Rate Per hour	1,200	1,200	1,200
Labour cost	936,000	2,836,800	1,812,000
Month 6 costs	1,041,600		
Total labour cost	1,977,600	2,836,800	1,812,000

b)

Total costs and profits	**Job X124**	**JobX125**
Total Production costs	4,544,160	5,777,000
Distribution, selling & admin costs	908,832	1,155,400
Total costs	5,452,992	6,932,400
Sales invoices	6,000,000	7,900,000
Profit	**547,008**	**967,600**

Chapter 11

SOLUTION

			K'000	K'000
	Contract Price		450,000	
	Cost to date	295,000		
	Estimated future costs	70,000		
	Estimated total costs		(365,000)	
	Estimated total profit		85,000	
(a)	Cost to date	295,000	X 85,000 =	**68,699**
	Estimated total costs	365,000		
(b)	Work certified	300,000	X 85,000 =	**56,667**
	Contract Price	450,000		

Chapter 12

a)

PROCESS ACCOUNT

	Units	K'000		Units	K'000
Direct materials	50,000	24,800	Finished goods	30,000	36,000
Direct Labour		17,600	Closing WIP	12,000	11,000
			A/Loss	6,000	7,200
Production overheads		12,600	N/Loss	2,000	800
Totals	**50,000**	**55,000**	**Totals**	**50,000**	**55,000**

b)

ABNORMAL LOSS ACCOUNT

	Units	K'000		Units	K'000
Process account	6,000	7,200	Cash/Bank	6000	2,400
			P & L		4,800
Totals	**100**	**7,200**	**Totals**	**100**	**7,200**

Workings

W1

	3.1.1.1 Equivalent Units				Total Costs K'000	Cost Per Unit K'000
Cost Element	Finished Output	A/Loss	Closing WIP	Total		
Material	30,000	6,000	12,000	48,000	24,000**	0.50
Labour	30,000	6,000	8,000	44,000	17,600	0.40
Overheads	30,000	6,000	6,000	42,000	12,600	0.30
Total						**1.20**

** K24,800- 800 beings scrap value of normal loss

W2

Valuation of Closing Work-In-Progress

Cost Element	Equivalent Units – WIP	Cost per unit K'000	Value K'000
Material	12,000	0.5	6,000
Labour	8,000	0.4	3,200
Overheads	6,000	0.3	1,800
Total			**11,000**

Valuation of Finished Goods

Cost Element	Equivalent Units – WIP	Cost per unit K'000	Value K'000
Material	30,000	0.5	15,000
Labour	30,000	0.4	12,000
Overheads	30,000	0.3	9,000
Total			**36,000**

W3

Valuation of abnormal Loss

Cost Element	Equivalent Units – WIP	Cost per unit K'000	Value K'000
Material	6,000	0.5	3,000
Labour	6,000	0.4	2,400
Overheads	6,000	0.3	1,800
Total			**7,200**

Chapter 13

	Units	Costs
Process costs		K'000
Direct materials	4,000	6,400
Direct Labour		5,200
Total Prime Costs		11,600
Factory overhead (150% of K11.6m)		17,400
Total Process Costs		29,000
Less By-product sales**	(600)	(900)
Joint costs to be apportioned	3,400	28,100

** Note the treatment of the sales value of the by-product which has been deducted from the process costs.

a)

Apportionment of joint costs using Volume

			K'000
X	2500 / 3,400	X 39,700 =	29,191
Y	400 / 3,400	X 39,700 =	4,671
Z	500 / 3,400	X 39,700 =	5,838
Total costs apportioned			**39,700**

Workings for sales values at the split-off-point

Product	Quantities in Kg	Selling price per Kg Kwacha	K'000
X	2,500	10,160	25,400
Y	400	12,645	5,058
Z	500	6,740	3,370
Total sales value at split-off-point			33,828

b)

Apportionment of joint costs using relative sales values at split-off

			K'000
X	25,400 / 33,828	X K28,100 =	20,662
Y	5,058 / 33,828	X K28,100 =	3,306
Z	3,370 / 33,828	X K28,100 =	4,132
	Total costs apportioned		**28,100**

Chapter 14

Cost Item	K'000
Depreciation of vehicles [(500,000- 20,000)/10] / 4	7,500
Road fund licence and insurance	11,450
Tyres (80,000/40,000) x 8 x 1050	16,800
Servicing (80,000)/16,000 x 3250	16,250
Fuel (80,000/10) x 5	40,000
Drivers	36,000
Total	128,000
Kilometres per year	80,000
Cost per Kilometre	**1.60**

Standard Cost Card		
Direct materials	Costs	
	K	K
10kg of material X @ K1,600 per kg	16,000	
7.5kg of material Y @ K2,500 per Kg	18,750	
Material cost		34,750
Direct Labour:		
Preparation 14 hours @ K3,750 per hour	52,500	
Assembly 5 hours @ K5,000 per hour	25,000	
		77,500
Prime Cost		**112,250**
The budgeted total overheads for one year are:		
Variable Overheads		
Preparation 14 hours @ K3,150 per hour	44,100	
Assembly 5 hours @ K4,250 per hour	21,250	
		65,350
Variable Production Costs		**177,600**
Fixed Overheads		
Preparation 14 hours @ K1,250 per hour	17,500	
Assembly 5 hours @ K2,000 per hour	10,000	
		27,500
Total Production Cost		**205,100**

WORKINGS

	Total	Fixed OH	Variable
Preparation	88,000,000	25,000,000	63,000,000
Assembly	150,000,000	48,000,000	102,000,000

Fixed Production OH	Cost	Hours	OH rate per Hour
Preparation	25,000,000	20,000	1,250
Assembly	48,000,000	24,000	2,000

Variable Production OH	Cost	Hours	OH rate per Hour
Preparation	63,000,000	20,000	3,150
Assembly	102,000,000	24,000	4,250

Chapter 16

SOLUTIONS

ONE – Direct Material Cost Variances

Total material cost variance

	K'000	
Actual units	1,040	
Standard cost per unit (4,500 x 4)	18,000	
Standard material cost	18,720	
Actual material cost	14,400	
Variance	4,320	F

Material Price variance = (SP - AP)AQ

	K'000
(4,500 - 14,400,000/4,100) x 4,100 =	4050F

Material Usage Variance = (SQ - AQ) x SP

[(1040x 4) - 4,100] x 4,500	270F

TWO – Direct Labour Cost Variances

Total labour cost variance

	K'000	
Actual units	3,350	
Standard cost per unit	24,000	
Standard labour cost	80,400	
Actual labour cost	79,893	
Variance	507	F

Labour Rate variance = (SR - AR)AH

	K'000	
(6,000 - 79,893,000/13,450) 13,450 =	807	F

Labour efficiency Variance = (SH - AH) x SR

[(3,350x 4) - 13,450] x 6,000	-300	F

THREE – Fixed Overhead Cost Variances

Total Fixed overhead variance

	K'000	
Actual units	1,100	
Standard cost per unit	20,000	
Standard labour cost	22,000	
Actual labour cost	20,450	
Variance	1,550	F

Expenditure Variance

	K,000	
Budgeted Expenditure	20,000	
Actual Expenditure	20,450	
Expenditure Variance	(450)	A

Volume Variance

Actual Volume (Units)	1,100	
Budgeted Volume (Units)	1,000	
Budgeted Rate per unit (K'000)	20	
Variance (K'000)	**2,000**	**F**

Volume Variance Efficiency

Standard Hours = 1100 units @5 hours	5,500	
Actual Hours	5,400	
Standard Rate per Hour (K'000)	4	
Variance (K'000)	**400**	**F**

Volume Capacity Efficiency

Actual Hours	5,400	
Budgeted Hours = 1000 units @5 hours	5,000	
Standard Rate per Hour (K'000)	4	
Variance (K'000)	**1,600**	**F**

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