

Unity University
College of Distance and Continuing education
Course Title: Cost and Management Accounting I
Course No: ACFN 211
Credit Hour: 3
Contact Hour: ECTS 3, 5 hours

Prerequisites(s): FUNDAMENTALS OF ACCOUNTING II
(ACFN 202)



College of Distance and Continuing education

Course Description

Accounting information is important for every business which will serve the needs of a variety of interested parties. To satisfy the needs of all interested parties, a sound accounting system is very essential. Accounting as a discipline is generally divided into three main parts: (i) Financial accounting; (ii) Cost accounting; and (iii) Management Accounting.

Financial Accounting is mostly concerned to record the business transaction in books of accounts so that the financial statements can be prepared. Cost accounting is developed to help the internal management in decision making. The information provided by cost accounting acts as a managerial tool so that businesses can utilize the available resources at optimum level. Management accounting is an extension of management aspects of cost accounting. It provides the information to management so that the managerial functions (planning, organizing, directing, and controlling) of business operations can be done in an orderly manner.

Cost and Management Accounting is taken as one of the best business investment a student could make. This is simply because success in any organization, whether it is a small corner store or a large multinational corporation requires the use of cost and management accounting concepts, techniques and practices.

Cost and management accounting provides key data to managers for planning and controlling of future activities in which the company engages.

Cost management accounting prepares students for the rewards and challenges they face in the competitive world of today and tomorrow. The course emphasize both the development of analytical skills such as excel to leverage available information technology and the values and behaviors that make students effective in their future career.

This module can be used in the way in which it is organized from simple to complex. The topics in the course covered all the major purposes of accounting basic cost concepts and classification, cost determination, cost accumulation & allocation through job-order and process costing, accounting for spoilage, rework and defective goods, accounting for joint & by product costs and finally the ABC costing systems will be discussed.

Course Objectives

After completion of the course, the students be able to:

- ✓ Distinguish the similarity & distinction between Cost accounting, Management Accounting & Financial Accounting.
- ✓ Describe a framework for Cost Accounting and Management Accounting
- ✓ Explain the concept of cost and its application in the three business organizations: service, merchandising & manufacturing.
- ✓ Describe the approaches to evaluating and implementing job-order and process costing systems
- ✓ Describe how cost Accounting supports management Accounting & Financial Accounting

Required Text Book

Main textbook:

- ✓ Charles T Horngren, Cost Accounting: A Managerial Emphasis, 9th Edition, Prentice Hall In

- ✓ Cost Accounting: A Managerial Emphasis 11th ed Prentice Hall, Inc. New Jersey Charles T.Horgren

Additional references:

- ✓ Introduction to Management Accounting: Prentice Hall New Jersey Charles T. Horngren
- ✓ Principles & practice of cost accounting 2nd ed. Wheeler & Co. Ltd. New Delhi
- ✓ Cost Accounting 3rd ed. John Wiley & Sons, Inc. New York 1991
- ✓ Principles of Cost Accounting 10th ed. South Western College Publishing Company, Ohio 1979.
- ✓ Horngren, Datar & Rajan. Cost Accounting: A Managerial Emphasis, 14th Ed. 2012
- ✓ Garrison. Noreen and Brewer, Managerial Accounting, 13th Ed
- ✓ Jain and Narang, Cost and Management Accounting, Kalyani Publisher, 2001 Edition
- ✓ Charles T Horngren, Cost Accounting, 8th Edition, Prentice Hall Inc.
- ✓ CharlesT Horngren, Introduction to Management Accounting Prentice Hall Inc

MODULE ONE: COST AND MANAGEMENT ACCOUNTING FUNDAMENTAL

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1.0 INTRODUCTION



Dear learner, welcome to the first unit of the course Cost and Management Accounting I. This unit is an introduction to cost and management accounting that identifies the need for general accounting system and purpose of accounting, compares management accounting, cost accounting, and financial accounting and described elements of management control and cost management.

1.1. LEARNING OBJECTIVES

Overview



Dear learner! At the end of the session you are expected to:

- gain and over view of accounting in general
- describe the need for general accounting system
- understand the purpose of cost accounting
- Compare and contrast management accounting, cost accounting, and financial accounting.
- Understand how accounting can facilitate planning, and decision making.

1.2. COST AND MANAGEMNENT ACCOUNTING

After you are completing this section you should be able to provide an overview of accounting in general, the need for general accounting system, purpose of cost accounting, and compare and contrast management accounting, cost accounting, and financial accounting.

1.2.1. Overview of Accounting In General

Accounting is the system that measures business activities, processes that information into reports, and communicates these findings to decision makers. Financial statements are the documents that report on an individual or an organization's business in monetary amounts.

Is our business making a profit? Should we start up a new line of women's clothing? Are sales strong enough to warrant opening a new branch outlet? The most intelligent answers to business questions like these use accounting information. Decision makers use the information to develop sound business plans. As new programs affect the business's activities, accounting takes the company's financial pulse rate. The cycle continues as the accounting system measures the results of activities and reports the results to decision makers.

1.2.2. The Need For General Accounting Systems

The accounting system is the principal and the most credible quantitative information system in almost every organization. This system should provide information for four broad purposes.

Purpose 1: Internal routine reporting to managers for (a) cost planning and control of operations, and (b) performance evaluation of people and activities.

Purpose 2: Internal routine reporting to managers on the profitability of products, brand categories, customers and distribution channels, and so on. This information is used in making decisions on resource allocation and in some cases decisions on pricing.

Purpose 3: Internal non-routine reporting to managers for strategic and tactical decisions on matters such as formulating overall policies and long-range plans, new products development -investing in equipment and special orders or special situations.

Purpose 4: External reporting through financial statements to investors, government authorities, and other outside parties. To satisfy external purposes, businesses must report income and inventory costs, in accordance with the generally accepted accounting principles that guide financial accounting.

1.2.3. Purpose of Cost Accounting

The rule (or purpose) of cost accounting may be summarized as follows:

PLANNING: the cost accounting system provides vital information needed to plan future operations, cost data help to resolve questions relating to proposed projects or policies, such as the following:

- Should we build a new plant or modernize the old one?
- How far can we go in lowering prices to increase our volume of sales?
- What will be the effects on costs of automating part of our factory operations?

BUDGETING: cost accounting is also in preparing a company's budgets. A budget is the overall financial plan for the future activities. All levels of the management should be involved in the development of budgets.

CONTROLLING COSTS: Cost accounting is one of the most available management tools to control operations. Company actual costs with budgeted costs are helpful in evaluating the results of operations. The difference between the two sets of cost figured can be noted and investigated while there is still time to take remedial (corrective) actions.

DETERMINING PROFITS: one of the objectives of cost accounting is the consistent allocation of manufacturing costs to units in the ending inventory and to units sold during the period. At the end of the fiscal year, the matching of costs with revenues determines profits for the period.

PRODUCT PRICING: management's pricing policy should assure not only the recovery of all costs but also the securing of a profit even under adverse conditions.

CHOOSING AMONG ALTERNATIVES: managers are constantly faced with the existence of not just one or two alternatives but numerous alternative choices of action that might be taken in any given situation facing a firm. The cost and management accounting system assists the managers in arriving at a correct decision by presenting suitable analysis of the costs associated with the alternatives at hand. Cost accounting, for example, is a source of information concerning different alternative course of action such as make or buy, continue or discontinue production, developing new product or not, etc.

ESTIMATING AND BIDDING: in certain trades, knowledge of the costs of doing business is needed to estimate job or to bid for other jobs or contracts. The order generally goes to the lowest bidder under competitive pressure; the decisive difference in a bid may be as little as fraction of a cent per unit. Attempting to bid without detailed cost

information can mean losing the job or it can mean winning the job but having to perform the work at a loss. Either result is undesirable.

1.2.4. Management Accounting, Cost Accounting, And Financial Accounting

Cost accounting provides information for both management and financial accounting. Cost accounting measures and reports financial and non-financial information relating to the cost of acquiring or utilizing resources in an organization. Cost accounting includes those parts of both management accounting and financial accounting in which cost information is collected or analyzed.

Items of difference	Cost accounting	Management Accounting
Applicability	It is generally applicable to manufacturing concerns	Management accounting methods and techniques are applicable to all concerns
Accounting principles	It is used in accordance with the IFRS Double entry principles can be applied in cost accounting	It is not constrained by IFRS Double entry principle is not applied in the case of management accounting
Future activities	Cost accounting does not attach importance to future activities	Future activities are primarily considered.



Learning Activity 1.1

Answer the following questions.

1. The accounting system should provide management accounting information for four broad purposes. Describe them.

2. Distinguish between management accounting and financial accounting?

13. MANAGEMENT PROCESS AND ACCOUNTING

After completing this section you are able to provide an overview of elements of management control and cost management and accounting system.

13.1. Element of management control

Planning and control

There are countless definitions of planning and control.

Planning: is defined as (the top box) choosing goal, predicting results under various alternative ways of achieving those goals, and then deciding how to attain the described goals.

Management decisions
The daily sporting news

Management Accounting
system

PLANNING
Increase advertising
rates by

BUDGETS
Expected, advertising,
pages, rate per page

Financial
representatio
n of plans

<p>CONTROL ACTION Charging advertisers new rates</p> <p>PERFORMANCE EVALUATION *Advertising revenues 5.4% lower than</p>	<p>Accounting system</p> <ul style="list-style-type: none"> * Source documents (invoices to advertisers and their payments) * Recording in subsidiary and general ledgers 	<p>Recording of actions and classifying them in</p>
	<p>PERFORMANCE REPORT *Actual advertising pages, average rate per page and revenue</p>	<p>Report of actual comparing budgets with actual results</p>

Exhibit 1.1 How Accounting facilitates, planning and control

Planning and control are strongly intertwined that managers do not spend time drawing artificially rigid distinctions between them. Control can be used in its broadest sense to denote the entire management process of both planning and control. For example, management control system can be referring as management planning and control system.

Do not underestimate the role of people in management control systems. Both accountants and managers should always remember that management control systems are not confined exclusively to technical matters such as the type of computer systems used and the frequency with which reports are prepared. Management control is primarily a human activity that should focus on how to help individuals do their jobs better.

1.3.2. Cost management and Accounting systems

The term cost management is widely used in businesses today. Unfortunately, there is no uniform definition. We use cost management to describe the approaches and activities of managers in short-run and long-run planning and control decisions that increase value for customers and lower costs of products and services. For example, managers make decisions regarding the amount and kind of material being used, changes of plant processes, and changes in product designs.

Information from accounting systems helps managers make such decisions, but the information and the accounting systems themselves are not cost management.

Cost management has a broad focus. For example, it includes but is not confined to - the continuous reduction of costs. The planning and control of costs is usually inextricably linked with revenue and profit planning. For instance, to enhance revenues and profits, managers often deliberately incur additional costs for advertising and products modifications.

Cost management is not practiced in isolation. It is an integral part of general management strategies and their implementation. Examples include programs that enhance customer satisfaction and quality, as well as programs that promote "blockbuster" new products development.



Learning Activity 1.2

Answer the following questions.

1. What are the major differences between cost accounting and management accounting?

1.4. COST CLASSIFICATION CONCEPTS AND TERMS

In managerial accounting, the term cost is used in many different ways. The reason is that there are many types of costs, and these costs are classified differently according to the immediate needs of management. For example, managers may want cost data to prepare external financial reports, to prepare planning budgets, or to make decisions. Each different use of cost data demands a different classification and definition of costs. For example, the preparation of external financial reports requires the use of historical cost data, whereas decision-making may require current cost data.

This unit is concerned with the possible uses of cost data and the various cost classification systems that accountants have developed to facilitate management's allocation of resources to the firm's various activities. Although it emphasizes the problems of manufacturing enterprise, the concepts discussed here are also appropriate for non-manufacturing firms.

1.4.1 Costs in general

From accounting point of view, cost may be defined as a sacrifice of giving up of economic resources for particular purposes, usually in an exchange for some goods or services. The economic resource given up is measured in monetary units. It can be cash payment, usage of existing non-monetary assets, or assuming liability.

Cost is distinguished from expense, which is the value of assets given up to generate revenue. Clearly, most costs eventually become expenses. In fact some become expenses virtually at the same time as the costs are incurred. When this is true, the terms cost and expenses are interchangeably used. For example, if a firm buys supplies only as the

supplies are needed and if the supplies are used immediately to help generate sales, the outlay for supplies is usually called an expense. But in facts there was both a cost and an expense involved. The distinction between a cost and an expense can be made clearer if you change the example slightly. Consider a firm that buys supplies in bulk and uses them overtime. Now the cost of supplies is the value of the assets given up to acquire the inventory of supplies. The expense for supplies will be the values of the assets (supplies) that are given up (used) during a particular period to generate revenues.

1.4.2 Cost Accumulation and Assignment

A cost system typically accounts for costs in two broad stages:

- (1) It accumulates costs by some " natural" classification such as raw materials used, fuel consumed, or advertising placed , and then
- (2) It allocates (traces) these costs to cost objects. Thus, cost accumulation involves the collection of cost data in an organized way by some "Natural" classification, whereas cost assignment allocation is a general term that encompasses both cost tracing and cost allocation, cost tracing is the assigning of direct, costs, to the chosen cost object. Cost allocation is the assigning of indirect costs to the chosen cost object

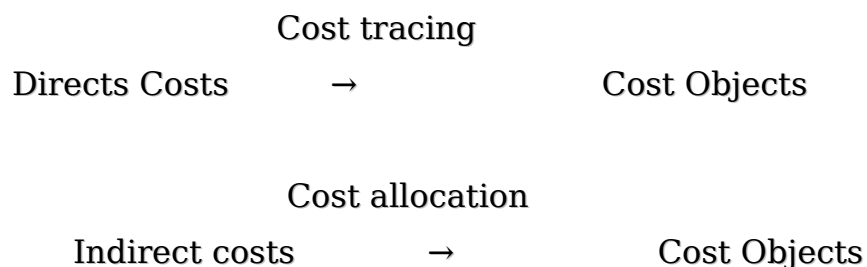


Exhibit 1.2 Cost Tracing and Allocation

Cost objects are chosen not for their own sake but to help decision making. A cost object is defined as any activity for which a separate measurement of costs is desired. Examples of cost objectives include

departments, facilities, stores, divisions, products, sales territories, kilometers driven, patients seen, student hours taught, and product lines.



Learning Activity 1.3

Answer the following questions.

1. What is cost objects?

2. What do you understand from the concepts of cost accumulation and cost assignment?

1.4.3. Cost Classification

Accountants have developed cost classifications that help to establish responsibility for resource utilization and to plan the activity levels of departmental cost units. The following are the different cost classification approaches:

- a) General cost classifications
- b) Product costs versus period costs
- c) Cost classifications for assigning costs to cost objects
- d) Cost classification for decision -making

General cost classifications

(Manufacturing Vs Non-manufacturing costs)

Classification of costs as manufacturing and non- manufacturing costs depends on whether the costs are considered direct costs in relation to the firm's manufacturing activities taken as a whole.

Most manufacturing companies divide manufacturing costs, often called production cost or factory cost, into three broad categories:

i) Direct materials ii) direct labor, and iii) Manufacturing overhead.

A discussion of each of these categories follows:

Direct materials: are those materials that become an integral part of the finished products and that can be physically and conveniently traced to it. Examples include:

- Lumber used to manufacture furniture
- Cotton to produce garment
- Cements and bricks to construct building
- Plastic to make toy

Direct labor: the term direct labor is reserved for those labor costs that can be easily (i.e. physically and conveniently) traced to individual units of products.. Direct labor is sometime called touch labor, since direct labor workers typically touch the products while it is being made. Examples include:

- the wages of machine operators in a factory
- The wages of Assemblers who make automobiles
- The wages of construction workers who build houses, and
- The labor costs of bricklayers.

Some labor such as that of janitors, forklift truck operators, plant guards and storeroom clerks is considered to be indirect because it is impossible or economically infeasible to trace such activity to specific products.

Manufacturing overhead: Manufacturing overhead, the third element of manufacturing costs, include all costs associated with the manufacturing process that are not classified as direct material or direct labor. It encompasses three types of costs: indirect material, indirect labor, and other manufacturing costs.

Various names are used for manufacturing overhead, such as indirect manufacturing cost, factory overhead, factory burden, overhead pool, factory expenses, manufacturing expense, and indirect factory expenses. All of the terms are synonymous with manufacturing overhead.

Indirect materials: materials needed for the completion of a production, but are insignificant in cost and cannot be conveniently traced to the units produced, are termed indirect materials. Examples of indirect materials include glue and screw used to put wooden items together, welding materials used to weld metallic items, and factory supplies such as lubricating oil, grease, and cleaning materials.

Indirect labor: Labor that do not work directly on the product but whose services are necessary for the manufacturing process, are classified as indirect labor. Such personnel include janitors in the factory, production departments supervisors, employees engaged in repairs and maintenance on production equipment, plant security guards and storeroom clerks.

Other manufacturing costs: All manufacturing costs other than indirect materials and indirect labor are classified as other manufacturing costs. Examples include:

- Rental costs on factory building
- Depreciation on factory building
- Costs related to heat, light and power used by factories
- Repair and maintenance costs on factory machines and equipments, and
- Insurance and property taxes on manufacturing facilities

Other manufacturing costs also include overtime premiums and the cost of idle time.

To summarize manufacturing costs include directs material, directs labor, and manufacturing overhead. Direct materials and directs labor are often referred to as prime costs. They are called so because direct materials

and direct labor makes significant portion of production costs in the past. Direct labor and overhead are often called conversion costs. This term stems from the facts that direct labor costs and overhead costs are incurred in the conversion of raw material into finished products.

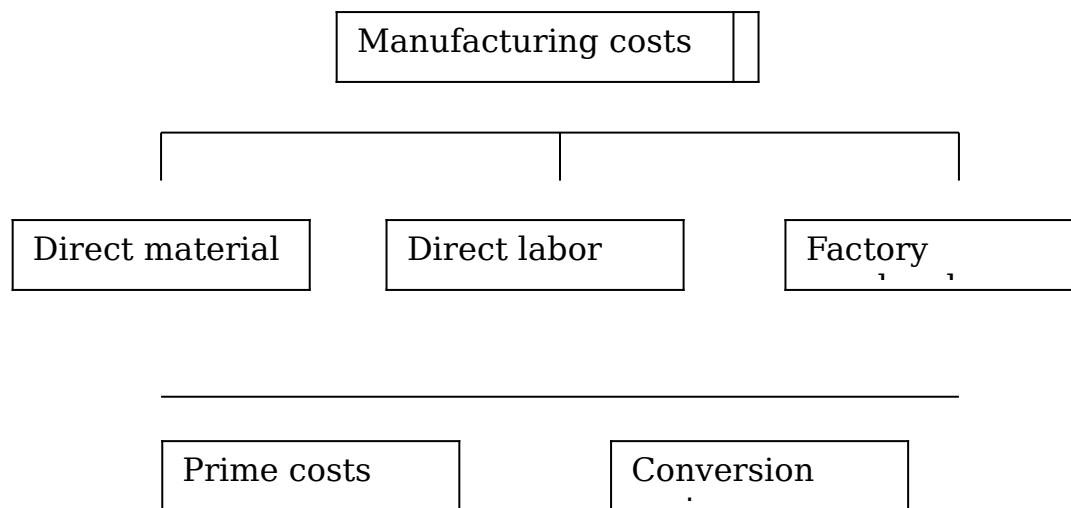


Exhibit 1.3 manufacturing costs

In addition to manufacturing costs, an understanding of non-manufacturing costs is very helpful. Generally, non-manufacturing costs or commercial expenses fall into two large categories.

1. marketing (distribution or selling) costs
2. Administrative (General and administrative) costs

Marketing or selling costs: include all costs necessary to secure customer orders and get the finished product or service into the hands of the customer. These costs are often called order-getting and order-filling costs. Examples of marketing costs include advertising, shipping, sales commissions, sales salaries, and costs of finished goods warehouse.

Administrative costs: include all executive, organizational, and clerical costs associated with the general management of an organization rather than with manufacturing, marketing, or selling. Examples of

administrative costs include executive compensation, general accounting, secretarial, public relations, and similar costs involved in the overall, general administration of the organization as a whole.



Learning Activity 1.4

Answer the following questions.

1. Identify the three elements that make up manufacturing costs?

2. Compare and contrast prime costs and conversion costs?

3. Firms usually classify non-manufacturing costs as either marketing costs or administrative costs. How do these two types of costs differ?

Product costs versus period costs

Product costs

For financial accounting purposes, product costs include all the costs that are involved in acquiring or making a product. In the case of manufactured goods, these costs consist of direct materials, direct labor, and manufacturing overhead. Product costs are viewed as “attaching” to units of product as the goods are purchased or manufactured, and they remain attached as the goods go into inventory awaiting sale. So initially, product costs are assigned to an inventory accounts on the balance sheet. When the goods are sold, the costs are released from inventory as

expense (typically called cost of goods sold) and matched against sales revenue. Since product costs are initially assigned to inventories, they are also known as inventoriable costs.

It is important to emphasize that product costs are not necessarily treated as expenses in the period in which they're incurred. Rather, as explained above, they are treated as expense in the period in which the related products are sold. This means that a product cost such as direct materials or direct labor might be incurred during one period but not treated as an expense until a following period when the completed product is sold.

Period costs

Period costs are all costs that are not included in product costs. These costs are expensed on the income statement in the period in which they are incurred using the usual rules of accrual accounting. All research, selling and administrative costs are treated as period costs. Under IFRS development cost is capitalized.

Cost classifications for assigning costs to cost objects

Costs are assigned to cost objects for a variety of purposes including pricing profitability studies, and control of spending. For purposes of assigning costs to cost objects, costs are classified as either direct or indirect.

Direct Costs

A direct cost is a cost that can be easily and conveniently traced to the particular cost objects under consideration in an economical feasible way. "Trace ability" refers to the existence of a clear cause -and- effect relationship between the cost object and the incurrence of a cost. "Economically feasible" means cost effective i.e. that managers do not want cost accounting to be too expensive in relation to expected benefits. For example, it may be economically feasible to trace the exact cost of

steel and fabric (direct costs) to a specific lot of desk chairs, but it may be economically infeasible to trace the exact cost of rivets or thread(indirect cost) to the chairs.

Indirect cost

An indirect cost is a cost that cannot be easily and conveniently traced to the particular cost object under consideration. For example, a soup factory may produce dozens of varieties of canned soups. The factory manger's salary would be an indirect cost of a particular variety soup.

A particular cost may be direct or in direct depending on the cost object. For example, if Lucy Company (a fictitious company based in Ethiopia) were assigning costs to its various original sales offices, then the salary of the sales manager in its Awassa office would be direct cost of that office. In contrast, the factory manger's salary at Awassa plant, for example, will be an indirect cost of a particular product manufactured there.

Controllable and uncontrollable costs

One of the primary uses of cost data is to facilitate control of the costing units of a firm. In order to analyze effectively a costing unit's performance, it is necessary to know for which costs the unit was responsible. Thus, accountants must develop reports that reflect cost behavior according to responsibility. A cost is said to be controllable by the head of a costing unit when the level of the cost incurred is under his influence. Thus, if the head of the costing unit, through his supervision, is able to affect the amount of raw materials used to produce a given output, raw material costs are to consider controllable by him.

However, if the supervisor has no control over the different skills of the workers assigned to him, a large portion of his labor cost must be considered non controllable by him.

As another example, the head of the accounting department may be able to hire as many accountants as he needs. But he must pay each accountant the wage established for persons who possess the skills necessary for the job, and this wage is usually set by the personnel department. Thus, the number of employees in the accounting department is controllable by the department head, but the rate at which they are paid is controlled by the personnel department.



Learning Activity 1.5

Answer the following questions.

1. "Advertising is period cost." Do you agree? Explain.

2. The same cost can be direct or indirect cost" do you agree? Explain.

Cost classification for decision -making

So far the focus has been on cost classifications that primarily serve management's need to control and evaluate the operations of the firm. At this point we consider cost classifications that are useful to management in making decisions that will affect future operations.

Decision problems arise whenever there are two or more alternative ways to accomplish the same objective. They are resolved by forecasting the net benefits that would be received by forecasting the net benefits that

would be received under each alternative and selecting the alternative that promises the highest net benefits. Expected net benefits of each alternative may be defined, in general , as the expected value to be received less the expected costs associated with the alternative. Cost estimates for decision making are based on forecasts of the resources that would be consumed under the various alternatives.

Incremental costs

Incremental costs are defined as the change in costs that will occur as the result of a change in activity from base or reference level to another level. The nature of these costs is best illustrated by the example shown in exhibit 2.9. The base or reference level is 400,000 units; this might represent the current level of operation, or it might be a contemplated level of activity for a future period.

Sunk costs

Sunk costs are the costs of resources already acquired whose total will be unaffected by the choice among alternatives. As an example depreciation is a sunk cost since it represents an allocation of the cost of resource services that will remain the same whether we accept or reject the increased output. The original or present recorded cost of an asset acquired in the past is also a sunk cost and should have no bearing on whether to use or sell that asset today. Suppose we acquired a machine for Br 10, 000 two years ago that we now list at a depreciated value of Br 8,000 the asset may be sold today for Br 6,000 or used for another operating cycle , after which it will be sold for Br 5,000 . The fact that the asset is listed on our records at Br 8,000 is generally irrelevant to our decision to use or sell the assets today. It is relevant only to our computation of the tax effects of selling the assets today. If the asset is

sold today, a book loss of Br 2,000 (br. 8,000 -Br 6,000) will be recognized and will produce a tax benefit (by reducing our tax bill) in the amount of Br 2,000 multiplied by the tax rate.

Opportunity costs

The opportunity cost of an asset in a specific alternative is the net benefit that would be received if the asset were utilized in its best alternative use. The opportunity costs of some assets may be difficult to measure in practice since the best alternative may not be known.



Learning Activity 1.6

Answer the following questions.

1. The sales department urges developing a new product and, as part of the data presented in support of its proposal, indicates total additional cost involved (the increase in total cost). What cost concept is matched with the given statement?

2. The management of a corporation considering replacing a machine that operates satisfactorily with a more efficient new model. Depreciation on the cost of the existing machine is omitted from the data used in judging the proposal, because it has little or no significance with respect to such a decision. What term of cost concept the above sentences describe?

-
-
3. Explain what an opportunity cost is. Accountants do not ordinarily record opportunity costs in the formal accounting records. Why?
-
-

15. The use of linear, curvilinear and step functions and how their calculations are used to analyze cost behavior

Cost behavior and cost drivers

Cost behavior shows the direction in which the cost of an activity is affected by changes in the level of cost driver. Some examples of activities include production, machine operation, assembling, product inspection, purchasing and set-up.

Cost driver is any factor whose change causes a change in the total cost of a related cost object. There are many possible cost drivers and the following are only some examples.

<u>Activity</u>	<u>Cost driver</u>
- Production	-number of units produced, number of set ups, direct labor hours, direct material costs. _____
-Machine operation	-machine hours operated
-Assembling	-labor hours assembled
-Production inspection	-no of products inspected
-Purchasing	-purchase orders handled
-Setup	-set up hours

-Maintenance

- machine hours

-Calling

- number of calls

Costs based on cost behavior are classified as follows:

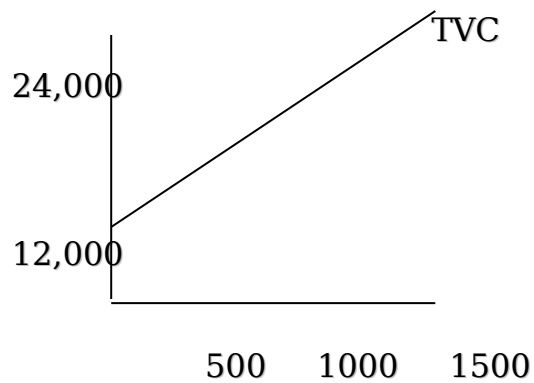
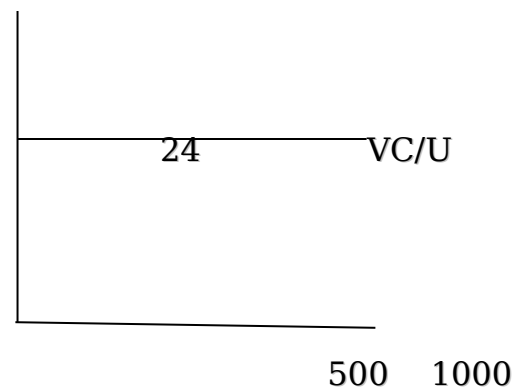
- a) Variable costs.
- b) Fixed costs
- c) Mixed costs
- d) Step costs
- e) Non-linear costs

a) Variable costs

A variable cost is a cost that varies, in total, in direct proportion to changes in the level of activity (cost driver). For instance, a 5% increase in the units production would produce a 5% increase in variable costs. However, the variable cost per unit of cost driver remains the same as activity changes. Some example of variable costs include direct material costs, direct labor costs, indirect materials costs, factory utilities, power to run machine, shipping costs and sale commission.

It is important to note that when we speak of a cost as being variable, we mean the total rises and fall as the activity level rises and falls. This idea is presented below, assuming that a company's products cost \$24:

Units produced	cost per unit (\$)	Total variable Cost (\$)
1	24	24
500	24	12000
1000	24	24000



1500

Volume of cost driver

Volume of cost driver

driver

Exhibit 1.4 variable cost behavior

As the above graphs show, total variable cost increases proportionately with activity. When the volume of activity (units produced) doubles from 500 to 1000 total variable cost doubles from birr 12000 to 24000. In contrast, a variable cost on a per unit basis remains constant birr 24 as the volume of output increases. The following formula can be used to show total variable and unit variable costs respectively.

$TVC = UVC \times A$, where

TVC-Total variable cost

UVC-unit variable cost

A-activity volume

$UVC = TVC / A$

b) Fixed costs

A fixed cost is a cost that remains constant, in total regardless of changes in the level of activity. Unlike variable costs, fixed costs are not affected by changes in activity. Consequently, as the activity level rises and falls, the fixed costs remain constant in total amount unless influenced by some outside force, such as price changes. Some examples of fixed costs include rental costs for building, machinery and equipment, depreciation

of building, machinery and equipment, property tax on building, insurance costs, salaries of permanent workers; advertising costs, plant administration, and plant supervisor's salary.

When we say a cost is fixed we mean it is fixed within some relevant range. The relevant range is the range of activity within which the assumptions about variable and fixed costs are valid. For instance, assume that MAD electric plant has relevant range of between 40000 and 80000 cases of light bulbs per month and that total monthly fixed costs within relevant range is birr 80000. Within the relevant range of 40000 to 80000 cases a month, fixed costs will remain the same. If production falls below 40,000 cases, change in personnel and salaries would slash fixed costs to an amount below birr 800,000. If operations rise above 80000 cases, increase in personnel and salaries would boost fixed costs above Br. 800000.

The basic idea of a relevant range also applies to variable costs. That is, outside relevant range some variable cost such as fuel consumed may behave differently per unit of cost driver activity. For example, the efficiency of motor is affected if they are used too much or too little.

Fixed costs can create difficulties if it becomes necessary to express the cost on a per unit bases. This is because if fixed costs are expressed on a per unit basis, they will react inversely with changes in activity. For instance, suppose that MAD clinic rents a machine for Br. 8000 per month that tests blood samples for the presence of leukemia cells. The Br. 8000 monthly rental cost will be sustained regardless of the number of tests that may be performed during the month. Assume also that the capacity of the leukemia diagnostic machine at the MAD clinic is Br. 2000 tests per month. In the clinic the average cost per test will fall as the number of tests performed increases. This is because the Br. 8000 rental cost will be spread over more tests. Conversely, as the number of tests performed in

the clinic declines. The average cost per test will rises as the Br. 8000 rental cost is spread over fewer tests. This concept is illustrated in the table below and in graphic form in exhibit 2.4.

Monthly Rental cost cost per test	No. of Tests performed	Average
Br. 8,000	10	Br. 8,000
8,000	500	16
8,000	2000	4

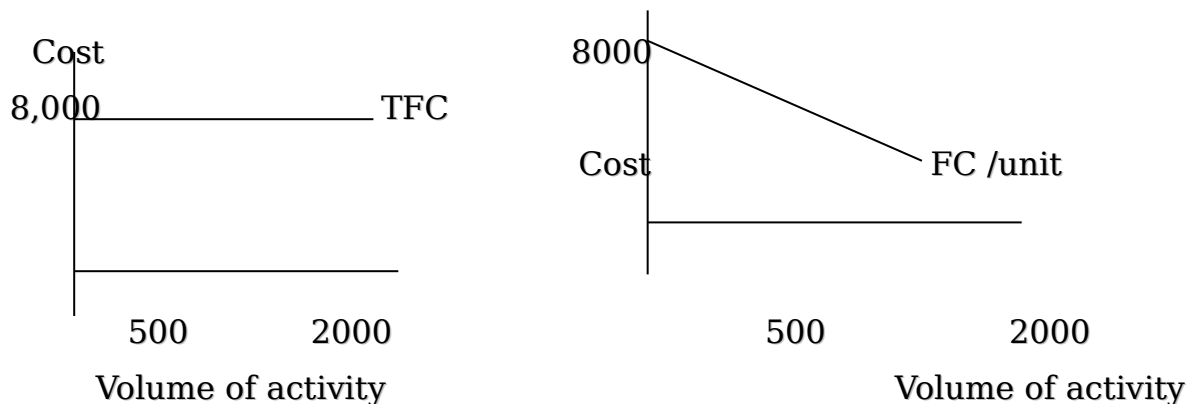


Exhibit 1.5 fixed cost behavior

Major assumption

The definitions of variable and fixed costs have important underlying assumptions:

1. The cost objects must be specified. Examples are activities, products, Services, projects, departments, etc.
2. The time span must be specified. Examples are months, quarters, years, and product life cycle.
3. Costs are linear that is, when plotted on ordinary graph paper; a total cost in relation to the cost driver will appear as an unbroken straight line.

4. For the time being, all costs are either variable or fixed. In practice, of course, classification is difficult and nearly always necessitates some simplifying assumptions
5. There is only one cost driver. The influences of other possible cost drivers in the total cost are held constant or deemed to be insignificant. Volume, often expressed in measures of units produced or sold.
6. The relevant range of fluctuation in the cost driver must be specified.

Committed fixed costs vs. discretionary fixed costs

Sometimes accountants further classify fixed costs as committed fixed costs and discretionary fixed costs.

Committed fixed costs: they are costs that result from having property, plant, equipment, and key managerial personnel. In the short run, managers can do little to change their amounts. Examples include depreciation, property taxes, insurance for plant and equipment, long term lease amounts, and salaries of key personnel.

Committed fixed costs usually are incurred in large, indivisible “chunks” that the organization is obligated to incur or usually would not consider avoiding.

Discretionary fixed costs: discretionary fixed costs, also called managed fixed costs (1) arise from periodic (usually yearly) budget decisions that reflect top- management policies, and (2) have no clear relationship between inputs and outputs. Examples include advertising and promotion, public relations, employee training programs, management salaries, short-term renewable costs, system development, research and development, and contributions to charitable organization.

C) Mixed costs

A mixed cost is a cost that has both a fixed and variable component. Many costs such as repair and maintenance, electricity, telephone, and water costs are incurred in such a way that part of the cost varies with the level of activity and part of it does not. The number of repairs required often depends on how much the equipment has been used. Thus, the repairs and their cost vary with the level of production. Maintenance that is performed periodically depends only on the passage of time, not on the level of activity. Therefore, the cost includes both a fixed component and a variable component and is labeled a mixed cost.

Electricity costs also are often mixed costs. Part of the electricity costs depends on the amount of time the equipment is operated. This part is variable. Part of the cost is incurred for lights and perhaps heating or cooling. This part of the cost does not depend on the level of activity and therefore is fixed.

Telephone costs are also typically mixed costs. The telephone cost is made up of a fixed monthly service charge and a variable charge that depends on the number of message units used. The variable charge depends on the number of message units used during the month. The same concept is true for water costs.

The sum up, the fixed portion of a mixed cost represents the basic, minimum cost of the just having a service ready and available for use. The variable portion represents the cost incurred for actual consumptions of the service. The variable element varies in proportion to the amount of service that is consumed.

d) Step costs

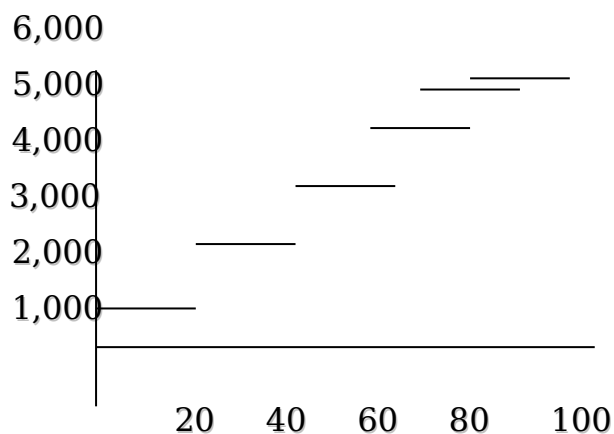
A step cost is a cost that remains fixed in total over a range of activity, then increases in steps to another level of activity where it again remains

fixed in total over a range of activity. This process may repeat itself many times.

Example: Assume that the Three-Honey Company owned and operated by T, R, and D needs a supervisor for every 20,000 units. Assume also that a supervisor's salary is also Br 1,000.

Output monthly Range supervisors	No of supervisor	Total Cost of
01- 20,000	1	Br 1,000
20,001- 40,000	2	2,000
40,001- 60,000	3	3,000
60,001 - 80,000	4	4,000
80,001 -100,000	5	5,000

The behavior of step cost is shown graphically in **Exhibit 1.6**

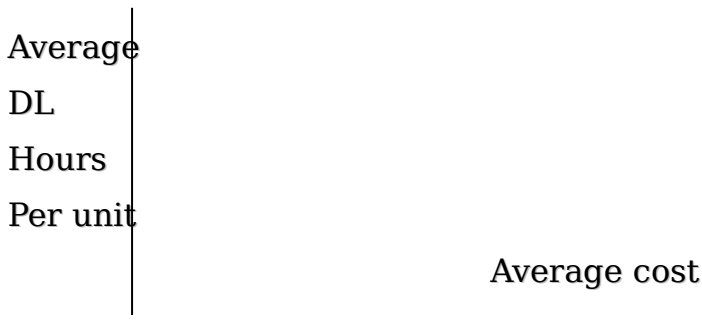


Volume of activity ('000)

Exhibit 1.7 step cost behavior

e) Non liner costs

A non-linear cost is a cost that varies with the volume of activity but not proportionally or consistently. Non-linear costs may increase at a decreasing rate or at an increasing rate. Exhibit 2.7 shows a non-linear cost that increases at a decreasing rate. This type of cost is referred to as a learning curve cost. The terms originate from the observed decrease in labor costs that sometimes occurs, as employee becomes familiar with a new task.



Cumulative units

Exhibit 1.8 The behavior of non-linear cost

As the graph in **exhibit 1.8** shows, the unit variable cost declines as activity increase. Put differently, this cost exhibit decreasing marginal costs (the cost of producing the next unit) or this type of cost behavior is characterized by smaller cost per unit of output as activity level increases.



Learning Activity 1.7

Answer the following questions.

1. What do managerial accountants mean when they speak of cost

behavior?

2. Classify each of the following costs as variable or fixed or mixed.
 - a) Depreciation of an office building based on straight line method.
 - b) Costs of raw materials used in producing a firm's products.
 - c) Leasing costs of a delivery truck, which is Br 9,500 per month and Br 38 per mile.
 - d) Local property taxes on land and buildings.

1.6. Flow of costs in a manufacturing company

The principles and procedures existing in accounting would also exist in cost accounting. Cost accounting consists of a system that is concerned with precise recording and measurement of cost elements as they originate and flow through the productive process.

Generally, the accounts that describe manufacturing operations are materials, payroll, factory overhead- control, and work -in -process, finished goods, and cost of goods sold. These accounts are used to recognize, and measure the flow of costs in each fiscal period from the acquisition of materials, through factory operations, to the cost of products sold and are known as cost accounts.

1.6.1 Schedule of cost of goods manufactured

Cost of goods manufactured refers to the cost of goods brought to completion, whether they were started before or during the current accounting period. Some of the manufacturing costs incurred during the year are held back as cost of the ending work-in-process inventory.

Similarly, the costs of the beginning work-in-process inventory become part of the cost of goods manufactured for the year. The schedule that shows this information is called schedule of cost of goods manufactured.

Cross Manufacturing Company
Schedule of cost of goods manufactured
For the year ended December 31,20xx

Direct material costs:

Beginning directs materials inventory	Br 60,000	
Add: purchases of directs materials (net)	<u>400,000</u>	
Cost of directs materials available for use	460,000	
Deduct: Ending direct materials inventory	<u>50,000</u>	
Direct materials used in production		Br
410,000		

Directs labor cost	60,000
--------------------	--------

Manufacturing overhead:

Indirect labor	Br 100,000	
Insurance, factory	6,000	
Machine rental	50,000	
Heat, light, and power, factory	75,000	
Supplies	21,000	
Depreciation, factory	90,000	
Property taxes, factory	<u>8,000</u>	
Total	overhead	costs
Br. <u>350, 000</u>		

Manufacturing costs incurred during the year	Br
820,000	

Add: Beginning work -in-process inventory

<u>90,000</u>	Total manufacturing costs
account for	Br.910, 000

Deducts: ending work-in-process inventory
60,000

Cost of goods manufactured
Br.850, 000

Exhibits 1.9 schedule of cost of goods manufactured

Note that the beginning work-in-process inventory must be added to the manufacturing costs of the period, and the ending work-in-process inventory must be deducted to arrive at the cost of goods manufactured.

In a manufacturing business cost of goods manufactured information is used to determine cost of goods sold for the period as shown in Exhibit 2.12.

Computation of cost of goods sold

Beginning finished goods inventory Br.
125,000

Add: cost of goods manufactured
850,000

Cost of goods available for sale Br
975,000

Deducts: Ending finished goods inventory
175,000

Cost of goods sold Br
800,00

1.7. SUMMARY



Accounting is the system that measures business activities, processes that information into reports and communicates these findings to decision makers. As part of accounting, managerial accounting and financial accounting both deal with economic events and reports about them. But the two areas of accounting are different in many ways, primarily because they serve different audiences. Managerial accounting serves internal managers in organizations. In businesses, managers associated with sales, production, finance, and accounting and top executives all use accounting data for planning and control, including decision making and performance evaluation. Whereas financial accounting primarily focuses on primary users (such as Investors and Creditors)

Cost accounting has developed as a specialty within the field of accounting at the same time that business enterprises become more complex and its role, includes planning, budgeting, controlling costs, determining profits, choosing among alternatives, and providing information for bidding.

In this unit, several cost terms, concepts, and classification are defined and illustrated. How the costs will be for preparing external reports, predicting cost behavior, assigning cost to cost objects, or decision making will dictate how the costs will be classified.

For purposes of valuing inventories and determining expenses, costs are classified as either products costs or period costs, product costs are assigned to inventories and are considered assets until the products are sold. At the point of sale, product cost become cost of goods sold on the income statement. Period costs, in contrast, are taken directly to the income statement as expenses in the period in which they are incurred.

For purposes of predicting cost behavior how cost will reacts to changes in activity-mangers commonly classify costs into five categories: variable, fixed, mixed, step, and nonlinear. Variable costs, in total, are strictly proportional to activity. Thus, the variable cost per unit is constant. Fixed costs, in total, remain at the same level for changes in activity that occurs within the relevant range. Thus, the average fixed cost per unit decreases as the number of unit increases and vice versa. Mixed cost has both a fixed and a variable component. Step cost remains fixed in total over a range of volume, then jumps to a new level and remains fixed at that level until the next jump. Nonlinear cost varies with the volume of activity but not proportionately.

For purposes of assigning costs to cost objects such as products or departments, costs are classified as direct or indirect. Direct costs can be conveniently traced to the cost objects. Indirect costs cannot be conveniently traced to cost objects. The terms controllable and uncontrollable are used to describe the extent to which a manger can influence a cost.

For purposes of making decisions, concepts of incremental costs, opportunity costs, and sunk costs are of vital importance. Incremental costs are the cost items that differ between alternatives. Opportunity cost is the benefit that is forgone when one alternative is selected over another. Sunk cost is a cost that occurred in the past and cannot be altered. Incremental and opportunity costs should be carefully considered in decisions. Sunk cost is always irrelevant in decisions and should be ignored.

Cost of goods manufactured refers to the cost of goods brought to completion, whether they were started before or during the current accounting period. Schedule of cost of goods manufactured shows how cost of goods manufactured during a year is determined.

1.8. MODEL EXAMINATION QUESTIONS

Part I. Write the word “True” if the statement is correct and the word “False” if the statement is incorrect.

_____ 1. Cost of finished goods does not include factory overhead costs-since factory overhead costs can't be identified cost effectively with a particular product or job.

_____ 2. After manufacturing overhead costs have been accumulated, departments must allocate these costs to jobs or products.

_____ 3. Under a job order cost system, the costs are accumulated for each department with in the factory.

_____ 4. Costs that are incurred in marketing the product and delivering the sold product to customers are not part of manufacturing costs.

_____ 5. As a practical matter, in order for costs to be classified as direct material cost, the cost must only be an integral part of the finished product.

_____ 6. Manufacturing cost is the sum of conversion cost and prime cost of a given period.

_____ 7. The time card shows the total hours worked by the employee each day and also the particular job worked on.

_____ 8. A debit balance in the Manufacturing Overhead account at the end of a period would mean that overhead was under applied for the period.

_____ 9. All the raw materials purchased during a period are included in the cost of goods manufactured figure.

_____ 10. Actual manufacturing overhead costs are charged directly to the Work in Process account as the costs are incurred.

Part II. Work Out

1. Cross incorporated produces a single product. The following data apply to the period just ended.

Inventories	Beginning	Ending
Direct materials	br 100	Br
70		
Work-in-process		140
150		
Finished goods		200
300		

The following additional information has been provided:

- The total materials available for use during the period amounted to br 250.
- Prime costs assigned to production during the period totaled Br 400.
- Overhead costs amounted to 50% of direct labor cost.
- Sales for the period were Br 1,000 and net income before taxes was br 250.

Required: Prepare a statement of cost of goods manufactured and an income statement for Cross Company.

2. Following are several words; choose the cost term or terms above that appropriately describe the costs identified in each of the following situations. A cost term can be used more than once.

Fixed cost	Conversion cost
Variable cost	prime cost
Mixed cost	opportunity cost
Period cost	sunk cost

Product cost

step cost

i) Depreciation on the equipment used to print the book would be classified by Artistic printing enterprise as a _____ cost. However, depreciation on any equipment used by the company is selling and administrator activities would be classified as a _____ cost. In terms of cost behavior, depreciation would be classified as a _____ cost.

ii) Taken together, the direct labor cost and manufacturing overhead cost involved in the manufacture of a product would be called a _____ cost.

iii) MAD company sells its product through agents who are paid a commission on each book sold. The company would classify these commissions as a _____ cost.

iv) The sum of direct material and direct labor makes up a _____ cost.

3. "For a furniture manufacturer, glue or tacks become an integral part of the finished product, so they would be direct material." Do you agree? Explain.

4. Explain "economically feasible" or cost effective "as applied to cost accounting.

5. Give three examples of cost object.

6. Classify each of the following costs based on function.

- a) Directs labor costs
- b) Quality inspection costs
- c) Factory depreciation
- d) Rent for plant facility
- e) Advertising expenses
- f) Directs materials costs
- g) Sales commissions
- h) Gasoline expenses for delivery trucks
- i) Accounting clerks' salaries
- j) Office building property taxes

6. Classify each of the following costs as a variable or a fixed cost.
- a) Transportation-in costs on materials purchased.
 - b) Assembly line workers' wages.
 - c) Salaries of top executives in the company.
 - d) Overtime premium for assembly workers.
 - e) Production supervisory salaries.
 - f) Supplies used in assembly work.
 - g) Power to operate factory equipment.
7. What is the difference between discretionary and committed fixed costs?
8. "My variable costs are br. 2 per unit. If I want to increase production from 100,000 units to 150,000 units, my costs should go up by only br. 100,000."
- Comment.
9. Graph for the descriptions of cost elements given below.
- a) Depreciation of equipment, where the amount of depreciation charged is computed by the units of production method.
 - b) Electricity bill, a flat charge plus a variable cost after a certain number of kilowatt hours are used.
 - c) Rent for a factory building donated by the country, where the agreement calls for rent of Br, 100.000 less Br 1 for each hour laborers worked in excess of 200,000 hours, but a minimum rental payment of Br 20,000 is required.
10. On January 30, 2004, a manufacturing facility of DAMI Company was severely damaged by an earthquake followed by a fire. As a result, the company's direct materials, work-in-process, and finished goods inventories were destroyed. The company did have access to certain incomplete accounting records that revealed the following:
- a) beginning inventories January 1:

Directs materials	Br 32,000
Work-in-process	68,000
Finished goods	30,000

b) key ratios for this plant are:

Gross profit = 20% of net sales

Prime costs = 70% of manufacturing costs

Ending work -in- process averages 10% of the monthly manufacturing

Costs

Factory overhead = 40% conversion costs

c) All costs are incurred uniformly in the manufacturing process

d) Actual operating data for January:

Net sales= Br 900,000

Directs material purchase = Br 320,000

Directs labor cost incurred = Br 360,000

Required: from the above data, reconstruct a schedule of cost of goods manufactured.

MODULE TWO: COST DETERMINATION: THE COSTING OF RESOURCE INPUTS

Content

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2.2 Raw Material Overview

2.3 Concepts and Objectives of Material Control

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2.3.3 Sorting and Issuing Material

- 2.4 Controlling and Valuing Inventory
 - 2.4.1. Inventory Control
 - 2.4.2. Valuing Inventory
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- 2.6. Glossary
- 2.7. Accounting for Labor
 - 2.7.1 Type of labor costs
 - 2.7.2 Accounting procedures for labor costs:
- 2.8 Summary
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- 2.11. Departmentalizing overhead costs
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2.0 INTRODUCTION



Dear learner, welcome to the second unit of the course Cost and Management Accounting I. This unit discusses where the cost of raw materials originates, how raw material costs are accounted, how the raw materials are physically controlled. The detailed procedures and records required to account for materials purchased and used will be introduced

at the beginning of the unit. The procedures required to control and value inventory of raw materials are discussed by the end of the unit.

2.1 LEARNING OBJECTIVES

Overview



Dear learner! At the end of the session you are expected to:

- Define materials control
- Describe documents and records used to control materials
- Describe the Accounting journal entries required to record major material transactions
- Know material inventory costing methods
- Explain the major types of labor costs
- Describe accounting procedures for labor cost
- Explain the Meaning& nature of over head
- Analyze Departmentalizing overhead costs
- Determine how overhead rates are Set
- Explain the accounting for Over applied or under applied overhead cost

2.2 RAW MATERIALS: OVERVIEW

The term “materials” generally used in manufacturing concern refers to raw materials used for production, sub-assemblies and fabricated parts. These materials will be, directly or indirectly, entered in to the production of the final product. Thus, proper accounting and control over materials are required for effective & efficient materials management.

2.3 CONCEPTS AND OBJECTIVES OF MATERIALS CONTROL

Materials cost constitute the major part of the total cost of production in manufacturing firms. Therefore, proper accounting for and control over materials purchase, consumption, and inventories are important for effective management of a business. Basically, materials control aims at efficient *purchasing, &Receiving* of materials, their Storing and efficient Use, or Consumption.

In general, the following are the objectives in a good system of materials control.

1. Materials of the desired quality will be available when needed for efficient and uninterrupted production.
2. Materials will be purchased only when need exists and in economic quantities.
3. The investment in materials will be maintained at the lowest level consistent with operating requirements.
4. Purchase of materials will be made at the most favorable price under the best possible terms.
5. Materials are protected against loss by fire & theft.
6. Materials should be handled in such a way that the handling time and cost can be minimized.
7. Vouchers will be approved for payment only if the materials have been received and are available for use.
8. Issues of materials are properly authorized and properly accounted for.
9. At all times, materials are charged as the responsibility of some individual.

In short, control over materials enables us to achieve the five R's.

1. Right quantity materials
2. Right Quality materials
3. At the right time

4. At the right place
5. From right suppliers

2.3.1 Accounting& Control for Purchase and Receipt of Materials

Different firms may have different purchasing procedures, but all of them follow a general pattern in the purchase and receipt of materials and payment of obligations. The most important steps in materials purchasing and receiving procedures are summarized below:

1. Purchase Requisition

The purchase requisition is properly approved, or authorized, written request for materials. Usually, purchase requisitions are prepared by the storekeepers for regular store items, which are below, or approaching the minimum level of stock. The purchase of specialized materials may be requested by production or user departments. These purchase requisitions are used as a formal request to purchasing department to order goods. A typical purchase requisition contains details, such as number, date, department, quantity description, and signatures of the concerned individuals.

2. Purchase order

After receiving requisition, the purchasing department places an order with a supplier. For routine purchases, the order is placed with established suppliers. In other cases, the purchasing department may ask for bids or send out request for price quotation before placing the order.

Purchase order should clearly state the materials required and the price; and provide information such as delivery period and the department for whom the materials are purchased. Purchase order may be prepared in several copies depending on the need of the firm. The original copy however is sent to the supplier; Second copy to accounting department; third copy to store; fourth copy to receiving department and so on.

3. Receiving Materials

The receiving department performs the function of unloading and unpacking materials which are received by an organization. Materials are inspected and inspection report is prepared, indicating the items accepted and rejected, with reason. Receiving report is prepared by the receiving department. Inspection report may be incorporated in the receiving report, or may be issued separately.

Receiving report may be prepared in several copies, one going to each department interested in the arrival of materials, including stores, purchasing department, and accounting department.

4. Preparing and Recoding the Voucher:

The invoice received from the supplier is sent to the purchasing unit. The purchasing unit holds the invoice and the purchase order in the open purchase order file until the receiving report is received from store (receiving department). After the receiving report is received, the purchasing unit compares the supplier's invoice with the purchase order and receiving report to make sure that:

- Goods ordered have been received in good condition and those listed on the invoice.
- Terms, unit prices, shipping charges, and other details agree with order specifications.
- Computations are correct.

After comparisons, an employee of the purchasing unit staples together one copy of the invoice, receiving report, and purchase order, and places them in a completed purchases file alphabetically by supplier. Next a disbursement voucher is completed and a second set of supporting

documents is attached to it. Then the voucher is formally approved and sent to the accounting unit for recording.

When the voucher, invoice, and attached papers reach the accounting unit, the voucher clerk compared quantities, verifies intentions and footings, computes discounts, and checks all other computations. The clerk also checks that all supporting documents are included in the file and that they are properly approved and signed.

5. Paying the voucher

Before the due, the voucher is removed from the unpaid vouchers file. A check is prepared for the net amount. The check is then recorded in the check register. The employee marks the voucher "paid "by using a rubber stamp and enters the check is mailed to the supplier, and the voucher is returned to the voucher clerk. The voucher clerk enters the check number and date of payment in the voucher register. The voucher, with the invoice and supporting documents, is then placed in the paid vouchers file.

Accounting for materials returned

Occasionally, damaged or defective materials received. These items are usually returned to the supplier immediately. A note of the return is made on the receiving clerk' copy of the purchase order and on the receiving repot. The purchasing agent then prepares a debit memorandum. A debit memorandum is a notice to the vendor (means supplier) of a reduction from the invoice for the cost of the returned materials. Then the following entry is recorded.

Vouchers payable -----	xxx
Purchase returns and allowances -----	xxx

Example

A furniture manufacturer has issued a debit memorandum to a supplier for materials returned costing \$3000. The entry to record this transaction in the book of the buyer is

Vouchers payable -----3000

Purchase returns and allowances ----- 3000

A credit memorandum is a notice to the supplier of an addition to the invoice a supplier ships more materials than were ordered. In this case, if the buyer needs the excess materials, they will be kept by issuing credit memorandum for additional cost. The accounting entry is shown below:

Raw materials -----xxx

Vouchers payable -----xxx

2.3.3 Storing and Issuing Materials

2.3.3.1 Storage of Materials

Two types of control are made in store, one is *physical control* of materials and the second is *accounting control*.

- a) Physical control of materials involves restricting admission to the storeroom area only for authorized personnel. If the store room is open to everybody, materials may be stolen.
- b) Accounting control of materials involves maintaining the necessary records for the materials; one important record is materials ledger. Materials ledger is used to protect materials in the storeroom and to identify materials. Materials ledger is established for each type of materials indicating material number, type of material and its location. Materials are stored in a systematic manner on a bin, on racks, or on shelves. A bin tag may be attached to each bin. The bin tag is an informal but carefully maintained record to show the quantities of the materials received, issued and on hand at all times

2.3.3.2 Issuance of Materials

Materials requisition is prepared by production (using) departments in order receive materials from the store. No material is issued without a

materials requisition. Materials requisition is prepared by department head or job supervisor.

Materials requisition shows the quantity materials number, description, and job number to which the materials are charged (for direct materials) or department (for indirect materials)

Up on receipt of materials requisition, the storeroom supervisor issues the materials and makes the necessary notations on the requisition. The storeroom clerk enters the unit price and computes and enters the total amount. Then the storeroom clerk records the entry in the issued section of the materials ledger, computes the new quantity on hand, and records it in the balance section.

Note that the materials ledger is a subsidiary ledger that will be verified against the raw materials control account. At the end of the accounting period, the sum of the dollar amount balances on the materials ledger cards should equal the balance of the control account.

After the requisition has been recorded on the related materials ledger, card the requisition is forwarded to the cost clerk. The cost clerk journalizes the transaction (issuance of materials) requisition journal.

The Journal entry is as follows:

Work in process -----	xxx
MOH control -----	xxx
Raw materials -----	xxx

Note that materials Requisition Journal is a special journal used in a job-cost system.

The next step is that the cost accountant will post the information from the requisition to the materials section of the proper job cost sheet. Similarly, the direct materials cost is posted to departmental overhead analysis sheet in the indirect materials section

The important principles of internal for storing and issuing materials are:

1. Admittance to the storage area is restricted.
2. Materials ledger cards are maintained to record all receipts and issues.
3. Each type of materials is clearly identified, stored in a particular place, and carefully protected while in storage.
4. Materials are issued only upon proper written authorization
5. The accounting system permits a periodic check of the materials ledger against the balance of the Raw materials control account.
6. Separation of duties in storage and issuance operations.

Special Issuing procedures

1. Bill of Materials

The bill of materials lists all materials required on the job and the date they will be needed. The bill of materials serves as a requisition

2.3.3.3 Return of Materials to storeroom

Sometimes materials that have been issued are returned to the storeroom. This may be due to requisitioning too many materials, withdrawing the wrong materials, or some other reasons. A returned materials report has to be prepared. It is very similar to the materials requisition. The bin tag is adjusted. Then the cost clerk will make the following entry and post to job cost sheet and/or department overhead analysis sheet.

Raw materials -----xxx

Work in process -----xxx

MOH-----xxx

Returned materials report is the basis to post the above transaction to job cost sheet and departmental overhead analysis sheet. Note that individual amount is not posted to general ledger (controlling) account) from materials requisition journal. Rather the totals of each column in the materials requisitions journal (work in process, MOH control and Raw materials) are posted to the appropriate controlling account.



Learning Activity 2.1

Answer the following questions.

1. What is a materials requisition form?

2. Difference between purchase requisition and materials requisition?

2.4. CONTROLLING AND VALUING INVENTORY

2.4.1. Inventory Control

Inventory management refers to the planning, organizing, and controlling activities to ensure that inventories are kept at levels which provide maximum services at minimum cost. The main objective of inventory control is to ensure that stock outs do not occur and that surplus stocks are not accumulated and carried. Inventory management includes management of finished goods, work-in-process, and raw materials.

In controlling inventories or stock levels are established for standardized materials which are regularly used by the firm so that inventory holding can be controlled.

Control of raw materials requires the purchasing department to determine the reorder point and reorder quantity. Reorder quantity refers the quantity to be covered in a single purchase order. Reorder point (or the level) is the level at which store-keeper initiates purchase requisitions for new supplies of materials. Lead time is another factor that should be

considered in determining reorder quantity. Lead time refers to the amount of time it takes for the materials to be delivered from the supplier. Usage is also used to determine the reorder quantity. Usage represents the consumption patterns.

Determining the Recorder point

In order to determine the reorder point, we need to have the lead time, usage and safety stock (if any). Safety stock is the minimum level of material that should be on hand to ensure that the company does not run out of materials.

Example

Assume that XYZ manufacturing wants to have at least 180 units on hand at all times. The factory uses 10 units every day. It takes fifteen days to receive an order. The reorder point is

Lead time usage (10x 15 days) -----	150 units
Add, Safety Stock-----	<u>180</u>
Reorder point -----	330 units

The reorder point represents the inventory level at which a new purchase order must be issued. According to the above example, a new purchase order is placed when the quantities of raw materials on hand reached 330 units. If the new purchase order is processed as expected within 15 days, the inventory reaches the safety stock of 180 units when the new units arrive at the premise of the factory.

Another problem is determining how much to order at a time (Economic order Quantity). To determine this quantity, it is necessary to consider the costs of placing an order and the costs of carrying items in the store. If the frequency of ordering materials is increasing, the cost of order will be higher and vice versa. Holding many items involve higher holding costs. Some examples of order costs are:

1. Costs of maintaining the purchasing department

2. Costs of operating the receiving department
3. Clerical costs of processing an order.

The costs of holding items in the inventory include:

1. Costs of handling and storing materials
2. Costs of operating the receiving department
3. Clerical costs of processing an order
4. Clerical costs of maintaining inventory records

In order to determine the quantity that should be ordered at a time, the following formula is used.

$$EOQ = \frac{2DC}{H}$$

Where

EOQ = Economic order quantity

D = Annual requirements (demand)

C = Ordering cost per unit

H = Holding cost per unit

Example

ABC printing has determined that the cost to place an order for papers is Br. 10 and the cost to carry this item in inventory is Br. 0.8 per dozen. 10,000 dozen of papers are required for production each year, what is the economic order quantity?

Solution

$$EOQ = \frac{2DC}{H} = \frac{2 \times 10,000 \times 10}{0.8} = 500 \text{ dozen of papers}$$

$$H \quad 0.8$$

2.4.2 Valuing inventory

In the earlier part of this chapter, it was assumed that the prices of materials were constant. However, prices vary from one purchase to the

next, and it is often impossible to tell the specific purchase from which an issue is made. This topic is intended to introduce how accountants price issuance of materials. And the topic will introduce how to value the units on hand.

The primary basis of inventory valuation is cost. In the situation where the purchase prices of materials vary, accountants must make an assumption about the flow of costs. The flow of costs may not match the physical flow of goods; these cost flow assumptions are called inventory costing methods. There are four basic inventory flow assumptions. These are:

1. Specific identification method
2. First-in-first -out (FIFO)
3. Last -in ,first out (LIFO)
4. Moving Average Method

Specific identification Method

Some materials do not lose their identity when placed in the bin. These materials have unique specification. Examples of these materials are electric motors for large pumps and compressors where each motor is different from others. In this case, it is easy to identify the purchase price of materials issued to production, and items remaining in store.

First-in, First-Out (FIFO) method

This method assumes that stocks (inventories) are issued in a strictly chronological order. Materials issues are costed at the unit cost of the oldest supply on hand. The ending inventory is composed of the most recent costs of material or production of goods.

Last -in First-Out (LIFO) method

Under LIFO, the cost of the latest items purchased is assumed to be the first to be assigned to units issued. The materials in the ending inventory

are costed at prices in existence at a much earlier date since they represent the cost of the oldest stock on hand.

Moving Average method

This method allows the issuance to be costed out currently at the average unit cost.

Cost of materials available for use

Average Unit Cost = Quantities of materials available for use

A new average unit cost is calculated after each purchase. Until another new purchase is made, the current average cost is used to value the materials issued.

Valuation of inventory at Lower of Cost or Net realizable Method (IAS 2)

The previous four methods have been on cost. When the Net realizable value (estimated selling price less cost to complete and sale) has declined, the most appropriate method is lower of cost or Net realizable Value, under lower of cost or market, the inventory is valued at either a cost, or replacement cost, whichever is lower.



Learning Activity 2.2

Answer the following questions.

1. Under what method of inventory costing are the materials on hand always considered to be from the last ones purchased?

2. What are the three ways that the lower of cost or Net realizable method can be applied to inventory items??

2.5 SUMMARY

Raw materials must be controlled to safeguard the company's big investment and to ensure enough supplies are on hand to meet the production schedules.

To achieve better accounting and control for raw materials major materials transaction should be accounted and carefully. Controlled this major transaction include purchasing, receiving, storing, issuing, using consuming and returning materials.

2.6. GLOSSARY

Raw materials: materials including indirect materials, direct materials and factory supplies

Purchase requisition: a form / document used to request material for purchase and prepared by the store

Purchase order: a legal document prepared by purchasing department and sent to vendors asking them to deliver materials

2.7.ACCOUNTING FOR LABOR

Labor cost is an important element of costs, It constitutes a significant portion of total cost of production. This it is important to establish an efficient system of labor control and selecting the most appropriate method of remunerating them. The productivity of all other resources is

linked to the productivity of employees. Assets cannot operate by themselves.

2.7.1 Type of labor costs

Labor costs are composed of direct and indirect payments to workers and other personnel engaged in manufacturing activities. In other words, labor costs represent the costs of purchasing the labor hours and employee's services. Thus labor costs are classified as direct labor indirect labor.

1. **Direct labor** is the personnel who work directly with the raw materials in converting them to finished goods. In other words, direct labor is the time spent by a work, identifiable with the particular job or a process.

2. **Indirect labor** is the wage of factory personnel who do not work directly on raw materials. Indirect labor does not directly spend time on a particular job or product. The distinction between direct labor and indirect labor is based on the convenience of linking the time spent on a particular job or product. Although indirect workers spend time on work of general nature, they also equally support production activities



Learning Activity 2.3

Answer the following questions.

1. Define direct labor costs?

2. Define indirect labor cost?

2.7.2 Accounting procedures for labor costs:

Accounting for labor cost requires

- a) Strict control on labor recruitment
- b) Correct time keeping
- c) Time booking i.e. analysis of time in terms of departments, operations and production orders or jobs.
- d) Generation of adequate and effective manpower performance reports indicating productivity and efficiency of labor.
- e) Constant attempt to improve productivity and efficiency through improvement in the remunerations, conversion of indirect labor into direct labor, etc.

In general, accounting for labor costs has three phases. These are:

- A. Timekeeping procedures
- B. payroll procedures
- C. Charging labor costs into production

A. Timekeeping procedures

Timekeeping is the procedure for keeping records of time worked by each employee. There are various methods for recording the time spent by an employee in the factory. Some of them are described below.

1. Clock cards (or time cards)

Clock cards are produced by mechanical devices. They provide evidence of the presence of a worker inside the plant and the time of his entry of departure. Clock cards are used with time clocks. Time clock is installed at the entrance of the plant. Each employee has his or her own time card which shows the dates worked and the time the employee entered and left each day. If there is time Clock card is entered in to time clock. The time clock prints on the card the "in" and "out" time. The clock card our time card may be filled out manually.

It is necessary that the timekeeping staffs are present at the time of filling the cards to supervise and ensure smooth and rapid movement of workers and also to ensure that proper clock card procedure is observed. Time cards may be collected daily or at the end of the wage period.

2. Time tickets (job tickets)

Time ticket show the time spent by each employee on individual job during the day. Time tickets serve dual purposes:

- a) it provides instructions for operations to be performed
- b) It records time spent in performing the operations

The worker normally collects the ticket form the foreman's office. On completion of the operations, the worker records time of completion on the ticket, submits the same to the Forman and collects a new ticket for the next job to be worked on. Time ticket is needed because time card or clock card indicates only the total time worked on by an employee. Time card does not show the number of hours worked on a specific job by an employee.

However, time ticket clearly shows the number of hours worked on by an employee on a specific job.

Daily analysis of Data

At the end of the day all time tickets are collected by a time clerk. The time clerk will complete the following procedures.

1. Compare the hours shown on each employee's time tickets with the total time shown on the employee's time card.
2. Investigate the differences between time tickets and time cards.
3. Enter the earnings (Amount) on the time tickets.
4. Enter the number of hours worked during the day by each worker, in the payroll register.

5. Separate individual parts of the time tickets to make it easier to sort by job or department.

Idle time

Idle time is said to occur if time cards show more hours as compared to the time tickets. Idle time may occur because of the following reasons:

- Hour lost waiting for materials
- Hour lost waiting for assignment to a new job
- Hour lost waiting for a machine to be repaired
- Strikers, fire floods etc.

Idle time costs are considered to be manufacturing overhead.

Note that the short time spent during the morning and afternoon rest periods is not considered idle time. It is absorbed into whatever job the employee is working on at the time of the break.

At the end of each week, an analysis of idle time is made and an idle time sheet is prepared. Then the idle time sheet is attached to time ticket.

If the clock card hours are less than hours recorded on time ticket the difference is as a result of error. The error has to be corrected in consultation with the Foreman and the worker concerned.

B. Payroll Procedures

The payroll unit (or payroll department) is responsible for the following:

1. Maintain details of job classification cost center and wage rate of each employee
2. Maintain a list of mandatory deductions such as employee income taxes
3. Maintain a list of voluntary deductions, such as credit association contribution,
4. Determine for each employee the amount of income tax to be deducted from each employee's gross pay.
5. Determine the net amount payable to each employee.

6. Prepare wage sheets which form the basis for disbursement of wages
7. Summarize the cost by cost center including the gross amount earned deductions, net pay hours, worked overtime premium incurred, incentive earned by each employee etc.

The time keeping procedures provide the data needed by the payroll department for computing earnings and completing labor cost records. Factory payroll register may be prepared weekly, and monthly (or semi monthly)



Learning Activity 2.4

Answer the following questions.

1. Describe the Following Phases in Accounting for Labor
 - A. time keeping
 - B. payroll procedure
2. Differentiate between time ticket and time card?

EMPLOYER'S PAYROLL TAXES

Employer's payroll taxes represent the amount of pension contributed to the employee's pension plan by the employer. Payroll taxes are usually part of the manufacturing overhead. They are recorded as follows:

Manufacturing overhead control -----xxx
Cash (or other account) -----xxx

Fringe Benefit Costs

Fringe benefits are costs related to salaries and wages. These include vacation and holiday pay, compensation insurance of workers, hospitalization, insurance, life insurance e.t.c. Fringe benefit costs are usually charged to manufacturing overhead



Learning Activity 2.5

Answer the following questions.

1. What are fringe benefits?

2. How they are typically accounted for?

2.8 SUMMARY



Labor cost is an important element of costs; it constitutes a significant portion of total cost of production. This it is important to establish an efficient system of labor control and selecting the most appropriate method of remunerating them. The productivity of all other resources is linked to the productivity of employees. Assets cannot operate by themselves.

2.9 GLOSSARY

Time keeping is a procedure used to keep records of the total hours worked by each employee

Time ticket a document used to record the amount of time spent by each employee on the

Job

Time card: a card used to record the total hour spent by each employee in the plant

ACCOUNTING FOR FACTORY OVERHEAD COSTS

2.10. MEANING& NATURE OF OVER HEAD

Overhead refers to any cost which is not directly attributable to a particular unit. In other words, overheads are real costs and represent spending on resources or services which benefit all units of products and services. Overhead costs are costs common to more than one unit cannot be linked to a particular unit.

2.11. DEPARTMENTALIZING OVERHEAD COSTS

Classification of overhead costs

a) Factory overhead

Factory overhead is the aggregate of indirect costs associated with manufacturing activities, Factory overhead is also called factory burden, manufacturing overhead, manufacturing expenses, or indirect manufacturing costs.

Factory overhead includes:

- Factory rent, lighting and heating
- Depreciation repairs and maintenance and insurance of factory building, plant and machinery & other facilities.
- Power and fuel
- Salaries and related costs of production management
- Wages of indirect costs of production management

- Indirect materials
- Direct materials of small individual value that cannot be economically feasible to allocate to individual unit
- Expenses connected with administration of factory
- Fringe benefits etc

In general, factory overhead costs are classified into three. There are:

1. Indirect labor
2. Indirect materials
3. Other factory overhead

b) Administration overhead

Administration overhead is the aggregate of the costs of formulating the policy, directing the organization and controlling the operations of an undertaking which is not directly related to production, selling and distribution. Administration is a distinct function of an organization which supports the other main functions.

Examples of administration are:

- | | |
|---|----------------------------|
| 1) Office rents | |
| 2) Office lighting, heating and cleaning | |
| 3) Depreciation, repairs and maintenance, and insurance of office buildings, office equipment office furniture and other office machines. | |
| 4) Salaries of office staff | 8) Printing and stationery |
| 5) Director's remuneration | 9) Audit fees |
| 6) Office supplies and other expenses | 10) Legal expense |
| 7) Postage and telephone | 11) Bank charges |

Administration overhead costs are not product costs, rather directly recorded as expense when incurred.

c) Selling overhead

Selling overhead costs refers to those indirect costs which are associated with marketing and selling (excluding distribution) activities. Examples are:

1. Salaries commissions and traveling expenses of salesmen and technical representatives.
2. Sales office expense
3. Bad -debts expense (or uncollectible accounts)
4. Brokerage or third-party commissions
5. Costs of marketing information system including market research
6. Advertisement and publicity expenses
7. Costs of catalogues and price -levels
8. Expenses incurred in maintenance of show rooms.

Selling overhead costs are not part of product costs. They are period costs

d) Distribution overhead

Distribution overhead costs are the aggregate of indirect costs associated with the distribution of finished goods. Distribution includes such activities as moving articles to central or local storage, moving articles to and from prospective customers. In gas, electricity, and water industries "Distribution" means pipes, mains and services which may be regarded as equivalent to packing and transportation. Some examples of distribution overhead are:

1. Packing charges
2. Warehousing expenses
3. Insurance of finished goods
4. Wastages of finished goods

5. Deprecation, repairs and maintenance, insurance, and cost of operating the distribution vehicles.

Behavioral classification of factory overhead

Factory overhead costs are also classified in to three behavioral classifications (categories)

1. Fixed overheads
2. Variable overheads
3. Semi variable overheads

Fixed overheads are indirect costs which conform to the definition of fixed costs. If there are many different types of overhead costs, factory overhead analysis sheets are used as a subsidiary ledger. The controlling account of the analysis sheet is manufacturing overhead control account. This summarizes the data in the analysis sheets. Usually large businesses divide factory operations into departments so that costs can be effectively controlled. There are two methods of achieving cost departmentalization.

1. Maintain separate control accounts

Under this method, a control account is maintained for each different manufacturing overhead cost. An analysis sheets are used to show the amount chargeable to each department in a subsidiary ledge. For example, a control account for indirect materials through the factory may be set up in the following manner.

Indirect materials

No _____

Date	Explanati on	Post Ref	Departmental Analysis				Total
			Dep 1	Dept 2	Dept 3	Dept 4	

2. Maintain single control accounts

Under this method a single control accounts is maintained for all manufacturing overhead costs. The subsidiary ledger may organize costs two ways.

a) Subsidiary ledger by type of cost

For each manufacturing overhead cost a subsidiary ledger account is maintained (or kept) for example, a separate account 'is established for indirect labor. Another account is maintained for utilities. This method enables to accumulate costs by type.

b) Subsidiary ledger by department

Under this method, the departmental overhead analysis sheet is used as a subsidiary ledger account)

Recording overhead costs

Certain factory overhead costs, such as electricity, fuel, and water are paid at end of month. Thus, these costs are recorded when paid or bills are received. Other manufacturing overhead costs, such as insurance vacations, and holidays, is accrued and arises from adjusting entries made at the end of the relevant period.

Once we obtain the necessary source documents, the necessary entries are made in the voucher register. In order to record in a voucher register, a voucher must be prepared first using the following steps.

1. Compare the invoice with purchase order and receiving report and all computations are checked.
2. Prepare a voucher, including a notation of the department to be changed
3. Record the voucher in the voucher register. The entry is:
Manufacturing overhead control -----xxx

Vouchers payable -----xxx

4. The cost clerk will post the cost to the appropriate departmental overhead analysis sheet.

Note that the above four steps do not apply to the manner of recording indirect materials and indirect labor. Indirect materials are directly entered into departmental overhead analysis sheet from materials requisition. Indirect labor is directly transferred from the time ticket analysis to departmental overhead analysis sheet.

Manufacturing overhead costs that occur at the end of the period are recorded by means of adjusting entries. These costs usually do not vary from month. Examples are depreciation, taxes, and property insurance. These costs are recorded in the general journal voucher and then posted to departmental overhead analysis sheet.

Illustration

1. Indirect materials costing Br 75,000 were issued to different departments. Prepare the entry to record the issuance.

Entry

MOH control - Indirect materials -----75,000
Raw materials -----75,000

2. Analysis of time ticket indicates that indirect labor costs amounted to Br. 160,000 prepare the entry to record the costs.

Entry

MOH control - Indirect labor -----160,000
Factory payroll clearing -----160,000

3. Assume that depreciation for the period amounts to Br. 120,000 on the factory building and to Br. 95, 000 on the factory equipment. Prepare the entry to record depreciation.

Entry

MOH control - Depreciation -----215,000

Accumulated depreciation -Factory Building -----
120,000

Accumulated depreciation - Factory Equipment-----
95,000

4. Insurance of factory building amounting Br. 5000 has been expired during the period. Prepayment for insurance was initially debited to asset account. Prepare the entry to record the expired insurance.

Entry

MOH control property taxes -----5000

Property taxes payable -----5000

5. Property taxes on factory facilities are estimated to be Br. 49000. Prepare the entry to record property taxes.

Entry

MOH control property taxes -----49000

Property taxes payable -----49000

6. Factory utilities have been paid in cash of Br. 140,000

Entry

MOH control - Utilities -----140,000

Cash -----140,000

Distributing Service Department Costs

By the end of the period, the Production departments and other service departments are expected to operate efficiently. But service departments do not produce goods themselves. The manufacturing overhead costs charged to service departments operations must be redistributed to where goods are produced.

2.11.1 Allocating Service Department Costs

Service departments help producing departments and other service departments to operate efficiently. But service departments do not produce goods themselves. The manufacturing overhead costs charged to

service departments operations must be redistributed to where goods are produced.

It must be noted that relationships exist not only between service departments and production departments but also among individual service departments. One service department receives service from other service departments, or gives service to other service departments. Costs are primarily accumulated at each department for planning and controlling purposes. For inventory costing purposes, however, the factory service department costs must be allocated to the production departments.

2.11.1.1 Basis of allocation

Allocation of service department costs require a proper assessment of the benefits received provide the most equitable basis of allocation. The following are some of common bases usually adopted for measurement of benefits.

Basis	Cost Item
1. Floor Area building service.	Rent, depreciation, maintenance of lighting heating, fire precaution
2. Number of workers employee	Any expense associated with workers such as recreation costs, time keeping supervision costs etc.
3. Value of materials passing such as through the department	Costs associated with material materials handling expenses
4. Capital value	Depreciation, insurance and maintenance of production facilities

5. Direct labor hours and/or items. Machine hours Majority of general overhead
6. Technical estimates, or watts number of Used lights machines coupled with operating time
 - a) Lighting: capacity of lighting or
 - b) Electric power, Horse power of
 - c) Steam
 - d) Water

2.11.1.2 Methods of Allocation

There are three methods of allocating the costs of service departments to production departments. These are:

1. Direct allocation method
2. Step down allocating method
3. Reciprocal allocation method

Example

Cross company is a manufacturing firm and has two service departments (Maintenance and Record Keeping departments) and two production departments (Production 1 and Production 2 departments). During the current year the service departments have rendered the following hours of service and incurred the respective costs:

Departmen ts	Cost	Service Hours			
		Maintenan ce Dept	Record keeping	Productio n Dept 1	Productio n Dept 2
Maintenan	40,000	-	2 Hrs	4 Hrs	4 Hrs

ce	Birr				
Record Keeping	60,000 Birr	5 Hrs	-	3 Hrs	2 Hrs

N.B. Allocation base used for allocating service department cost to production departments is Service Hours.

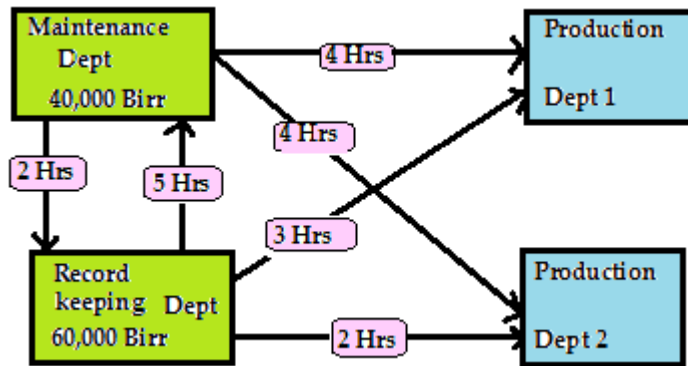
Required

Allocate service dept costs to production departments by using;

1. Direct Allocation Method
2. Step Down Allocation Method
3. Algebraic /Reciprocal/ Allocation Method

Solution

Before we start allocating service department costs to production departments, let us plot the relationship of service that exists between departments on a diagram. This helps us to understand the flow of services easily and allocate costs of service departments to production departments right away.



3. Direct Allocation method

Direct Allocation Method: Under this method, service exchanged between service departments is totally ignored. Service department cost is directly allocated to production departments.

Service Departments	S1	S2	P1	P2
Maintenance Department	-	-	$40000 \times \frac{4}{8}$ =20,000 Birr	$40,000 \times \frac{4}{8}$ =20,000 Birr
Record Keeping Department	-	-	$60,000 \times \frac{3}{5}$ =36,000 Birr	$60,000 \times \frac{2}{5}$ =24,000 Birr
Service Dept Costs allocated to production Departments			56,000 Birr	44,000 Birr
Total			100,000 Birr	

Where: S1 = Maintenance Department

S2 = Record Keeping Department

P1 = Production Department 1

P2 = Production Department 2

As it can be inferred from the above table; Out of the total service departments cost of 100,000 Birr, 56,000 Birr is allocated to Production Department 1 and 44,000 Birr is allocated to Production Department 2.

4. Step down method

Under this method service department cost is allocated between service department only in one direction that is from service department which has rendered its most service to the other service department to the service department which has rendered lesser .

Under our case, Maintenance has rendered 20% (2hrs/10hrs) of its service to Record Keeping department and Record-keeping department has rendered 50% (5hrs/10hrs) of its service to Maintenance Department. From this computation, it can be concluded that Record Keeping Department is the one, which has rendered its most service to other service department (Maintenance). Therefore, cost will be allocated from Record-Keeping to Maintenance department then the allocated costs will be distributed to production departments at the end.

Service Departments	S1	S2	P1	P2
Record Keeping Department	$60,000 \times \frac{5}{10} = 30,000$ Birr	-	$50,000 \times \frac{3}{10} = 18,000$ Birr	$50,000 \times \frac{2}{10} = 12,000$ Birr
Maintenance Department	-	-	$*70,000 \times \frac{4}{8} = 35,000$ Birr	$*70,000 \times \frac{4}{8} = 35,000$ Birr
Service Dept Costs			53,000 Birr	47,000 Birr

allocated to production Departments				
Total			100,000 Birr	

* 70,000 Birr = Cost allocated from Record Keeping + Cost of Maintenance Dept

Department to Record

Keeping Dept

= 30,000 Birr + 40,000 Birr

= 70,000 Birr

Where: S1 = Maintenance Department

S2 = Record Keeping Department

P1 = Production Department 1

P2 = Production Department 2

5. Algebraic /reciprocal /method

Under this method service exchanged between service departments is considered in both directions between service departments.

Before we start allocation of costs to production departments, we need to calculate costs of service departments by considering the costs allocated between themselves. For such purpose we can use simultaneous or substitution method. For this specific example, let us see how substitution method is applied:

$$S1 = 40,000 \text{ Birr} + 0.5 S2$$

$$S2 = 60,000 \text{ Birr} + 0.2 S1$$

$$S1 = 40,000 \text{ Birr} + 0.5 S2$$

Now Substitute S2 in S1's formula

$$S1 = 40,000 + 0.5 (60,000 \text{ Birr} + 0.2 S1)$$

$$S1 = 40,000 \text{ Birr} + 30,000 \text{ Birr} + 0.1 S1$$

$$S1 = 70,000 \text{ Birr} + 0.1 S1$$

$$S1 - 0.1 S1 = 70,000$$

$$0.9 S1 = 70,000 \text{ Birr}$$

$$S1 = 70,000 \text{ Birr} / 0.9$$

$$= 77,777.78 \text{ Birr}$$

Now Substitute S1 in S2's formula

$$S2 = 60,000 \text{ Birr} + 0.2 S1$$

$$S2 = 60,000 \text{ Birr} + 0.2(77,777.78 \text{ Birr})$$

$$= 75,555.5 \text{ Birr}$$

Once the service department cost is determined, on the next step it will be allocated to production departments.

Service Departments	S1	S2	P1	P2
Record Keeping Department	-	77,777.78x .02 =15,555.5 56 Birr	77,777.78X0.4= 31,111.112 = 31,111.112 Birr	77,777.78X0.4= 31,111.112 = 31,111.112 Birr

Maintenance Department	$75,555.5 \times 0.5$ $=$ 37,777.75 Birr		$75,555.5 \times 0.3$ $=22,666.65$ Birr	$75,555.5 \times 0.2$ $=15,111.1$ Birr
Service Dept Costs allocated to production Departments			53.777.8 Birr	46.222.2 Birr
Total			100,000 Birr	



Learning Activity 2.6

Answer the following questions.

1. What are the major techniques which could be used to allocate service department cost to production department?

2.12. SETTING OVERHEAD RATES

Manufacturing overhead costs are not directly traceable to a unit of output. Instead, these costs are accumulated during the year and charged

to jobs or products at the end of the year. However, management cannot wait until the end of the year, or month to find out how much particular job costs. Cost data are most useful when they are immediately available then they can be used to evaluate efficiency, to suggest changes in procedures, and to help setting profitable selling prices. The cost accountant is usually expected to report the total setting profitable selling prices. The cost accountant is usually expected to report the total cost of a job as soon as it is finished. At this time the actual total overhead costs are available, as they would be the end of a fiscal period. Thus, the accountant has to devise a method of estimating overhead costs applicable of the completed jobs. This is achieved by establishing a predetermined overhead rate, or predetermined overhead application rate.

Predetermined overhead application rate refers to the rate determined before the commencement of the period during which the same would be used.

2.12.1 Factors Affecting Rate Setting

Several factors affect the setting overhead rate. Among these are:

1. Length of the Period

This refers to the length of the period over which the rate is to be used. Selection of the length of the period determines the questions as to how frequently the rate should be revised. The period varies from organization to organization. Rate may be revised every year, six months, quarter, or even every month.

The general principle governing the selection of the period is that the period should be long enough to normalize the rate. A shorter period for averaging costs is not satisfactory because wide variation can occur from to period. These variations are due to changes in seasons, calendar, and

volume. Fluctuating costs also complicate any attempt to use shorter period such as a month.

2.12.2. Departmental and factory rates

The second factor is whether a single factory wide rate is used for all factory overhead or whether separate rates are used for each producing departments. If the company is small, has a few manufacturing departments, produces very few types of goods, it may successfully use a single overhead application rate. However, a single overhead rate is not appropriate if different types of products are manufactured, or if all products do not go through all departments. If one department uses largely machine operations, and another department uses primarily hand labor, a single rate is not suitable. Note that when a single rate is used for the entire, it is called blanket rate.

2.12.3 Types of overhead rate bases

The overhead rate is calculated with reference to the amount of overhead provided in the budget and a predetermined volume of production in terms of the base which will be used as denominator. The base should be the best available of the cause and effect relationships between overhead costs and cost drivers.

$$\text{Overhead rate} = \frac{\text{Estimated manufacturing overhead}}{\text{Estimated activity base}}$$

Activity base may be any one of the six bases mentioned below:

A number of bases may be used in computing overhead application rate. The most common bases are:

1. Units of production
2. Direct material cost

3. Direct labor cost
4. Prime cost
5. Direct labor hours
6. Machine hours

Illustration

A summary of the budget data for Abdi manufacturer for the year ended December 31, 1998 is given below:

Budgeted	Manufacturing overhead costs	= \$ 600,000
"	Units of production	= 30,000 units
"	Direct labor costs	= \$400,000
"	Direct labor hours	= 240,000 hours
"	Direct material costs	= \$ 360,000
"	Machine hours	= 350,000 hours

Required: Determine overhead application rate under each of the following bases:

- a) Units of production
- b) Direct material cost
- c) Direct labor cost
- d) Prime cost
- e) Direct labor hours
- f) Machine hours

a) Units of production

Units of production result in a meaningful rate only if the manufacturing process is simple and only if one type or a few very similar types of goods are produced.

$$\text{Rate} = \frac{\text{Estimated Manufacturing Overhead}}{\text{Estimated units of production}}$$

$$\frac{= 600,000}{30,000} = \$ 20 \text{ unit}$$

The rate implies that if one units is produced, the overhead applied (charged) to this unit is \$20. If a job of 100 units is produced, the overhead applied to the job would be \$2000 (i.e. \$20 x 100 units= \$2000)

b) Direct Material cost

Under this method, the overhead application rate is expressed as a percentage of direct material costs.

$$\begin{aligned} \text{Rate} &= \frac{\text{Estimated Manufacturing Overhead}}{\text{Estimated Direct material costs}} \\ &= \frac{600,000}{360,000} \\ &= 1.67 \text{ or } 167\% \text{ of direct maternal costs} \end{aligned}$$

If direct materials consumed of job No. 15 totaled \$22,000, the overhead applied to this job would be \$36,740 (i.e. 167%22000: 36,740) Direct material cost is more appropriate when each article manufactured must require approximately the same amount of materials, or usage must be distributed uniformly thought out the manufacturing process.

However, in practice, most overhead costs have little relationship to materials used. As a result, it is likely to give totally inaccurate results.

C) Direct labor cost

$$\begin{aligned} \text{Rate} &= \frac{\text{estimated manufacturing overhead}}{\text{Estimated direct labor costs}} \\ &= \frac{600,000}{400,000} \end{aligned}$$

The rate implies that the amount of overhead applied to a job or product is 150% of actual direct labor cost incurred on that job. For instance, if actual direct labor costs incurred on job No. 15 totaled \$ 20,000, the overhead applied to this job would be \$ 30,000 (i.e. 150% x20, 000 = 30,000)

This method is the most widely used overhead application basis because it is simple and easy to use. However, the direct labor costs basis is not generally used in all cases where a large proportion of overhead costs relate to the use of machinery. Also if hourly wage rates vary widely between different workers on the same job or in the same department, the direct labor cost is not appropriate.

d) **Prime cost** under this method overhead rate is expressed as a percentage of prime costs (i.e. direct materials plus direct labor)

$$\text{Rate} = \frac{\text{Estimated Manufacturing Overhead}}{\text{Estimated prime cost}}$$

$$= \frac{600,000}{400,000 + 360,000} = 0.79 \text{ or } 79\% \text{ of prime cost}$$

This method takes in to account both direct materials and direct labor. However, it would produce inaccurate results due to the following reasons:

1. If material cost is predominant in prime cost, the method would completely ignore the time element.
2. If ignores the fact that use of expensive machinery gives rise to additional overheads (i.e. higher depreciation higher insurance, higher repair and maintenance etc)
3. It combines the disadvantages associated with the rates based on the direct material costs and those based on the direct labor costs.

e) Direct labor hours:

This method assumes that overhead costs tend to vary with the number of hours of direct labor used:

$$\begin{aligned}\text{Rate} &= \frac{\text{Estimated Manufacturing Overhead}}{\text{Estimated Direct labor hours}} \\ &= \frac{600,000}{240,000} \\ &= 250\% \text{ of direct labor hours, or} \\ &= \$2.50 \text{ direct labor hour.}\end{aligned}$$

If a job required 100 direct labor hours is completed, the overhead applied to job would be \$25000 (i.e. \$2.50 x 100 hours = \$2500)

The direct labor hour basis is more appropriate if labor operations are the major part of the production process.

f) Machine Hours

This method is used when machine operations are the major part of the production process. When work is performed primarily by machines, a large part of factory overhead consists of depreciation, power repairs and other costs associated with machinery. Thus, a logical relationship exists between the use of the machinery and the amount of overhead costs incurred.

$$\begin{aligned}\text{Rate} &= \frac{\text{Estimated Manufacturing Overhead}}{\text{Estimated Machine Hours}} \\ &= \frac{600,000}{350,000} \\ &= \$1.71 \text{ per machine hour}\end{aligned}$$

If job 15 used hours basis is not accurate if different kinds of machines are used for various products. In such a case, variations in original cost,

operating costs, machine speed, and labor costs would make this rate in appropriate as an overall formula.

Setting Departmental overhead rates

As described earlier, if a single factory -wide overhead rate is not appropriate, multiple overhead rates are calculated for each production departments. Note that the rate is now computed for service departments. In order to compute departmental overhead rates, the following may be used:

Step 1. Allocate service department costs to production departments using the methods introduced earlier (i.e. direct allocation method, step -down allocation method, or reciprocal allocation method)

Step 2. Determine the overhead application rate using any one of the appropriate base described earlier in this chapter. It is determined in the same way as single overhead application rate.



Learning Activity 2.7

Answer the following question.

1. A company manufactures four products A, B, C and D products are assigned 5,10,8 and 4 points respectively, to compensate the basic difference in the products. The normal capacity is as follows:

A-----1000 units

B-----3000 units

C-----5000 units

D-----1000 units

Total factory overhead costs for the budget year are estimated at \$700,000.

Required: Determine overhead application rate if normal capacity units of production basis are used?

2.13. APPLYING MANUFACTURING OVERHEAD

In the preceding discussion, the methods of determining overhead application rate were introduced. However, accounting for applied overhead was not introduced. Thus, this topic is intended to introduce how manufacturing overhead is applied to jobs or products, how to record in the accounting records, and how to treat the difference between actual manufacturing overhead and applied manufacturing overhead.

In general the following procedures are used to apply manufacturing overhead to jobs or products.

Step 1. Select the application base (bases described earlier)

Step 2. Prepare a factory overhead budget for the planning period. The two key items are

(a) Budgeted total overhead and

(b) Budgeted total volume of the application base.

Step 3 Compute the overhead application rate by dividing the budgeted total overhead by the budgeted total volume of the application base.

Step 4 Obtain the actual application base data (such as machine hours) for the period.

Step5 Apply the overhead to the jobs by multiplying the overhead application

rate by the actual application base data.

Step 6 prepare the necessary entry to the applied factory overhead by the following entry:

Work in process-----xxx	
	Manufacturing overhead applied
-----xxx	

Step 7 At the end of the period, account for any difference between the amount of overhead actually incurred and overhead applied to products.

2.14. OVER APPLIED OR UNDER APPLIED OVERHEAD

Actual manufacturing overhead costs have been debited to MOH control account, and the same account has been credited from the manufacturing overhead applied to jobs or products. At the end of the period, MOH control account may have debit or credit balance. A credit balance in the account implies over applied manufacturing overhead. In other words, over applied overhead occurs when applied overhead is greater than actual manufacturing overhead. If actual manufacturing overhead, on the other hand, exceeds applied overhead, the difference is called under applied overhead. In other words, under applied overhead is said to exist if MOH control account has debit balance.

The balance of under applied or over applied manufacturing overhead represents a difference between overhead costs applied to goods worked on during the year and the actual overhead costs that were incurred in producing these goods. There are two ways of treating under applied or over applied overhead at the end of the year.

a) **Immediate write off method**

If the amount of under applied or over applied overhead is small, it is regarded as an adjustment to Cost of Goods sold (i.e. written-off against cost of goods sold account).

Example

Assume that factory overhead incurred is \$800.000 and that factory overhead applied is \$750.000. The difference is under applied of \$50.000. The closing entry is:

Cost of Goods sold	50.000
Manufacturing overhead control	50.000

If the difference were over applied, the closing entry would be:

Manufacturing overhead control	50.000
Cost of Goods sold	50.000

b) Perorations Method

If the amount of under applied or over applied overhead is considered to be material, it is divided among Cost of Goods Sold. Work in Process, and Finished Goods Inventory.

Example

Assume that factory overhead incurred is \$900.000 and that factory overhead applied is \$1,200,000. The difference is considered to the material. Assume further that the ending balances (before prorating) were as follows:

Cost of goods sold	\$1,000,000
Work in Process	400,000
Finished goods	600,000

Required

1. Compute under applied or over applied overhead at year end.
2. Prorate under applied or over applied overhead among the three balances.

3. Prepare the closing entry to record the prorated amount assuming that applied overhead was recorded in manufacturing overhead control account.
4. Compute the new balances of the account after proration.

Solution

1. Over applied overhead:

Factory overhead applied	\$1,200,000
Less Factory overhead incurred	<u>900,000</u>
Over applied overhead	<u>\$ 300,000</u>

2. Proration of over applied overhead is shown below:

$$\text{Cost of Goods Sold} = \frac{1,000,000}{2,000,000} \times 300,000 = \$ 150,000$$

$$\text{Work in Process} = \frac{400,000}{2,000,000} \times 300,000 = 60,000$$

$$\text{Finished Goods} = \frac{600,000}{2,000,000} \times 300,000 = 90,000$$

3. Manufacturing overhead control 300,000

Cost of Goods sold 150,000

Work in Process 60,000

Finished Goods 90,000

4. The balance of the three accounts after proration are computed below.

$$\text{Cost of Goods sold} = 1,000,000 - \$150,000 = \$850,000$$

$$\text{Work in Process} = 400,000 - 60,000 = 340,000$$

$$\text{Finished Goods} = 600,000 - 90,000 = 510,000$$

1. During the month of March 2005 the production department of Ethio pharmaceuticals had requisition totaling \$60,000 for direct materials and \$18000 for indirect materials.

Prepare the necessary entry in general journal form, to record the cost of materials requisitioned for the month.

2. Assume that the production department had returned \$5,500 of indirect materials.

Prepare the necessary journal entry to record the cost of the materials returned to the storeroom.

3. Addis furniture factory uses 45000 units of materials XXX every day in production. It takes 10 days for an order to be delivered. The factory always wants to have a four-day supply on hand (or safety stock), what is the point at which it should reorder material XXX
4. A manufacturer has determined that the cost to place an order for its material is Br 15 and the cost to carry this item in inventory is Br 2 per unit. The company requires 24,000 units for production each year. Calculate the economic order quantity (EOQ)
5. Assume that Marble Manufacturing Company has four types of materials that can be grouped into two categories. These materials with their costs and Net realizable values (NRV) are summarized below

	Units	Cost	NRV
Category 1			
Material A	460	\$1.40	\$1.30
Material B	880	0.85	0.90
Category 2			
Material C	1290	1.20	1.45
Material D	580	0.65	0.55

Required: Determine the value of the inventory if the lower of cost or net realizable value method is applied to:

- a) individual inventory item
 - b) Category of items
 - c) Inventory as a whole
6. Assume that the total labor costs paid during the month is Br 200,000. the analysis of time tickets that labor costs amounted Br 40,000 were not paid at the end of the month.

Required

- A. What is the amount by which factory payroll clearing account has been debited during the month?
 - B. What is the amount by which factory payroll clearing account has been credited for the month?
 - C. Determine the balance of factory payroll clearing account at the end of the month.
 - D. How much should be shown as a current liability in the balance sheet at the end of the month?
7. At the end of the month, after posting, the Factory payroll clearing account has a \$10,000 credit balance. What does this credit balance represent, and where is it shown on t financial statements?
8. GH manufacturing company applies overhead to jobs on the basis of machine hours. The following data is extracted from the record or the company for 1996.

Budgeted factory overhead costs	\$ 7,000,000
Budgeted machine hours	200,000 hours
Actual factory overhead costs	\$ 6,800,000
Actual machine hours	195,000

Required

9. Compute the factory overhead application rate.
10. Journalize the application of factory overhead.

11. Compute the amount of under applied or over applied factory overhead. And pass the necessary Journal entry.

MODULE THREE: JOB ORDER AND CONTRACT COSTING METHODS

Content

- 3.0 Introduction
- 3.1 Objectives
- 3.2 Work flow and Cost flow
 - 3.2.0 Overview
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 - 3.2.2 Workflow
 - 3.2.3 Recording Costs as Incurred
 - 3.2.4 Product and Service Costing
- 3.3 Job order costing accounting application
 - 3.3.0 Overview
 - 3.3.1 Objectives

3.3.2 Illustration of Job-order Costing
3.4 Job-Order Cost Systems for Service Enterprise
3.5 Summary
3.6 Glossary
3.7 Model Exam Questions

3. INTRODUCTION



Dear learner, welcome to the third unit of the Cost and Management Accounting I. This unit examines the details of job order costing system. Job order costing system is used by companies where goods are produced in distinct batches and there are significant differences among the batches. Examples of firms that use job order costing are aircraft manufacturers, printers, custom furniture manufacturers, and custom machining firms. In job order costing each distinct batch of production is called a job or job order. The cost accounting procedures are designed to assign costs to each job. Then the

costs assigned to each job are averaged over the units of production in the job to obtain an average cost per unit.

Procedures similar to those used in job-order costing are also used in many service industry firms, although these firms have no work in process or finished goods inventories. In a public accounting firm, for example, costs are assigned to audit engagements in much the same way they are assigned to a batch of products by a furniture manufacturer. Similar procedure are used to assign costs to "cases" in health care facilities, to "programs" in government agencies, to research "project" in universities and to "contracts" in consulting and architectural firms.

3.1. OBJECTIVES

Overview



Dear learner! At the end of the session you are expected to:

- Diagram the flow of costs through the manufacturing accounts used in product costing.
- Understand how the job -order costing system is used.
- Compute a predetermined overhead rate, and explain its use in job-order costing.
- Prepare journal entries to record the costs of direct labor, direct material, and manufacturing overhead in a job -order costing system.
- Understand how job -order costing system is used in a service enterprise.

3.2 WORK FLOW AND COST FLOW

The cost accounting system of a firm parallels the flow of its operations. This section discusses the flow of products through the manufacturing operations and the flow of manufacturing costs through the accounting system. It also discusses the purposes of product and service costing.

3.2.1 Objectives

After completing this section you should describe the flow of costs and work flow in a business organization, and explain the purposes of product and service costing for a business organization.

3.2.2. Work flow

The cost accounting system of a firm parallels the flow of its operations. A firm that makes and sells products may have four steps in its cycle of operation. These four steps form the operating cycle of a firm and are chronological in nature. These steps are:

1. Procurement

Procurement is the process of acquiring the necessary inputs for production. These inputs are raw materials, labor and factory facilities. Factory facilities include manufacturing machinery, utilities and similar facilities.

In the procurement step, we need to purchase the necessary materials, recruit the necessary labor force and acquire the appropriate manufacturing facilities. Raw materials are converted into finished products by means of manpower and factory facilities, such as machinery, utilities and similar items. Raw materials have to be ordered, received and stored.

2. Production

Production refers to the actual conversion of raw materials by means of labor and factory facilities. At this stage, raw materials are transferred

from the store room to the factory floor. Labor, tools, machines and other facilities are applied to complete the product.

3. Warehousing

Warehousing is the movement of the completed products from factory floor to warehouse to await for sale. Those goods that have been completed should be moved from factory to warehouses.

4. Selling

Selling includes finding customers and making shipments of merchandises. Customers are found, agreement is reached on with the customers, goods will be shipped from the warehouse and sales to customers are recorded.

3.2.3 Recording costs as incurred

As each cost is incurred, it must be recorded in an appropriate ledger account. At different points in the operating cycle different accounts are needed.

1. Procurement

At this stage accountants should be provided to record the purchase of material cost, labor cost and overhead costs. These costs will later be charged to production. Typical, general ledger account titles used are raw material, factory payroll clearing and manufacturing overhead control.

2. Production

An account is required to gather procurement costs as they become chargeable to manufacturing operation and this account is called work-in-process inventory.

3. Warehousing

An account should be set up to record the cost of goods that have been completely manufactured. This account is finished goods inventory.

4. Selling

The cost of completed goods that have been sold and must be recorded, and for this purpose a general ledger account called cost of goods sold is maintained.

3.3. JOB-ORDER COSTING ACCOUNTING APPLICATION

3.3.0 Overview

The preceding section examined the accumulation of costing in a job order costing system in a manufacturing enterprise. This section illustrates the procedures used in job-order costing system. It also discusses the application of job-order costing system for a service enterprise.

3.3.1 Objectives

This section exemplifies the application of job -order costing system in manufacturing enterprises. It also describes the application of job-order costing system to a service enterprise.

3.3.2 Illustration of Job-order Costing

The following information is available for us about St. Gabriel Company for the year ended Dec 31,20xx. The company is engaged in production of items based on customers' specification.

1. Beginning Raw Material

RM A..... 100 Unit @100Br
RMB.....200 Unit @120Br.
RMC.....150 Unit @110Br.

2. The Company has purchased the following Raw Materials during the period:

RM A..... 200 Units @110Br

RMB.....100 Units @110Br.

RMC.....100 Units @120Br

3. The following amount of Raw Materials are used for production during the period:

RM A..... 200 units

RMB..... 250 units

RMC..... 200 units

4. The following information presents the percentage of material cost incurred for the respective Jobs:

Job 01..... 40%

Job 02.....20%.

Job 03.....40%

5. Beginning Work In Process Inventory

WIP Job 01 1,000Br

6. Beginning Finished Goods Inventory

FG Job 04100 Units @1500Br

7. Direct labor cost is equal to 40% of direct material cost

8. Factory over head cost is applied at 10% of direct labor cost

9. The following jobs were completed during the period

Job 1100 units

Job 03..... 120 units

10. The following units were sold during the period

Job 0150 units

Job 02..... 60 units

Job 0350 units

11. The following costs are found out as been incurred during the period

Indirect material.....1, 000 Birr

Indirect labor.....800 Birr

Machine depreciation.....500 Birr

Factory rent200 Birr

Required

1. Pass the necessary journal entries
2. Prepare job cost sheet
3. Pass the necessary entry for over/under applied FOH cost

Solution

1. There is no need to pass an entry for beginning inventory since it is already on the record since beginning inventory of current period is ending inventory of the previous period.

2. RMA22,000

RMB.....11,000

RMC.....12, 000

Cash.....45,000

3 &4. WIP Job 129,200

WIP Job 214, 600

WIP job 3.....29,200

RMA21,000

RMB.....29,500

RMC.....22, 500

5&6. There is no need to pass an entry for beginning inventory since it is already on the record i.e. beginning inventory of current period is ending inventory of the previous period.

7. WIP Job1..... 14,600

WIP job 2.....7, 300

WIP Job314,600

Salary Payable.....36,500

8. WIP Job1..... 1,460

WIP job 2.....530

WIP Job31,460

FOH Applied3,650

(To record estimated Factory Overhead Cost)

9. FG job 1 46,260

FG Job 345,260

WIP job 1..... 46,260

WIP job 245, 260

Cost /unit

Job 01 = 46,260 Birr = 462. 60 Birr/ Unit

100 Unit

Job 03 = 45,260 Birr = 377.16 Birr/ Unit

120 Unit

10. Cost of Goods Sold120, 760

FG job 1 23,130

FG job 0322, 630

FG job O4.....75, 000

St. Gabriel Company

Job cost sheet

For the year ended Dec 31,20xx

	Job 1	Job 3
Beg WIP	1000	-
RM	29200	29200
DL	14600	14600
FOH	14600	1460
Total Cost	46260	45260

11. FOH control2,500

RM.....1,000

Salary Payable.....800

Acc. Dep 500

Rent pay200

Adjustment:

FOH app.....3,650
 FOH over/under applied.....1,150
 FOH control.....2, 500

There are different methods that could be used to adjust FOH over/under applied costs:

1. Direct write off (if the amount is in significant)
2. Proportion method
3. Adjusting the rate method

As per **IFRS (International Financial Reporting Standard)**, if the actual cost exceeds the estimated, there is no need to make an adjustment on the cost rather it will be reported as management inefficiency and expensed on the income statement.

Direct write of method

Under this method factory over applied cost is directly adjusted to the cost of goods sold account. It is advisable to use this method when the over applied cost is insignificant.

FOH over/under applied..... 1,150
 Cost of Goods Sold.....1, 150

Peroration method

Under this method factory over applied cost is adjusted through prorating it to the accounts affected. The prorated amount depends on the carrying balance of every account.

Accounts	Rate	
WIP job 02.....22,630	0.12X1150	=
FG job 01.....23,130	138	
FG job 0322,630	0.12X1150	=
	138	
CGS.....12,760	0.12X1150	=

189,150	138	
	0.64x1150	=
	736	
	1	
	1,150	

FOH/over/under app.....1150

WIP job 02.....138
 FG job 01.....,... 138
 FG job 01.....,.....138
 Cost of Goods Sold.....736

3.4 JOBS -ORDER COST SYSTEMS FOR SERVICE ENTERPRISE

A job order cost accounting system may be useful to the management of a service enterprise in planning and controlling operations. Since the "product" of such an enterprise is service, management focus is on direct labor and overhead costs. The cost of any materials or supplies used in rendering services for a client is usually small in amount and is normally included as part of the overhead.

The direct labor and overhead costs of rendering services to clients are accumulated in a work in process account, which is supported by a cost ledger. A job cost sheet is used to accumulate the costs for each client's job. When a job is completed and the client is billed, the costs are transferred to a cost of services account. This account is similar to the cost of merchandise sold account for a merchandising enterprise or the cost of goods sold account for a manufacturing enterprise. A finished goods account is not necessary, since the revenues associated with the service are recorded after the services have been rendered.

In practice, additional accounting consideration unique to service enterprise may need to be considered. For example, a service enterprise may bill clients on a weekly or monthly basis rather than waiting until a job is completed. In these situations, a portion of the costs related to each billing should be transferred from the work in process account to the cost of service account.



Learning Activity 3.1

Answer the following questions.

1. Record the entry for the following transactions.
 - a. Purchase of materials on account , Br 2500
 - b. Factory overhead costs incurred on account, Br 300.
 - c. Depreciation of machinery , Br 1500
 - d. Direct materials request turned and direct factory labor used is respectively Br 600 and Br 5000 respectively.
 - e. The factory overhead rate is 50% of direct labor cost.

3.5 SUMMARY



Product costing is the process of accumulating the costs of a production process and assigning them to the firm's products. Product costs are needed for three major purposes: 1) to value inventory and cost of goods sold in financial accounting 2) to provide managerial accounting information to managers for planning, cost control and decision making and (3) to provide cost data to various organizations outside the firm, such as equipment agencies or insurance companies. Information about the costs of producing goods and services is needed in manufacturing companies, service industry firm and unprofitable organization.

Two types of product costing systems are used, depending on the type of product manufactured. Process costing is used by companies that produce large number of nearly identical products, such as cannot dog food and motor oil. Job order costing, the topic of this unit, is used by firm's that produce relatively small members of dissimilar products such as custom furniture and major kitchen appliances.

In job order costing system, the costs of direct materials, direct labor and manufacturing overhead are first entered into the work -in-process inventory account. When goods are completed, the accumulated manufacturing costs are transferred from work-in costs are transferred from finished goods inventory. Finally there product costs are transferred from finished goods inventory. Finally, there product costs are transferred from finished goods inventory to cost of goods sold when sales occur direct material to cost of goods sold when sales occur. Direct material and direct labor are traced easily to specific batches of production called job orders. In contrast, manufacturing overhead is an indirect cost with prospect job orders or units of product. Therefore overhead is applied for production jobs using a predetermined overhead rate, which is based on estimates of manufacturing overhead and the level of some cost driver. The most commonly used volume based cost drivers are direct labor

hours direct labor cost, and machine hours, since these estimates will seldom be completely accurate, the amount of overhead applied during an account period to work-in-process inventory will usually differ from the actual costs incurred for overhead items. The difference between actual overhead and applied overhead, called over applied or under applied may be closed out into cost of goods sold or prorated among work-in process inventory, finished goods inventory and cost of goods sold.

==

3.6 GLOSSARY

1. Activity base (or cost driver): a measure of an organization activity that is used as a basis for specifying cost behavior.
2. Job cost sheet: A document on which the costs of direct material, direct labor and manufacturing overhead are recorded for a particular production job orders of production.
3. Job -order costing system: a product costly system in which costs are assigned to batches or job orders of production.
4. Material requisition form: a document up on which the production department supervisor requests the release of raw materials for production.
5. Peroration: The process is allocating under applied or over applied overhead to work in process inventory, finished goods inventory and cost of goods sold.
6. The ticket: a document that records the amount of time an employee spends on each production job.
7. Volume based cost driver: a cost driver that is closely associated with production volume such as direct labor hours or machine hours.

3.7 MODEL EXAM QUESTIONS

I. Multiple choice questions

1. The account maintained by a manufacturing business for inventory of goods in the process of manufacture is:

- A. Finished goods
- B. Materials
- C. Work in process
- D. None

2. If the factory overhead account has a credit balance, factory overhead is said to be:

- A. Under applied
- B. Over applied
- C. Under absorbed
- D. None of the above

3. For which of the following would the job order cost system be appropriate?

- A. Antique furniture repair shop
- B. Rubber manufactures
- C. coal manufactures
- D. All of the above

4. Which of the following is not a volume based out driver?

- A. Machines hours
- B. Direct labor hours
- C. Direct labor costs
- D. None of the above

5. When a job is completed and the client is billed, the costs are trampled to what account in a cost accounting system for a service enterprise?

- A. Accounts payable
- B. Cost of service account
- C. Purchase account
- D. None of the above

6. Product costing in a manufacturing firm is the process of:

- A. Accumulating the companies period costs
- B. Allocating costs among the organizational departments
- C. Placing a value on the company's fixed assets
- D. Assigning costs to the organizations inventory
- E. Assigning costs to the company's financial statement

7. XYZ company incurred Br 50,000 of direct labor and Br 2000 of indirect labor the proper journal entry to record their events would include a debit to work in process for:
- A. Br 0 because work in process should be credited
 - B. Br 0 because work in process is not affected
 - C. Br 2000
 - D. Br 50,000
 - E. Br 52,000
8. ABC company, which applies overhead at rate of 150% of direct labor cost, began work on job no 101 during February. The job was completed in March and sold during April, having accumulated direct material and labor chapter of Br. 15,000 and Br 6000 respectively. On the bases of this information, the total overhead applied to job no 101 amounted to:
- A. Br 0
 - B. Br 4000
 - C. Br 6000
 - D. Br 8000
 - E. Br 9000
9. The left side of the manufacturing overhead amount is used to accumulate
- A. actual manufacturing overhead costs ad incurred throughout the accounting period
 - B. Overhead applied to work in process inventory
 - C. under applied overhead
 - D. Predetermined overhead
 - E. Over applied overhead
10. As production takes place, all manufacturing costs are added to the:
- A. work in process inventory account
 - B. Manufacturing overhead inventory account
 - C. Cost of goods sold account

- D. Finished goods inventory account
- E. Production labor account

11. A print shop would likely utilize

- A. Job -order costly
- B. Process costing
- C. Job-order brightly
- D. Process budget
- E. Joint costing

12. A typical job-cost sheet would practice information about all of the following items related to an order except.

- A. the art of direct materials used
- B. administration costs
- C. Direct labor costs incurred
- D. Applied manufacturing overhead
- E. Direct labor hearts worked

13. Walton manufacturing recently sold goods that cost Br 35,000 for Br 42,000 cash. The journal entries to record this transaction would include:

- A. A credit to work in process inventory for Br 35,000
- B. a debit to sales account for Br 42,000
- C. A credit to profit on sales for Br 7000
- D. A debit to finished goods inventory for Br 35,000
- E. A credit to sales revenue for Br 42,000

14. TOT Company worked on four jobs during its first year of operations:

No 410,402,403 and 404 Nos. 401 and 402 were completed by year end, and no 401 was sold at a profit of 40% cost. A review of job no 403's cost sheet revealed direct materials charges of Br 20,000 and total manufacturing costs of Br. 25,000. It Tokyo company applies overhead at 150% of direct labor cost, the overhead applied to job no 403 must have been:

- A. Br 0

- B. Br 2000
- C. Br 3000
- D. Br 3333
- E. Br 5000

15. Which of the following entries would not likely be a user of job costing system?

- A. Custom furniture manufacturers
- B. Consuming firms
- C. Hospitals
- D. Law firms
- E. None of the above, as all are likely users

The following data apply to question # 6 through 8.

Selected data concerning the past fiscal year's operations of the Eyoha Manufacturing Company are presented below:

	Inventories	
	<u>Beginning</u>	<u>Ending</u>
Direct materials	Br.75, 000	Br.85, 000
Work in process	80, 000	30, 000
Finished goods	90, 000	110,000

Other data follows:

Direct materials used.....Br.326, 000

Total manufacturing costs charged to production..... 686, 000*

* Include direct materials, direct labor, and factory overhead applied at the rate of 60% of direct labor cost. Assume no under or over applied manufacturing overhead.

16. The cost of direct materials purchased during the year amounted to:

- A. Br.411, 000
- B. Br.360, 000
- C Br.316, 000
- D. Br.336, 000
- E. None of the above

2. Company which uses a job costing system is a labor intensive firm, with many skilled crafts people on the payroll. Job No 789 was the only job in process on January 1, having costs of Br 22,500 as of that date: Direct materials used and direct labor incurred January were:

Job No	Direct Materials	Direct Labor
Job. No 789	Br 2000	Br 6000
Job No 790	9000	10,000
Job no 791	14,000	8000

Job no 791 was the only job in production as of January 31

Required

- Should mono company use direct labor or machine hours as a cost driver why?
- Assume that the company decided to use direct labor as its art driver. If the budgeted amount of direct labor and manufacturing overhead are anticipated to be Br 200,000 and Br 300,000 respectively. What is the firm's predetermined overhead rate?
- Compute the cost of work in process inventory as of January 31
- Compute the cost of completed jobs during January
- Suppose that the company sold its completed jobs, adding a 40% markup to cost. How much would the firm report as (1) art of goods sold and (2) sales revenue?

UNIT FOUR: PROCESS COSTING

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4.0 INTRODUCTION



Dear learner, welcome to the fourth unit of the Cost and Management Accounting I. Process - Costing systems are used for costing like or similar units of products, which are often mass-produced. These units differ from the custom-made or unique products costed under Job-costing systems. Process costing is most commonly used in industries that produce essentially homogeneous (i.e., uniform) products on a continuous basis, such as bricks, paper, steel, chemical, and textile. A form of process costing may also be used in utilities that produce gas, water, and electricity.

This unit covers product costing using process-costing systems. The unit has three main sections. In section 1, you will see the similarities and differences between job-order costing and process-costing systems. In section 2, you will see the flow of process costs in procurement, production, warehousing and selling. Finally, in section 3, you will see the detailed discussion of cost accumulation and inventory costing in process costing system.

4.1. OBJECTIVES

Overview



Dear learner! At the end of the session you are expected to:

- ✓ Know the similarities and differences between the two main inventory-costing methods- Job order and process costing
- ✓ Prepare journal entries to record the flow of materials, labor, and overhead through a process costing system.
- ✓ Compute the equivalent units of production for a period by the weighted-average method.
- ✓ Prepare a quantity schedule for a period by the weighted-average method
- ✓ Compute the costs per equivalent unit for a period by the weighted-average method.
- ✓ Prepare cost reconciliation for a period by the weighted-average method.
- ✓ Compute the equivalent units of production for a period by the FIFO method.
- ✓ Prepare a quantity schedule for a period by the FIFO method.
- ✓ Compute the costs per equivalent unit for a period by the FIFO method.
- ✓ Prepare cost reconciliation for a period by the FIFO method.

4.2. SIMILARITIES AND DIFFERENCES BETWEEN JOB-ORDER AND PROCESS-COSTING SYSTEMS

In some ways process costing is very similar to job-order costing, and in some ways, it is very different. In this section, we focus on these similarities and differences in order to provide a foundation for the detailed discussion of process costing that follows.

4.2.1 Similarities between job-order and process costing

It is important to recognize that much of what was learned in the preceding unit about costing and about cost flows applies equally well to process costing in this unit. That is, we are not throwing out all that we have learned about costing and starting from “Scratch” with a completely new system. The similarities that exist between job-order and process costing can be summarized as follows:

- 1) The same basic purposes exist in both systems, which are to assign material, labor and overhead cost to products and to provide a mechanism for computing unit costs.
- 2) Both systems maintain and use the same basic manufacturing accounts, including manufacturing overhead, raw materials, work in process, and finished goods.
- 3) The flow of costs through the manufacturing accounts is basically the same in both systems

As can be seen from this comparison, much of the knowledge that we have already acquired about costing is applicable to a process costing system. Our task now is simply to refine and extend this knowledge to process costing.

4.2.2 Differences between job-order and process-costing

The differences between job-order and process costing arise from two factors. The first is that the flow of units in a process costing system is more or less continuous, and the second is that these units are indistinguishable from one another. Under process costing, it makes no sense to try to identify materials, labor, and overhead costs with a particular order from a customer (as we did with job-order costing), since each order is just one of many that are filled from a continuous flow of virtually identical units from the production line. Under process costing, we accumulate costs by department, rather than by order, and assign these costs equally to all units that pass through the department during a period.

A further difference between the two costing systems is that the job cost sheet has no use in process costing, since the focal point of that method is on departments. Instead of using job cost sheets, a document known as a production report is prepared for each department in which work is done on products. The production report serves several functions. It provides a summary of the number of units moving through a department during a period, and it also provides a computation of unit costs. In addition, it shows what costs were charged to the department and what disposition was made of these costs.

The major differences between job-order and process costing are summarized below.

<u>Job - order costing</u>	<u>Process - costing</u>
1. Many different jobs are worked produced on during each period, with each basis or job having different production requirements identical.	1. A single product is either on a continuous for long period of time. All units of product are
2. Costs are accumulated by individual job	2. Costs are department
3. The job cost sheet is the key document controlling the accumulation of costs by a job	3. The department production report is the key document showing the accumulation and disposition of costs by a department
4. Units costs are computed by job on the job cost sheet	4. Unit costs are computed by department on the department production report



Learning Activity 4.1

Answer the following question.

1. Explain the types of industries that commonly use process costing system?

2. What similarities exist between job-order and process costing?

3. Costs are accumulated by job in a job-order costing system; how are costs accumulated in a process costing system?

4.3 THE FLOW OF PROCESS COSTS

Many procedures and records used in the process costing system are similar to those in job order cost accounting. Here is an overview of the process costing system.

4.3.1 Procurement

- 1) Materials: Purchases of materials are first recorded in the voucher register and are charged to the raw materials account. The raw materials inventory is controlled through the materials ledger. Issues are made by an authorized requisition, and requisitions are recorded in a materials requisition journal. It is often unnecessary to distinguish between the direct and indirect materials used in a given process

because both types of materials apply proportionately to all units manufactured during the period.

2) Labor: The same time card and payroll procedures are used as in the job order cost system. Since these are no individual jobs, a daily time ticket for each worker is used to accumulate the data required for charging labor costs to departments. The charging is done in a weekly or monthly payroll analysis by processes or departments. As with materials costs, many accountants do not distinguish between direct and indirect labor costs incurred in producing departments. They prefer to charge both directly to the work in process accounts for the departments.

3) Overhead: Other manufacturing costs are recorded as usual through the payroll register, the voucher register and general journal vouchers. Details are posted to departmental overhead analysis sheets in the same way as under job order costing. At the end of the month, overhead costs are allocated to producing departments or processes.

4.3.2 Production

Costs are charged to work in process by one of several arrangements, according to the complexity of the firm's operations.

- A single work in process account may be used by a company that has only one producing department or continuously produces a single product, such as ice, salt, cement, a single style of chair, or a single type of sheet metal.
- Departmental works in process accounts are preferable if production flows through several cost centers or departments. Separate cost figures for each process might also be desirable.

1. Materials. As in job order costing, material requisitions are used to accumulate material costs to each department. The details are considered reduced in process costing because the number of departments is usually less than the number of jobs that a firm handles at a given time. In

addition, frequently materials are issued only to the process-originating department. The issuance of materials is recorded as follows:

Work in process - department x.....xx

Materials.....xx

2. Labor costs: the detailed clerical work of accumulating labor costs by job order costing is eliminated in process costing because labor costs are identified by and charged to departments. Direct labor costs are distributed to departments using the following entry:

Work in process - department x.....xx

Work in process - department y.....xx

Work in process - department z.....xx

Payroll (Salary and Wages payable).....xx

3. Manufacturing overhead costs: In both job order and process costing, there is manufacturing overhead subsidiary ledger for departments. When costs are incurred, they are recorded in manufacturing overhead control account and posted to departmental expense analysis sheets, which constitute the subsidiary ledger. Actually manufacturing overhead costs are recorded as follows:

Manufacturing overhead control.....xx

Account payable.....xx

Accumulated depreciation..... xx

Materials.....xx

Payroll (Salary payable).....xx

At the end of each period either actual or applied overhead is charged to the producing departments. When overhead costs are applied to departments the following entry is made:

Work in process - department x.....xx

Work in process - department y.....xx

Work in process - department z.....xx

Manufacturing overhead applied.....xx

4. Output data from each department are summarized in periodic production reports. Then the average costs are computed and presented in cost of production reports.

5. Costs are transferred from one process to the other as the product flows toward completion.

Work in process - department y.....xx

Work in process - department x.....xx

4.3.3 Ware housing

When the goods are finished and transferred to the warehouse to await sale, their cost is debited to finished goods. The corresponding credit is posted to the work in process account of the last department in the producing sequence.

Finished goods - 101.....xx

Work in process - department z.....xx

4.3.4 Selling

The cost of products sold is debited to cost of goods sold and credited to finished goods. In turn, sales are credited for the selling price, and cash or accounts receivable is debited.

Cost of goods sold.....xx

Finished goods - 101.....xx

Cash or accounts receivable.....xx

Sales.....xx



Learning Activity 4.2

Answer the following question.

1. In what journal are requisitions for direct materials recorded?

2. Under job order costing, the daily time ticket for each worker whose wages are classified as direct labor shows the job worked on. What does the time ticket for such workers show if the process cost system is used?

44 COST ACCUMULATION AND INVENTORY COSTING

After materials labor and overhead costs have been accumulated in department, the department's output must be determined so that unit costs can be computed. Material, labor and overhead costs often are incurred at different rates in a production process. Direct material is usually placed into production at one or more discrete points in the process. In contrast, direct labor and manufacturing overhead, called conversion costs, and usually are incurred continuously throughout the process. When an accounting period ends, the partially completed goods that remain in process generally are at different stages of completion with respect to material and conversion activity.

44.1 Equivalent units of production

The difficulty in determining unit costs of products is that a department usually has some partially completed units in its ending inventory. It does not seem reasonable to count these partially completed units as

equivalent to fully completed units when counting the department's output. Therefore, we will mathematically convert those partially completed units into an equivalent number of fully completed units. In process costing, this is done using the following formula:

Equivalent units = number of partially completed units x percentage completion

The equivalent units are the number of completed units that could have been obtained from the materials and effort that went into the partially complete units.

There are two different ways of computing the equivalent units of production for a period: the FIFO method and weighted average method. The FIFO method of process costing is a method in which equivalent units and unit costs relate only to work done during the current period. In contrast, the weighted-average method blends together units and costs from the current period with units and costs from the prior period.

Equivalent units = Equivalent units to complete beginning WIP inventory*

Under FIFO method + units started and completed during the period
+ Equivalent units in ending work in process inventory

*Equivalent units to units in the percentage

Complete beginning = beginning WIP x (100% - completion of WIP)

WIP inventory inventory beginning inventory

Alternative method to compute Equivalent units under FIFO method:

Equivalent units Units transferred out

Under FIFO method = + Equivalent units in ending work in process inventory

· Equivalent units in beginning work in process inventory

Equivalent units Units transferred to the next department or to finished goods

Under weighted = + Equivalent units in ending work in process inventory

average method

4.4.2. The Cost of Production Report

The key document in a typical process-costing system is the departmental production report, prepared for each production department at the end of every accounting period. This report replaces the job cost sheet, which is used to accumulate costs by job in a job-order costing system. The departmental production report summarizes the flow of production quantities through the department, and it shows the amount of production cost transferred out of the department's work-in-process Inventory account during the period. It is the source for summary journal entries for the period.

The following four steps are used in preparing a departmental production report.

1. Analysis of physical flow of units
2. Calculation of Equivalent units (for Direct Material and conversion activity)

3. Costs to account for schedule- a computation of the cost per Equivalent unit for direct material and conversion.

4. Cost recapitulation (Costs accounted for schedule) - A reconciliation of all cost flows into and out of the department during the period.

1. *Quantity schedule*: This schedule shows the physical flow of units into and out of departments. The total units to account for must always equal the total units accounted for.

2. *Equivalent Production schedule*: In most cases not all units are completed during the period. There are units still in process at varying stages of completion at the end of the period. In order to determine unit cost, all units should be expressed in terms of completed units. Therefore, Equivalent (production) units equal total units completed plus incomplete units restated in terms of completed units.

3. *Costs to account for schedule*: This shows costs, which are accumulated or charged by the department. Equivalent unit costs are reported in this section.

4. *Costs accounted for schedule*: This shows the distribution of accumulated costs to completed and uncompleted units. It depicts how the costs that have been charged to department during a period are accounted for. Typically, the costs charged to a department will consist of the following:

- a. Costs in the beginning work in process inventory
- b. Materials, Labor, and overhead costs added during the period.
- c. Costs (if any) transferred in from the preceding department

In production report, these costs are generally titled "cost to be accounted for." These costs are accounted for in a production report by computing the following amounts:

- a. Costs transferred out to the next department (or to finished goods)
- b. Costs remaining in the ending work in process inventory.

In short, when cost reconciliation is prepared, the “cost to be accounted for” is reconciled with the sum of the cost transferred out during the period plus the cost in the ending work in process inventory .

Now let us see the computation of unit costs and inventory costing with the following three cases:

Case I: When there is no beginning or ending work in process inventory

Case II: When there is no beginning work in process inventory but there is

ending work in process inventory

Case III: when there are both beginning and ending works in process inventories

4.4.3. Process costing with no work in process inventories

In process costing system, the computation of unit costs is relatively simple when there is no work in process inventories. A cost flow assumption or method -weighted average or FIFO- is not necessary when there is no beginning and ending work in process inventories.

A production report that uses the FIFO method in place of weighted average will produce different figures for equivalent production and unit cost only when beginning work in process inventory is present. If there is no beginning work in process inventory, the production report for both FIFO and Weighted Average methods will be exactly the same.

Illustration

Tanta Company started producing 100,000 units of a product and completed the 100,000 units during the month of February 2006. The cost data for these units are as follows:

Direct materials	Br.250,000
Direct labor	150,000
Overhead	<u>120,000</u>
Total	Br. <u>520,000</u>

Required:

Prepare cost of production report for the month February 2006

Tanta Company
Cost of production report
For the month of February 2006

Quantity schedule and equivalent units:

Quantity schedule:

Units to be accounted for:

Units started into process

100,000

Units accounted for:

Units completed and transferred out

100,000

Equivalent units:

Materials

Conversion costs

Units completed and transferred

100,000

100,000

Cost schedule:

Cost to be accounted for:

Total cost ÷ Equivalent units =

Unit cost

Direct material

Br. 250,000 ÷ 100,000

Br.2.50

Direct labor

150,000 ÷ 100,000

1.50

Overhead

120,000 ÷ 100,000

1.20

Total cost to be accounted for

Br. 520,000

Br. 5.20

Cost accounted for:

Completed and transferred: 100,000 x Br. 5.20 Br. 520,000

4.4.4 Process costing with no beginning work in process but ending work in process Inventories

Like in Case I, the production report produces the same results under both weighted average and FIFO method in this case. This is because there is no beginning work in process inventory.

Illustration

Nigus Company manufactures its product in two departments: department A and department B. The following information belongs to department A of the company for the month of March 2006:

Units started during March	50,000
units	
Units completed and transferred to department B	40,000
units	
Still in process	10,000
units	

Direct material: 100% complete

Conversion : 40% complete

Cost incurred during March by department A

Direct material	Br. 90,000
Conversion costs:	
Direct labor	88,000
Applied manufacturing overhead	<u>105,600</u>
Total conversion costs	Br. <u>193,600</u>

The following additional data belongs to department B:

Units received from department A	40,000
Units transferred to finished goods inventory	32,000
Units still in process (30% complete as to conversion cost)	8,000

Costs charged to production by department B

Direct labor	120,400
Factory overhead applied	96,320

Instruction

- Prepare a cost of production report for department A and department B.
- Prepare all journal entries to record

- i. The issuance of direct materials
- ii. The direct labor
- iii. The applied overhead
- iv. The transfer of costs to the next department (or to finished goods)

Solution

a.

Nigus Company

Cost of production report-department A

For the month of March 2006

Quantity schedule and equivalent units:

Quantity schedule:

Units to be accounted for:

Units started ~~into~~ process

50,000

Units accounted for:

Units completed and transferred out 40,000

Units still in process on March 31 — 10,000

50,000

Equivalent units:

	<u>Materials</u>	<u>Conversion</u>
<u>costs</u>		
Units completed and transferred	40,000	40,000
Units still in process	<u>10,000</u> (100%x10, 000)	<u>4,000</u>
(40%x10, 000)		
Equivalent units	<u>50,000</u>	<u>44,000</u>

Cost Schedule:

Costs to be accounted for:

Total cost ÷ Equivalent units =

Unit cost

Direct material	Br. 90,000 ÷ 50,000
Br.1.80	
Direct labor	88,000 ÷ 44,000
2.00	
Overhead	<u>105,600</u> ÷ 44,000
<u>2.40</u>	
Total cost to be accounted for	Br. <u>283,600</u>
Br. <u>6.20</u>	

Costs accounted for (cost recapitulations):

Completed and transferred: 40,000x Br 6.20 Br.
248,000

Work in process, March 31:

Direct material 10,000 x Br.1.8 = Br18, 000

Direct labor 4000 x Br. 2.00 = Br 8,000

Overhead 4000 x Br. 2.40 = Br 9,600

35,600

Total accounted for Br.

283,600

Nigus Company
Cost of production report-department B
For the month of March 2006

Quantity schedule and equivalent units:

Quantity schedule:

Units to be accounted for:

	Units	started	into	production
<u>40,000</u>				_____

Units accounted for:

Completed and transferred out		32,000	
Still in process on March 31			— <u>8,000</u>
<u>40,000</u>			

Equivalent units:

	<u>Transferred-in</u>	<u>Materials</u>	<u>Conversion</u>
<u>costs</u>			
Completed & transferred 32,000		32,000	32,000

Work in process, Mar.31	<u>8,000</u> (100%x8, 000)	<u>8,000</u> (100%x8, 000)	
2,400(30%x8000)			
Equivalent units	<u>40,000</u>	<u>40,000</u>	<u>34,400</u>

Cost schedule:

Costs to be accounted for:

<u>Total cost</u> ÷ <u>Equivalent units</u> =		
<u>Unit cost</u>		
Costs in proceeding department	Br. 248,000 ÷	40,000
Br. 6.20		
Direct labor	120,400 ÷	34,400
3.50		
Overhead	<u>96,320</u> ÷	34,400
<u>2.80</u>		
Total cost to be accounted for		Br. <u>464,720</u>
<u>Br 12.50</u>		

Costs accounted for:

Completed and transferred: 32,000x Br. 12.50 Br.
400,000

Work in process, March 31

Cost in proceeding department	8,000 x Br. 6.20	= Br. 49,600
Direct labor	2,400 x Br. 3.50	= Br. 8,400
Overhead	2,400 x Br. 2.80	= <u>Br. 6,720</u>
<u>64,720</u>		

Total accounted for =Br
464,720

b. Journal entries

i. To record placing of materials to production

Work in process -Department A	90,000
Materials	90,000

ii. To record direct labor costs

Work in process -Department A	88,000
Work in process- Department B	120,400

Salary and wages payable	208,400
iii. To record application of manufacturing overhead	
Work in process -Department A	105,600
Work in process -Department B	96,320
Manufacturing overhead applied	201,920
iv. 1. To record the transfer of units to department B	
Work in process -Department B	248,000
Work in process -Department A	248,000

2. To record the transfer of units to finished goods

Finished Goods	400,000
Work in process -Department B	400,000

4.4.5 Process Costing with both beginning and ending work in process inventories

In this case, a production report that uses the weighted average method in place of FIFO method will produce different figures for equivalent units and so that unit costs since there is beginning work in process inventory. Therefore, let us see application of process costing using these methods separately.

A. Weighted -Average method

This cost flow assumption is more commonly used in practices. It combines any costs assigned to the beginning work in process with the costs expended in the current period to arrive at the average costs assignable to the output in the current period. The equivalent units of production for a department are the number of units transferred to the next department (or to finished goods) plus the equivalent units in the department's ending work in process.

Illustration

BANTU Block Company produces cement blocks used in the foundations for buildings. The process takes place in two sequential departments. The following cost data pertain to the month of October.

	<u>Pouring department</u>	<u>Finishing</u>
<u>department</u>		
Direct material	Br. 350,000	Br.
122,000		
Direct labor		850,000
700,000		

Applied manufacturing overhead		<u>950,000</u>
		<u>800,000</u>

Total	Br. <u>2, 150,000</u>	Br.
		<u>1,622,000</u>

Beginning work in process inventory on October 1, 2006 amounted to

	<u>Pouring department</u>	<u>Finishing</u>
<u>department</u>		

Cost in proceeding department	-0-	Br.
		200,000

Direct material		Br. 40,000
		12,000

Direct labor		26,960
		23,860

Overhead		<u>30,640</u>
		<u>20,080</u>

Total	Br. <u>97,600</u>	Br.
		<u>255,940</u>

The quantity of production statistics for the month of October 2004 are as follows:

	<u>Pouring department</u>	<u>Finishing</u>
<u>department</u>		

Beginning work in process inventory		4,000
		7,000

Started new		46,400
		-0-

Transferred -in		-0-
		33,000

Transferred-out		33,000
		30,000

Ending work in process inventory:

(100% materials; 60% conversion)	17,000	
(100% materials; 40% conversion)		
10,000		

Instructions

- a. Prepare a cost of production report for both departments.
- b. Prepare all Journal entries to record:
 - i. The issuance of direct materials
 - ii. The direct labor
 - iii. The applied overhead
 - iv. The transfer of costs to the next department (or to finished goods)

Solution

a.

BANTU Block Company
Cost of production report-Pouring department
Weighted average Costing Basis
For the month of October 2006

Quantity schedule and equivalent units:

Quantity schedule:

Units to be accounted for:

Work in process, October 1	4,000	
Started into production		46,000
		<u>50,000</u>

Units accounted for:

Completed and transferred out	33,000	
Work in process, October 31		<u>17,000</u>
		<u>50,000</u>

Equivalent units:

	<u>Materials</u>	<u>Conversion</u>
<u>costs</u>		
Completed and transferred	33,000	33,000
Work in process, March 31		<u>17,000(100%x17, 000)</u>
		<u>10,200(60%x17, 000)</u>
Equivalent units	<u>50,000</u>	<u>43,200</u>

Cost schedule:

Cost to be accounted for:

Cost in this department:

$$\text{WIP- beginning} + \text{Costs added} = \text{Total cost} \div$$

$$\text{Equivalent units} = \text{Unit cost}$$

Direct material	Br. 40,000	Br. 350,000	Br. 390,000	50,000
				Br.7.80
Direct labor	26,960	850,000	876,960	43,200
				20.30
Overhead	<u>30,640</u>	<u>950,000</u>	<u>980,640</u>	43,200
				<u>22.70</u>
Total	Br. <u>97,600</u>	Br <u>2,150,600</u>	Br <u>2,247,600</u>	
				Br <u>50.80</u>

Total cost to be accounted for Br 2,247,600

Cost accounted for:

Completed and transferred out: 33,000 x Br. 50.80Br.
1,676,400

Work in process, October 31:

Direct material 17,000 x Br. 7.80 = Br.132, 600

Direct labor 10,200 x Br. 20.30 = Br. 207,060

Overhead 10,200 x Br. 22.70 = Br. 231,540

571,200

Total accounted for Br.
2,247,600

BANTU Block Company

Cost of production report - Finishing department

Weighted average Costing Basis

For the month of October 2006

Quantity schedule and equivalent units:

Quantity schedule:

Units to be accounted for:

Work in process, October 1 7,000

Started into production _____ 33,000

40,000

Units accounted for:

Completed and transferred out 30,000

Work in process, October 31 10,000 _____ 40,000

Equivalent units:

	<u>Transferred in</u>	<u>Materials</u>	<u>Conversion</u>
<u>costs</u>			
Completed & Trans.	30,000	30,000	30,000

WIP, March 31	<u>10,000</u> (100%x10, 000)	<u>10,000</u> (100%x10,000)	
<u>4,000</u> (40%x10,000)			
Equivalent units	<u>40,000</u>	<u>40,000</u>	<u>34,000</u>

Cost schedule:

Cost to be accounted for:

Cost in proceeding department:

	<u>Total cost</u>	<u>Unit</u>
<u>cost</u>		
Work in process, October 1	Br 200,000	
Transferred in during the period	<u>1,676,400</u>	
	Br 1,876,400 ÷ 40,000	Br
46.91		

Cost in this department:

<u>WIP- beginning</u> + <u>Costs added</u> = <u>Total cost</u> ÷				
<u>Equivalent units</u> = <u>Unit cost</u>				
Direct material	Br. 12,000	Br. 122,000	Br. 134,000	40,000
Br. 3.35				
Direct labor	23,860	700,000	723,860	34,000
21.29				
Overhead	<u>20,080</u>	<u>800,000</u>	<u>820,080</u>	34,000
<u>24.12</u>				
Total	Br. <u>55,940</u>	Br. <u>1,622,000</u>	Br. <u>1, 677,940</u>	
Br <u>48.76</u>				
Total cost to be accounted for (1,876,400+1,677,940) =				<u>Br.3, 554,340</u>
Total unit cost = Br 46.91 + Br 48.76 = Br				<u>95.67</u>

Cost accounted for:

Completed and transferred: 30,000 x Br 95.67Br.
2,870,100

Work in process, October 31:

Cost in proceeding departs. 10,000 x Br.46.91 = Br. 469,100
 Direct material 10,000 x Br. 3.35 = Br. 33,500
 Direct labor 4,000 x Br. 21.29 = Br. 85,160

Overhead	4000	x Br. 24.12 = Br. <u>96,480</u>
<u>684,240</u>		
Total accounted for		Br.
<u>3,554,340</u>		

b. Journal entries

i. To record placing of materials to production

Work in process -Pouring	350,000	
Work in process -Finishing	122,000	
Materials		472,000

ii. To record direct labor costs

Work in process - Pouring	850,000	
Work in process- Finishing	700,000	
Salary and wages payable		1,550,000

iii. To record application of Manufacturing overhead

Work in process - Pouring	950,000	
Work in process - Finishing	800,000	
Manufacturing overhead applied		1,750,000

iv. 1. To record the transfer of units to Finishing department

Work in process - Finishing	1,676,400	
Work in process - Pouring		1,676,400

2. To record the transfer of units to finished goods

Finished Goods	2,870,100	
Work in process - Finishing		2,870,100

B. FIFO method

The FIFO method of process costing differs from the weighted- average method in two basic ways: (1) the computation of equivalent units, and

(2) the way in which costs of beginning inventories are treated in the cost reconciliation report. The FIFO method is generally considered more accurate than the weighted -average method, but it is more complex.

The computation of equivalent units under the FIFO method differs from the computation under the weighted-average method in two ways. First, the “units transferred out” figure is divided in to two parts. One part consists of the units from the beginning inventory that were completed and transferred out, and the other part consists of the units that were both started and completed during the current period.

Second, full consideration is given to the amount of work expended during the current period on units in the beginning work in process inventory as well as on units in the ending inventory. Thus, under the FIFO method, it is necessary to convert both inventories to an equivalent unit basis. For the beginning inventory, the equivalent units represent the work done to complete the units (cost incurred for the uncompleted portion); for the ending inventory, the equivalent units represent the work done to bring the units to a stage of partial completion at the end of the period (the same as with the weighted-average method).

Two methods are used to compute FIFO equivalent production, and if both methods are used, one can use one method as a check on the other.

Method I

FIFO equivalent production is computed in the same way as weighted-average equivalent production except the equivalent units in the beginning work in process inventory are subtracted. The result would be the equivalent work done in the period under consideration. The equation for this approach is as follows:

$$\begin{array}{lcl} \text{Equivalent} & & \text{Units completed and transferred} \\ \text{Units} & = & + (\text{percentage completed} \times \text{WIP- Ending}) \end{array}$$

- (percentage completed x WIP-beginning)

Method II

This approach compute amount of equivalent work needed to complete the beginning work in process inventory and then add to the amount new equivalent work done in the period under considerations. Therefore, it is necessary to convert units in the beginning WIP as well as on units in the ending inventory to an equivalent unit basis. For the beginning inventory, the equivalent units represent the work done to complete the units; for the ending inventory, the equivalent units represent the work done to bring the units to a stage of partial completion at the end of the period. The equation for this approach is as follows:

$$\begin{aligned} \text{Equivalent units} = & [1 - (\text{percentage completion} \times \text{units in the WIP-} \\ & \text{beginning})] \\ & + [\text{units started and completed this month}] \\ & + [\text{percentage completed} \times \text{units in the WIP-ending}] \end{aligned}$$

Illustration

ROBE Company has one production department. For the month of April 2006, the company incurred the following costs:

Direct materials	Br. 211,200
Direct labor	323,380
Overhead	<u>463,220</u>
Total	Br. <u>997,800</u>

The beginning work in process inventory on April 1 2006, amounted to

Direct materials	Br. 25,000
Direct labor	20,000
Overhead	<u>22,000</u>
Total	Br. <u>67,000</u>

The quantities of production statistics for the month of April 2006 are as follows:

Beginning work in process (100% material, 30% conversion)	12,000
Started new	88,000
Transferred out	80,000
Ending work in process (100% material, 55% conversion)	20,000

Instruction

- a. Prepare a cost of production report.
- b. Prepare all journal entries to record
 - i. The issuance of direct materials.
 - ii. The direct labor cost incurred.
 - iii. The applied manufacturing overhead.
 - iv. The transfer of costs to finished goods.

Solution

a)_

ROBE Company

Cost of production report-FIFO Basis

For the month of April 2006

Quantity schedule and equivalent units:

Quantity schedule:

Units to be accounted for:

Work in process, April 1	12,000	
Started into production		<u>88,000</u>
		<u>100,000</u>

Units accounted for:

Completed and transferred out	80,000	
Work in process, April 30	<u>20,000</u>	<u>100,000</u>

Equivalent units:

	<u>Materials</u>	<u>Conversion</u>
<u>costs</u>		
Units Completed and transferred	80,000	80,000
Less: work in process, April 1	<u>12,000</u> (100%x12, 000)	
<u>3,600</u> (30%x12, 000)		
	68,000	76,400
 Add: work in process, April 30	 <u>20,000</u> (100%x20, 000)	
<u>11,000</u> (55%x20, 000)		
Total equivalent units	<u>88,000</u>	<u>87, 400</u>

Or (alternatively)

	<u>Materials</u>	<u>Conversion</u>
<u>costs</u>		

Work in process, April 1	-0- [(100%-100%) x12, 000]	8,400 [(100%-30%) x12, 000]
Units started & completed in Apr.	<u>68,000</u> (80,000-12,000)	68,000
	68,000	76,400
Add: work in process April 30	<u>20,000</u> (100%x20, 000)	
	<u>11,000</u> (55%x20, 000)	
Equivalent units	<u>88,000</u>	<u>87,400</u>

Cost schedule:

Cost to be accounted for:

Cost in this department:

Work in process, April 1:

	<u>Total cost</u> ÷ <u>Equivalent units</u> = <u>Unit cost</u>		
Direct materials	Br. 25,000		
Direct labor	20,000		
Overhead	<u>22,000</u>		
Total	Br. <u>67,000</u>		

Current period costs:

Direct materials	Br 211,200	÷	88,000	=	Br. 2.40
Direct labor	323,380	÷	87,400	=	3.70
Overhead	<u>463,220</u>	÷	87,400	=	<u>5.30</u>
Total	Br <u>997,800</u>				Br. <u>11.40</u>

Total cost to be accounted for (67,000 + 997,800) Br.1,064,800

Costs accounted for:

Completed and transferred:

From beginning work in process inventory:

Prior period costs Br. 67,000

Costs to complete these units:

Direct material -0-

Direct labor 31,080*

Overhead	<u>44,520</u> ** Br.
142,600	
Started and completed this month (68,000 x Br. 11.40)	
<u>775,200</u>	
Total completed and transferred to finished goods	Br.
917,800	
Work in process, March 31:	
Direct material (100% x 20,000 x Br 2.40) =	Br. 48,000
Direct labor (55% x 20,000 x Br 3.70) =	Br. 40,700
Overhead (55% x 20,000 x Br 5.30) =	Br. 58,300
<u>147,000</u>	
Total costs accounted for	Br.
<u>1,064,800</u>	

*Br 31,080 = 12,000 x (100%-30%) x Br 3.70

** Br 44,520 = 12,000 x (100%-30%) x Br 5.30

b. Journal entries

i To record issuance of direct materials

Work in process	211,200	
Materials		211,200

ii. To record direct labor costs incurred

Work in process	323,380	
Salary and wages payable		323,380

iii. To record the applied manufacturing overhead

Work in process	463,220	
Manufacturing overhead applied		463,220

iv. To record the transfer of units to finished goods

Work in process	917,800	
Goods		917,800

Work in process	917,800
-----------------	---------

4.4.6. Comparison of the weighted- average and FIFO method

Weighted- average method	FIFO method
Quantity schedule and equivalent units	
i The quantity schedule includes all units transferred out in a single figure.	i. The quantity schedule divides the units transferred out into two parts. One part consists of units in the beginning inventory, and the other part consists of units started and completed during the current period.
ii. In computing equivalent units, the units in the beginning inventory are treated as if they were started and completed during the current period.	ii. Only work needed to complete units in the beginning inventory is included in the computation of equivalent units. Units started and completed during the current period are shown in separate figure.
Total and unit costs	
i. The “Cost to be accounted for” part of the report is the same for both methods.	i. The “Cost to be accounted for” part of the report is the same for both methods.
ii. Costs in the beginning inventory are added in with costs of the current period in unit cost computations.	ii. Only costs of the current period are included in unit cost computation.
	iii. Unit cost will contain only

iii. Unit costs will contain some element of cost from the prior period.	elements of costs from the current period.
Cost Reconciliation	
i. All units transferred out are treated the same, regardless of whether they were part of the beginning inventory or started and completed during the period.	i. Units transferred out are divided into two groups (a) units in the beginning inventory and (b) units started and completed during the period.
ii. Units in the ending inventory have cost applied to them in the same way under both methods	ii. Units in the ending inventory have cost applied to them in the same way under both methods



Learning Activity 4.3

Answer the following questions.

1. Assume the company has two processing departments, Mixing and Firing. Explain what costs might be added to the Firing Department's work in process account during a period.

2. What is meant by the term equivalent units of production when the weighted-average method is used?

3. Clonex Labs Company uses a process costing system. The following data are available for one department for October:
Work in process, Oct.1 30,000 (materials, 60% completion;

	conversion costs, 30% completion)
Work in process, Oct. 31	15,000 (materials, 80% completion; conversion costs, 40% completion)
The department started 175,000 units and completed 190,000 during October. Calculate the equivalent units of production using FIFO method.	
<hr/>	
<hr/>	

4.5 SUMMARY

Process costing is used in production process where relatively large numbers of nearly identical products are manufactured. The purpose of a process costing system is the same as that of a job order costing system—to accumulate costs and assign these costs to units of product. Costs flow through the manufacturing accounts in basically the same way in both job order and process costing systems. A process costing system differs from a job order system primarily in that costs are accumulated by department (rather than by job) and the department production report replaces the job cost sheet.

To compute unit costs in a department, the department's output in terms of equivalent units must be determined. In the weighted average method, the equivalent units for a period are the sum of the units transferred out of the department during the period and the equivalent units in ending work in process inventory at the end of the period. In the LIFO method, the equivalent units for a period are the sum of equivalent units to complete the beginning work in process inventory, units started and completed during the period, and the equivalent units in the ending work in process inventory.

The activity in a department is summarized on a production report. There are three separate (though highly interrelated) parts to a production report. The first part is a quantity schedule, which includes a computation of equivalent units and shows the flow of units through a department during a period. The second part consists of a computation of costs per equivalent unit, with unit costs being provided individually for materials, labor, and overhead as well as in total for the period. The third part consists of a cost reconciliation, which summarizes all cost flows through a department for a period.

4.6 MODEL EXAM QUESTIONS

Part I: Say “True” if the statement is correct and “False” if the statements is wrong.

1. In process costing system, if the there is no beginning work-in process inventory, the cost flow assumptions, weighted-average or FIFO is not necessary.
2. Manufacturing firms producing products that fulfill customer orders (specific to each customer) use the process costing to accumulate the product costs.
3. Material costing and overhead costing is the same in both job-order and process costing.
4. In a process costing system, unit costs are computed by job on the job cost sheet.

5. The number of work in process accounts used in a process costing system may depend on the number of production departments in a manufacturing.

Part II: Choose the best answer from the alternatives given.

1. The analysis of the activity in a department or cost center for a period in a process costing is termed as

- A. Income statement
- B. Schedule of cost of goods manufactured
- C. Cost of production report
- D. All
- E. None of the above

2. Incomplete units restated in terms of completed units plus total units completed are referred to as

- A. Units to be accounted for
- B. Equivalent units
- C. Scraps
- D. Costs accounted for
- E. None of the above

3. For which one of the following industries is process-costing system not appropriate?

- A. Chemical
- B. Cement
- C. Garment or Clothing
- D. Textile
- E. None of the above

4. Which of the following is (are) true?

- A. The details of accumulating material costs in a process costing system are considered reduced in a process costing system as compared to the

job order costing system since the number of departments are usually less than the number of jobs handled at a given time.

B. In FIFO method of process costing, the equivalent units relate only to work done during the current period.

C. Costs transferred out during the period plus the costs in the ending of work in process inventory are called costs to be accounted for.

D. In weighted-average method, the units transferred out are divided in to units in the beginning inventory and units started and completed during the period.

E. A and B

F. All of the above

5. A journal entry to record overhead costs incurred is

- A. Factory overhead-control.....xx
 Factory overhead-applied..... xx
- B. Factory overhead -applied.....xx
 Cash, Account Payable, etc..... xx
- C. Cash.....xx
 Factory overhead-control..... xx
- D. Factory overhead-control.....xx
 Cash, Account Payable, etc..... xx
- E. None of the above

6. All of the following are correct in describing process costing system except:

- a. In calculating equivalent production units, the main difference between FIFO and weighted average methods is the treatment given to ending work in process.
- b. The weighted average method in process costing focuses on the total work done to date regardless of whether that work was done before or during the current period.

- c. When there is no beginning work in process, equivalent productions under process costing system are calculated by using FIFO method only.
- d. The FIFO method and the weighted average method will produce the same number of equivalent units if there is no beginning work in process.
- e. None of the above

7. KIYA Company employs a process costing system. The following information applies to the current period:

The ending work in process (WIP) inventory consists of 9, 000 units. The ending inventory is 100% complete as to materials and 70% complete as to labor and overhead. If the production cost per equivalent unit for the period is Br.3.75 for material and Br.1.25 for labor and overhead, what is the balance of the ending WIP inventory account?

- A. Br.41, 625
- B. Br.33, 750
- C. Br.45000
- D. None of the above

Part II: Work out

Exercise I

Pure Form Corporation manufactures a product that passes through two departments. Date for a recent month for the first department as follows:

	<u>Units</u>	<u>Materials</u>	<u>Labor</u>
<u>Overhead</u>			
Work in process, beginning	5,000	Br. 45,000	Br.12,500
			Br.18,750
Units Stated in process	45,000		
Units transferred out	42,000		
Work in process, ending	8,000		
Costs added during the month		528,000	215,000
			322,500

The beginning work in process inventory was 80% complete as to materials and 60% complete as to processing. The ending work in process inventory was 75% complete as to materials and 50% complete as to processing.

Instructions

1. Assume that the company uses the weighted-average method of accounting for units and unit costs, prepare a cost of production report for this month.
2. Prepare a cost of production report for the month using FIFO method.

Exercise II

CHAW Plastics makes plastics real lamps for cars using an injection molding process. The following information actual cost of direct material and direct labor for April 2006 is available.

		Direct Materials			
Direct Labor		Equivalent		Total	
Equivalent	Total				
		<u>Units</u>		<u>Costs</u>	
<u>Units</u>	<u>Costs</u>				
Work in process, April 1*	15,000	Br.	60,000	?	Br.
50,000					
Work done during April 1	<u>25,000</u>		<u>105,000</u>		<u>?</u>
<u>110,000</u>					
To account for	<u>40,000</u>	Br.	<u>165,000</u>	<u>?</u>	Br.
<u>160,000</u>					
Units completed and					
Transferred in April	24,000		?		24,000
?					

Work in process, April 30**	16,000	?	?
?			

* Degree of completion: direct materials, 100%;

Conversion costs, 80%,

**** Degree of completion: direct materials, 100%;**

Conversion costs, 60%

Manufacturing overhead costs are 40% of direct labor costs.

Required:

A. Prepare a cost of production report for the month of April 2006 using weighted-average method.

B. Prepare a cost of production report for the month of April 2006 using FIFO method.

C. Prepare journal entries to record the following transaction using weighted-average method.

(1) Issuance of direct materials

(2) Direct labor costs

(3) Manufacturing overhead costs applied

(4) The transfer of completed units to finished goods

D. Using FIFO method, prepare journal entry to record transfer of completed units

to finished goods.

Exercise III

Shemsu Company makes super-premium cake mixes that go through two processes, blending and packaging. The following activity was recorded in the Blending Department during July:

Production data

Units in process, July 1: 30% complete

As to conversion costs

10,000

Units started in to production
170,000
Units completed and transferred to packaging
?
Units in process, July 31: 40% complete
as to conversion costs
20,000

Cost data:

Work in process inventory, July 1:

Materials cost	Br. 8,500	
Conversion cost		<u>4,900</u>
		13,400
Costs added during the month:		
Materials cost	139,400	
Conversion cost		<u>244,200</u>
		<u>383,600</u>
Total cost		Br.
		<u>397,000</u>

All materials are added at the beginning of work in the Blending Department conversion costs are added uniformly during processing.

Required:

1. If the company uses FIFO method, prepare a cost of production report.
2. If the company uses weighted-average method, prepare a cost of production report.

EXERCISE IV

1. Two processing departments are used by Kelemu Chemical Company to produce its product. The two departments had the following activities and costs during the month of January:

	<u>DEPARTMENT 1</u>	<u>DEPARTMENT 2</u>
Beginning units in process	0	0
Units started in process	35,000	
Units received from another department		30, 000
Ending units in process	5, 000	6, 000
Costs added by department:		
Materials	\$31, 500	\$ 0
Labor	24, 180	15, 680
Overhead	20, 480	13, 440
Degree of completion of ending work in process:		
Materials	100%	-
Conversion costs	1/5	2/3

Instructions:

- Prepare a cost of production report for Department 1 and Department 2.
- Make all the necessary journal entries to record the above events completed during the month.

Exercise V

Tora manufacturing company has two departments, mixing and coloring. For the month of March 2004, the company incurred the following costs:-

	<u>Mixing</u>	<u>Coloring</u>
Direct material-----	\$73,175	\$12,500
Direct labor -----	\$78,940	\$142,600
Overhead -----	<u>\$94,728</u>	<u>\$114,080</u>
Total -----	<u>\$246,843</u>	<u>\$269,180</u>

The beginning inventory on March 1, 2004 amounted to

	<u>Mixing</u>	<u>Coloring</u>
Cost in preceding department -----	0	\$39,000
Direct material -----	\$7,825	\$2,060
Direct labor -----	\$5,540	\$3,720
Overhead -----	<u>\$6,648</u>	<u>\$2,976</u>
Total -----	<u>\$20,013</u>	<u>\$47,756</u>

The quantity production statistics for the month of March 2004 are:-

	<u>Mixing</u>	<u>Coloring</u>
Beginning Inventory -----	3,000	4,000
Stated new -----	27,000	0
Transferred in-----	0	22,000
Ending inventory-----	22,000	20,000
(100% materials; 60% conversion)-----	8000	
(100% materials; 40% conversion)-----		6000

Required:

- 1) prepared a cost of production report for both departments
 - 2) prepare all journal entries to record:
 - a) The issuance of direct materials
 - b) The direct labor
 - c) The applied overhead
 - d) The transfer of cost to the department (or to finished goods)
- Use i) FIFO method
- ii) WA method

MODULE FIVE: ACCOUNTING FOR SPOILAGE, REWORKED UNITS AND SCRAP

Content

- 5.0 Introduction
- 5.1 Objectives
- 5.2 Spoilage in General
- 5.3 Job Costing and Spoilage
 - 5.3.1 Normal Spoilage
 - 5.3.2 Abnormal Spoilage
- 5.4. Job Costing and Reworked Units
 - 5.4.1 Normal Reworked Units
 - 5.4.2 Abnormal Reworked Units
- 5.5 Job Costing and Scrap
 - 5.5.1 Recognizing Scrap at the Time of Sale of Scrap
 - 5.5.2 Recognizing Scrap at the Time of Production Scrap
- 5.6 Summary
- 5.7 Model Examination Questions

5.0 INTRODUCTION



Dear learner, welcome to the fifth unit of the Cost and Management Accounting I. The emphasis on quality and the high costs of spoilage, reworked units and scrap has resulted in managers paying close attention to those costs. *Spoilage* refers to completed or partial completed units that don't meet production standard (unacceptable units of production) and that are discarded or are sold for a disposal value. *Reworked units* are unacceptable units of production that are subsequently reworked and sold as acceptable finished goods. For example, defective units of products such as pagers, computer disk drives, computers, and telephones can sometimes be repaired and sold as good products. *Scrap* is material left over when making main or joint products. *Scrap* is a product that has minimal (frequently zero) sales value compared with the sales. Examples are shaving and short lengths from woodworking operations, steel edges left from stamping operations and end cuts from suit making operations.

5.1 LEARNING OBJECTIVES:

Overview



Dear learner! At the end of the session you are expected to:

- Distinguish among spoilage, rework, and scrap
- Describe the general accounting procedures for normal and abnormal spoilage

- Know the accounting procedures for spoilage, reworked, and scrap under job order costing.
- Know the accounting procedures for spoilage in process costing.

5.2 SPOILAGE IN GENERAL

There are two key objectives when accounting for spoilage:

- a) Determining the magnitude of the costs of spoilage.
- b) Distinguishing between the costs of normal and abnormal spoilage.

Spoilage is an important consideration in any production related planning and controlling decisions. Management must determine the most efficient production process that will keep spoilage to a minimum. Spoilage is divided into two: *normal* and *abnormal*.

NORMAL SPOILAGE: It is a spoilage that arises under efficient operating conditions; it is an inherent result of the particular production process. Costs of normal spoilage are typically viewed as a part of the costs of good units manufactured.

For a given production process, management must decide the rate of spoilage it is willing to accept as normal. Normal spoilage rates should be computed using the total good units completed as the base, not the total actual units started. Why? Because total actual units started also include any abnormal spoilage in addition to normal spoilage.

ABNORMAL SPOILAGE: Abnormal spoilage is spoilage that is not expected to arise under efficient operating conditions; abnormal spoilage is usually regarded as avoidable and controllable.

Abnormal spoilage costs are written off as losses of the accounting period in which the detection of the spoiled units occurs.

5.3. JOB CONSTING AND SPOILAGE

5.3.1 Normal Spoilage

In job order costing systems, normal or planned are considered as part of normal manufacturing costs. *Normal spoilage costs have commonly been accounted for by one of the following two methods:*

- a) Allocated or applied to a specific job.
- b) Allocated or applied to all jobs.

Normal Spoilage Attributable to Specific Job: When normal spoiled units develop from a specific job that job should absorb this cost of spoilage by net of the salvage value of the spoiled units, if salable. In other words, in such cases the salvaged value is removed from work in process (WIP) inventory leaving the unsalvageable costs in the WIP. The following entry would be made to do that:

Material Control (Spoiled Units Inventory)*	xxx
WIP-Job xxx	xxxx

* Material account is debited by the estimated market value of the spoiled units if it is saleable. After posting the above journal entry the WIP inventory account represents the costs of good units, including the unsalvageable cost of normal spoilage.

Normal Spoilage Attributable to All Jobs: In some cases, spoilage may be considered a normal characteristics of a given production cycle. The spoilage inherent in the process only in accidentally occurs when a specific job is being worked on. The spoilage is then not attributable, and hence is not charged, to the j specific job. Instead, it is costed as manufacturing overhead (MOH). The budgeted MOH allocation rate includes a provision for normal spoilage cost. Therefore, normal spoilage cost is spread, through overhead allocation over all jobs rather than

loaded on a particular job only. The following entry would be made to do that:

Material control (Spoiled Units Inventory)*	xxx
Manufacturing Overhead	xxx
WIP-	
Job#205.....	xxx

* Material account is debited by the estimated market of the spoiled units if it is saleable. Example (1) In Karim Machine Shop, 10 machine parts out of lot of 100 machine parts are spoiled Costs assigned up to the point of inspection are Br. 4,000 per unit. The current disposal price of the spoiled parts is estimated to Br1.200.

Instructions:

- Prepare the necessary journal entry as the spoiled units are identified and given that they are related to the particular jobs.
- Calculate the cost of good units.

Solutions:

Units put to production= 100 units

Good units= 90 units

Spoiled units=10 units

A. the entry record the normal spoilage is given by:

Materials control (Spoiled Units Inventory).....	1200x10
WIP- Job xxx.....	12.000

*Estimated salvage value= 10 x Br. 1.12, 000

As shown here above, when the spoilage is detected the spoiled goods are inventoried at the estimated market value, i.e., Br.1.200 per unit. The effect of this accounting is that the net cost of the normal spoilage becomes a direct cost of good units produced.

$$\begin{aligned} \text{b. cost of good units} &= (100 \times \text{Br. } 4,000) - \text{Br. } 12,000 \\ &= \text{Br. } \underline{388,000} \end{aligned}$$

Or computed alternatively,

Production costs = Br. 4,000 per unit

Total cost (to manufacture the spoiled units) = $10 \times \text{Br. } 4,000 = \text{Br. } 40,000$

Br. 40,000	<div style="border-left: 1px solid black; border-top: 1px solid black; border-bottom: 1px solid black; width: 50px; height: 40px; margin: 0 auto;"></div>	Br. 12,000 Salvageable costs
		Br. 28,000 Unsalvageable costs

$$\begin{aligned} \text{b) Total cost of good units} &= (90 \times \text{Br. } 4,000) + \text{Br. } 28,000 \\ &= \text{Br. } \underline{388,000} \end{aligned}$$

2. Examples (2) Addis Garment Manufacturing Company uses a job order system. The company completes an order for 1000 denim jackets (Job # 205) at the following unit costs:

Materials.....	Br. 20
Labor	20
Overhead	<u>10</u>
Total cost per unit	Br. <u>50</u>

During the final inspection, 50 jackets are found to be inferior and are classified as irregulars or seconds.

They are expected to sell for Br. 10 each.

Instructions:

- a) Record the cost of production of 1,000 denim jackets
- b) Record the entries required to record the spoiled jackets
 - i. if the cost of the spoiled units is charged to the specific job
 - ii. If the cost of the spoiled units is charged to the factory overhead.

Solutions:

a) Entry of record the cost of production of 1,000 denim jacket

	WIP - Job # 205(50x1, 000).....	50,000
	Raw Materials (20x1, 000)	
20,000		
	Salary Payable (Payroll) [20x1, 000].....	
20,000		
	MOH- Applied.....	
10,000		

b) Unit put into production = 1, 1000 units

Good units = 950 units

Spoiled units = 50 units

Under example (1), the spoiled units were identifiable with a specific job. Consequently, the good units absorb the total cost of normal spoilage, net of salvage value. Taking example (2) into account the two alternative approaches used to account normal spoilage will be discussed here under. **ALTERNATIVE 1:** Normal spoilage Attributable to Specific Job. Here, the spoiled units are inventoried at the estimated market value of the spoiled units, i.e. Br. 10 per unit. The unsalvageable cost Br. 40 for each unit (Br. 50- less 10) is treated as part of the cost of good units.

Salvageable costs = $50 \times \text{Br.}10 = \text{Br.} 500$

Unsalvageable cost = $(50 \times \text{Br.} 50) - \text{Br.} 500 = \text{Br.} 2000$. This portion of the total manufacturing costs of the spoiled units will remain in the WIP inventory account. Stated differently, the unsalvageable cost is considered as part of the cost of good units.

Thus, the entry to record the normal spoilage is given be:

Materials Control (Spoiled Unit Inventory)	500
WIP Job # 205	500

ALTERNATIVE 2: Normal Spoilage Common to All Jobs.

Here, the cost of normal spoilage is wholly (entirely) removed from the WIP account. And the unsalvageable cost of normal spoilage is treated as *manufacturing overhead*. The journal entry under this alternative follows:

Materials control (Spoiled Units Inventory)	500=
10x50	
Manufacturing Overhead.....	2,
000=40x50	
WIP- Job # 205	2,500
= 50x50	

Spoilage costs charged to FOH are allocated among all jobs in production. When spoilage is attributed to a specific job, however, the entire cost of spoilage is reflected in the cost of that job. In the example here above, Job # 205 will be charged with only a portion of the 2,000 loss from spoilage when FOH cost is allocated to the various jobs.

5.3.2 Abnormal Spoilage

Spoilage in excess what is normal for a particular production process is known as abnormal spoilage. It can be controlled by the production personnel and is usually the result of inefficient operation. The total cost of abnormal spoilage should be removed from the WIP inventory account and then treated as period cost titled "Loss from Abnormal Spoilage"

3. Example (1) Assume that 5,000 units (Job # 105) are put in to production at the cost of Br, 20,000.

The unit cost on Job # 105 would be Br. 4.00 (Br. 20,000/5,000). If 20 units were found to be spoiled with a salvage value of Br. 0.50 each and no spoilage was anticipated for job # 105.

Instruction: Present the entry to account for the cost of abnormal spoilage.

Solutions:

In this example spoilage was not anticipated. Therefore, the entire spoilages (20 units) are abnormal.

Salvageable cost = $0.50 \times 20 = \text{Br.}10$

Unsalvageable cost = $(4.00 - 0.5 \times 20) = \text{Br.} 70$. It is period cost recorded "Loss from Abnormal spoilage"

Materials control	10
Loss from Abnormal Spoilage	70
WIP- Job # 105	80

4. Example (2) Assume that 10, 000 units were put into production for Job # 109 when the total cost of production was Br. 300,000. Normal spoilage for the same job is estimated to be 50 units. At the completion of production, only 9910 units were good. Salvage value of the spoiled units was Br. 5 each.

Instruction: Present the required entries to record the above data. Assumes the normal spoilage is allocated to a specific job.

Solutions:

Unit put in to production = 10.000 units

Good units = 9,910 units

Spoiled units = 90 units	<div style="border-left: 1px solid black; border-bottom: 1px solid black; width: 50px; height: 50px; margin: 0 auto;"></div>	Normal spoilage = 50 units
		Abnormal spoilage = 40 units

i. entry record the abnormal spoilage (50 units)

Material control	250 ^{*(1)}
WIP- Job # 109	250

ii. Entry to record the abnormal spoilage (40 units)

Materials control	200 ^{*(2)}
Loss from Abnormal spoilage	1,000 ^{*(3)}
WIP- Job # 109	1,200

^{*(1)} 250= 5x50

$$^{*(2)} 200 = 5 \times 40$$

$$*^{(3)} 1,000 = (30 - 5) \times 40$$



Learning Activity 5.1

Answer the following questions.

1. Distinguish among normal and abnormal spoilage

2. Which of the following defects are avoidable under efficient working condition.
A. Normal spoilage C. Scraps
B. Abnormal Spoilage D. None of the above
3. If spoilage is normal and inherent to the production process, its salvageable value is irrelevant for cost computation of good units
A. True B. False
4. On a particular job a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were defective; the defective units are considered to be normal as part of the production process; each defective unit was reworked at a cost of \$4 for materials and \$8 for labor; manufacturing overhead is applied at the rate of 100% of direct labor costs. Pass journal entry

5. On a particular job a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were defective; the defective units are considered to be normal as part of the production process for the specific job; each defective unit was reworked at a cost of \$4 for materials and \$8 for labor; manufacturing overhead is applied at

the rate of 100% of direct labor costs. Pass journal entry

6. On a particular job a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were defective; the defective units are considered to be abnormal; each defective unit was reworked at a cost of \$4 for materials and \$8 for labor; manufacturing overhead is applied at the rate of 100% of direct labor costs. Pass journal entry

5.4 JOB COSTING AND REWORKED UNITS

5.4.1 Normal Reworked Units

Like spoiled units, reworked units are classified as normal or abnormal. the number of defective unit in any particular production process that can be expected despite efficient operations are known as normal reworked units. Normal reworked (defective) units may be accounted for by the following two methods:

- i. Allocated to specific jobs
- ii. Allocated to all jobs.

NORMAL Reworked Unit Attributed to specific job: When rework is normal but occurs because of the requirements of a specific job, the rework costs are charged to Work in process inventory of that job. The entry is as follows:

WIP- Job xxxxxx

Materialsxxx

Salary and Wages payable	xxx
MOH- Applied	xxx

Normal Reworked Units Common to All jobs: When rework costs are incurred, FOH- control account is charged because rework costs have already been charged to WIP as part of applied FOH. The following entry would be made:

FOH- control	xxx
Materials	xxx
Salary (Payroll) Payable	xxx
FOH- Applied	xxx

Example (1) Assume that 20 units were found to be defective on Job # 202 and had be reworked the cost of reworking the defective units is as follows:

Direct materials.....	Br. 1,000
Direct labor	400
Factory overhead	50 % of direct labor cost

Instruction: Present the entry required to account for normal defective labor cost

- a) If applied to a specific job
- b) If applied to all jobs

Solutions:

Total rework cost:

Direct materials.....	Br. 1,000
Direct labor	400
Factory overhead (50% x 400).....	<u>200</u>
Total cost	Br. 1,600

a) Entry to record normal reworked units applied to specific job:

WIP - Job # 202.....	1,600
----------------------	-------

000	Materials	1,
400	Salary (Payroll) payable	
200	FOH- Applied	

b) Entry to record normal reworked units applied to all jobs:

FOH-Control	3,225
Materials	1000
Salary (Payroll)payable	400
FOH-Applied	200

5.4.2 Abnormal Reworked Units

The number of defective unit that exceed what is considered to be normal for an efficient operation is known as abnormal defective units. The total cost of reworking abnormal defective units should be charged to a “*Loss from Defective Units*” account.

The following entry would be made to do that:

Loss from Abnormal Defective Units	xxx
Materials.....	xxx
Salary (Payroll) Payable.....	xxx
FOH-Applied.....	xxx

Example (1) Assume that 40,000 units are placed in to production for Job # 302. Normal defectives are estimated to be 400 units. Actual defective units were 1,000 units. The total cost to rework the 1,000 defective units was as follows:

Direct Materials	Br. 500
Direct labor	1,000
Factory overhead	50% of direct labor cost.

Instruction: Present the entry required to account for defective units.
Assume that normal rework costs are applied to specific jobs.

Solution:

Units put in to production = 40,000 units

Defective units = 1000 units

Normal defective units = 400 units

Abnormal defective units = 600 units

Rework costs per unit:

Direct material = Br. 500 = Br. 0.50
1,000

Direct labor = Br. 1,000 = Br. 1.00
1,000

Cost of normal reworked units:

Direct materials (0.50x400)	Br. 200
Direct labor (1x400).....	400
Factory overhead (400x0.5)	<u>200</u>
Total cost	Br. <u>800</u>

Cost of abnormal reworked units

Direct materials (0.5x600)	Br. 300
Direct labor (1x600)	600
Factory overhead (600x.5).....	<u>300</u>
Total Cost	1200

*Entry to record the normal reworked units is given by:

WIP-Job # 302	800
Materials	200
Salary (Payroll) Payable	400
FOH-Applied	200

*Entry record the abnormal reworked units is given by:

Loss from Abnormal Defective Units	1,200
Materials	300
Salary (Payroll) Payable	600
FOH-Applied	300

The above two journal entries would be *combined as follows*:

WIP-Job # 302	800
Loss from Abnormal Defective Units	1,200
Materials	500
Salary (Payroll) Payable	1,000
FOH-Applied	500

***Accounting for rework in process costing only requires abnormal rework to be distinguished from normal rework. Abnormal rework is accounted for as in job costing. Since masses of similar units are manufactured, accounting for normal rework follows the accounting described for rework common to all jobs.*

5.5 JOB COSTING AND SCRAP

Scrap is material left over when making main or joint products. Scrap is a product that has minimal (frequently zero) sales value compared with the sales.

There are two major aspects of accounting for scrap:

- i. Planning and control, including physical tracking
- ii. Inventory costing, including when and how to affect operating income

The issues regarding the accounting for scrap are:

- i. When should any value of scrap be recognized in the accounting records: at the time of production of scrap or at the time of sale & scrap?
- ii. How should revenue be accounted for?

5.5.1 Recognizing Scrap at the time of sale of scrap

Scrap Attributable to a Specific Job: Job costing systems sometimes trace the sales of scrap to the jobs that yielded the scrap. This method is used only when the tracing can be done in an economically feasible way. The journal entry is:

Scrap returned to storeroom: No Journal entry. (Memo of quantity received and related job is entered in the inventory record.)

Sales of Scrap: Cash (Account Receivable).....xxx
WIP Control.....xxx
Posting made to specific job record

Unlike spoilage and rework, there is no cost attached to the scrap, and scrap, and hence no normal or abnormal scrap. All scrap sales, whatever the amount, are credited to the specific job. Scrap sales reduce the materials' costs of the job.

Scrap Common to All Jobs: The journal entry in this case is:

Scrap returned to storeroom: No Journal entry. (Memo of quantity received and related job is entered in the inventory record.)

When scrap is sold, the simplest accounting is to record scrap sales as a separate line item of other revenues. The journal entry is:

Sales of scrap: Cash (Account Receivable).....xxx
Sales of Scrap.....xxx

However, many companies account for the sales as offsets against manufacturing overhead. The journal entry is:

Sales of Scrap: Cash (Account Receivable)xxx
Manufacturing Overhead Control.....xxx

Posting made to subsidiary record-“Sales of Scrap” column on department cost record.

This method does not link scrap with any particular physical product. Instead, all products bear regular production costs without any credit for scrap sales except in an indirect manner. The sales of the scrap are considered when setting budgeted manufacturing overhead rates. Thus, the budgeted overhead rate is lower than it would be if no credit for scrap sales were allowed in the overhead budget. This accounting is used in both process costing and job costing system.

Example (1) Mendoza Company has an extensive job costing facility that uses a variety of metals. Consider each requirement independently.

Instruction

- i. Job 372 uses a particular metal alloy that is not used for any other job. Assume that scrap is accounted for at the time of sale of scrap. The scrap is sold for Br. 490 Prepare the journal entry.
- ii. The scrap from job 372 consists of metal used by many jobs. No record is maintained for the scrap generated by individual jobs. Assume that scrap is accounted for at the time of its sale. Scrap totaling Br. 4,000 is sold. Prepare two journal entries that could be used to account for the sale

Solutions:

- i. Cash (Account Receivable) 490
WIP490
- ii. Alternative 1:
Cash (Account Receivable)4,000
Sales of Scrap 4,000

Alternative II:

- Cash (Account Receivable) 4,000
Manufacturing Overhead Control 4,000

5.5.2 Recognizing scrap at the time of production of scrap

Our preceding illustrations assume that scrap returned to the storeroom is sold or disposed of quickly and hence not assigned an inventory cost figure. Scrap, however, sometimes has a significant market value, and the time between storing it and selling or reusing it can be quite long. Under this condition, the company is justified in inventorying scrap at a conservative estimate of net realizable value so that production costs and related scrap recovery may be recognized in the same accounting period. Some companies tend to delay sales of scrap until the market price is most attractive. Volatile prices fluctuations are typical for scrap metal. If scrap inventory becomes significant it should be inventoried some "reasonable value"-a difficult task in the face of volatile market prices.

Scrap Attributable to a Specific Job: The journal entry in the Mendoza Company example is:

Scrap returned to storeroom: Material Control	490
WIP.....	490

Scrap Common to All Jobs: The journal entry in this case is:

Scrap returned to storeroom: Material Control	4,000
Manufacturing Overhead Control	4,000

Observe that Materials Control account is debited in place of Cash or Account Receivable.

When this scrap is sold, the journal entry is:

Sales of Scrap: Cash (Account Receivable)	xxx
Material Control	xxx

Scrap is sometimes reused as direct materials rather than sold as scrap. Then it should be debited to material Control as a class of direct materials and carried at its estimated net realizable value. For example, the entries when the scrap generated is common to all jobs are:

Scrap returned to storeroom: Material Control.....	xxx
--	-----

Manufacturing Overhead Controlxxx

Reuse of scrap: Work in Process.....xxx

Material Control.....xxx

The accounting for scrap under process costing follows the accounting for jobs when scrap is common to all jobs since process costing is used to cost the mass manufacture of similar units. The high cost of scrap focuses management's attention on ways to reduce scrap and to use it more profitably.

Example (2) Refer requirement (ii) of example (1) on page 14 above. Suppose that the scrap generated is returned to the storeroom for the future use and a journal entry is made to record the scrap. A month later, the scrap is reused as direct material on a subsequent job. Prepare the journal entries to record these transactions.

Solutions:

Scrap returned to storeroom: Material Control4,000

Manufacturing Overhead Control4,000



Learning Activity 5.2

Answer the following questions.

1. On a particular job a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were spoiled; the spoiled units are considered to be normal as part of the production process; each spoiled unit can be sold as scrap for an estimated net realizable

value of \$5. Pass the necessary journal entry

2. On a particular job a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were spoiled; the spoiled units are considered to be normal as part of the production process for the specific job; each spoiled unit can be sold as scrap for an estimated net realizable value of \$5. Pass the necessary journal entry

3. On a particular job a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were spoiled; the spoiled units are considered to be abnormal; each spoiled unit can be sold as scrap for an estimated net realizable value of \$5. Pass the necessary journal entry

4. During January a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were defective; the defective units are considered to be normal; each defective unit was reworked at a cost of \$4 for materials and \$8 for labor; manufacturing overhead is applied at the rate of 100% of direct labor cost. Pass the necessary journal entry

5. During January a corporation produced 10,000 units at a cost of \$45 per unit; 200 of the units were defective; the defective units are

considered to be abnormal; each defective unit was reworked at a cost of \$4 for materials and \$8 for labor; manufacturing overhead is applied at the rate of 100% of direct labor cost. Pass the necessary journal entry

5.5. SUMMARY



1. Defective Units--production that does not meet quality standards or designated product specifications and is reworked to a sufficient quality level so that it can be sold through normal distribution channels
 - a. Normal Defective Units--the number of defective units that are expected as part of the production process
 - b. Abnormal Defective Units--the number of defective units that arise for unusual or abnormal reasons
2. Spoilage--production that does not meet quality standards or designated product specifications and is not reworked to a

sufficient quality level so that it can be sold through normal distribution channels

- a. Normal Spoilage--the number of spoiled units that are expected as part of the production process
- b. Abnormal Spoilage--the number of spoiled units that arise for unusual or abnormal reasons

Defective Units

1. Job Order Costing a. Accounting

- 1) Normal Defective Units--the cost to rework the normal defective units is treated as a necessary cost to obtain the goods units of output
 - a) Production Process--if the defective units are expected as part of the production process, the cost to rework the defective units is included in the pre-determined overhead rate and, therefore, is added to the manufacturing overhead account to offset the applied overhead
 - b) Specific Job--if the defective units arise from the production process for the specific job (higher quality standards, lower tolerances, etc.), the cost to rework the defective units is not included in the pre-determined overhead rate; therefore, the cost to rework the defective units is added to the work in process account so that the specific job is charged the cost to rework the defective units
- 2) Abnormal Spoilage--the cost to rework the abnormal defective units is treated as an expense for the period

2. Process Costing a. Accounting

- 1) Normal Defective Units--the cost to rework the normal defective units is treated as a necessary cost to obtain the goods units of output, is included in the pre-determined overhead rate, and, therefore, is added to the manufacturing overhead account to offset the applied overhead
- 2) Abnormal Spoilage--the cost to rework the abnormal defective units is treated as an expense for the period

C. Spoilage

1. Job Order Costing--the cost of the spoiled units is computed in the same manner as the cost of production when no spoilage exists

a. Accounting

1) Normal Spoilage--the cost of the normal spoilage is treated as a necessary cost to obtain the goods units of output

a) Production Process--if the spoiled units are expected as part of the production process, the cost of the spoilage less any salvage value of the spoiled units is included in the pre-determined overhead rate and, therefore, is transferred to the manufacturing overhead account to offset the applied overhead

b) Specific Job--if the spoiled units arise from the production process for the specific job (higher quality standards, lower tolerances, etc.), the cost of the spoilage less any salvage value of the spoiled units is not included in the pre-determined overhead rate; therefore, any salvage value of the spoiled units is removed from the work in process account so that the specific job is charged with the net cost of the spoiled units

2) Abnormal Spoilage--the cost of the abnormal spoilage less any salvage value of the spoiled units is treated as an expense for the period

2. Process Costing--the cost of spoiled units is computed in the same manner as the cost of production when no spoilage exists

a. Accounting

1) Normal Spoilage--the cost of the normal spoilage less any salvage value of the spoiled units is treated as a necessary cost to obtain the goods units of output, is included in the pre-determined overhead rate, and is, therefore, added to the manufacturing overhead account to offset the applied overhead

a) Cost of Good Units--sometimes in practice an estimate of the cost of the normal spoilage less any salvage value of the spoiled units is not included in the pre-determined overhead rate, and, therefore, the cost

of the normal spoilage less any salvage value of the spoiled units is added to the cost of the good units of output

2) Abnormal Spoilage--the cost of the abnormal spoilage less any salvage value of the spoiled units is treated as an expense for the period

b. Illustrations

1) A corporation uses a weighted average process costing system; on January 1, 3,000 units were in process--80% complete in regards to materials and 70% complete in regards to conversion costs--at a cost of materials of \$38,120 and a cost of conversion costs of \$40,950; during January 19,000 units were started; during January materials costs of \$282,000 and conversion costs of \$378,000 were added to production; during January 20,000 units were completed; on January 31, 2,000 units were in process--60% complete in regards to materials and 50% complete in regards to conversion costs; 500 of the completed units were spoiled; company-wide standards state that a spoilage rate of 2% of completed units is considered to be normal; spoilage is detected at the end of the manufacturing process; it is assumed that the spoiled units came entirely from the units started and completed during January.

Beginning Inventory	3,000
Units Started	<u>19,000</u>
	<u>22,000</u>

2) A corporation uses a FIFO process costing system; on January 1, 3,000 units were in process--80% complete in regards to materials and 70% complete in regards to conversion costs--at a cost of materials of \$38,120 and a cost of conversion costs of \$40,950; during January 19,000 units were started; during January materials costs of \$282,000 and conversion costs of \$378,000 were added to production; during January 20,000 units were completed; on January 31, 2,000 units were in process--60% complete in regards to materials and 50% complete in regards to conversion costs; 500 of the completed units were spoiled; company-wide standards state that a spoilage rate of 2% of completed units is considered to be normal; spoilage is detected at the end of the manufacturing process; it is assumed that the spoiled units came entirely from the units started and completed during January

Beginning Inventory	3,000
Units Started	<u>19,000</u>
	<u>22,600</u>

		<u>Equivalent Units</u>	
		<u>Materials</u>	<u>Conversion Costs</u>
Beginning Inventory	3,000	600 (20% x 3,000)	900 (30% x 3,000)
Good Units Started and Completed	16,500	16,500 (100% x 16,500)	16,500 (100% x 16,500)
Normal Spoilage	400	400 (100% x 400)	400 (100% x 400)
Abnormal Spoilage	100	100 (100% x 100)	100 (100% x 100)
Ending Inventory	2,000	1,200 (60% x 2,000)	1,000 (50% x 2,000)
	<u>22,000</u>	<u>18,800</u>	<u>18,900</u>

Beginning Inventory Costs	79,070	38,120	40,950
Current Costs	<u>660,000</u>	<u>282,000</u>	<u>378,000</u>
	<u>739,070</u>	<u>320,120</u>	<u>418,950</u>

Cost Per Unit	15.00	20.00
	(282,000 / 18,800)	(378,000 / 18,900)

Beginning Inventory	106,070	38,120	40,950
		9,000 (15.00 x 600)	18,000 (20.00 x 900)
Good Units Started and Completed	577,500	247,500 (15.00 x 16,500)	330,000 (20.00 x 16,500)
Normal Spoilage	14,000	6,000 (15.00 x 400)	8,000 (20.00 x 400)
Abnormal Spoilage	3,500	1,500 (15.00 x 100)	2,000 (20.00 x 100)
Ending Inventory	38,000	18,000 (15.00 x 1,200)	20,000 (20.00 x 1,000)
	<u>739,070</u>	<u>320,120</u>	<u>418,950</u>

Finished Goods Inventory	683,570
(106,070 + 577,500)	
Manufacturing Overhead	14,000
Loss from Abnormal Spoilage	3,500
Work in Process	701,070

Cost per Unit:

Beginning Inventory = 106,070 / 3,000 = 35.36

Started and Completed = 577,500 / 16,500 = 35.00

3. List the three types of defects.

Part III. Work out

The following data, in physical units describe a grinding process for January:

Work in process, beginning	19000
Started during period	150000
Spoiled units	12000
Good units completed and	
Transferred out	132000
Work in process ending	25000

Inspection occurs at the 100% conversion stage. Normal spoilage is 5% good units passing inspection

Required

1. compute normal spoilage in units
2. Compute abnormal spoilage in units
3. Assume that the equivalent unit cost of spoiled unit is Br 10.
Compute the amount of potential savings if all spoilage were eliminated, assuming that all other cost would be unaffected.
Comment your answer

UNIT SIX: JOINT PRODUCTS, COST ALLOCATION AND BY PRODUCTS

Content

- 6.0 Introduction
- 6.1 Objectives
- 6.2 Joint Produced
- 6.3 Joint Cost Allocation
- 6.4 Accounting for byproducts
- 6.5 Summary
- 6.6 Model Examination Questions

6.0 INTRODUCTION



Dear learner, welcome to the sixth unit of the Cost and Management Accounting I course. Joint production occurs whenever two or more products must result from the same production process. The key word in this definition is “must”. The crucial characteristics of joint products are that the production of one automatically results in the production of the other. It is often possible, of course, to eliminate one of the joint products; it is not economic to do so if the product has a sales value greater than the unique costs of completing and marketing. For example, in marble quarrying, it is possible to leave all the marble except the best grade at the quarry site. If other grades must be quarried to obtain the best grade, it is not economic to leave the other grades at the quarry so long as their sales value exceeds the unique costs of finishing and selling. In this case, the quarrying of marble is a joint-production process because, in quarrying pure white marble, it is necessary (from an economic point of view) to quarry other grades.

The fact that joint products must be produced together is of the major importance to the cost accountant because it means that all cost

allocations among joint products are entirely arbitrary. If two products must result from a single productive process, one product without both, the cost of producing only one cannot be isolated. The facts are that it costs a certain sum of money to produce a certain amount of each of two products. If part of the joint production cost is assigned to one of the products, it is a meaningless allocation. This is the most important point to remember about joint cost accounting because it is this characteristics that makes it necessary traditional cost accounting techniques.

6.1 LEARNING OBJECTIVES

Overview



Dear learner! At the end of the session you are expected to:

- ✓ Identify split off point in a joint cost situation
- ✓ Distinguish between joint products and by products
- ✓ provide several reasons for allocating joint costs to individual products
- ✓ Distinguish alternative methods of allocating joint costs
- ✓ Describe why we sales value at split off method is widely used
- ✓ Describe the irrelevance of joint costs in to sell or process further
- ✓ Distinguish alternative methods of accounting for by products

6.2 JOINT PRODUCT

Joint products are two or more manufactured products (1) that have relatively significant sales values and (2) that are not separately identifiable as individual products until their split of point.

The split-off point is that juncture of manufacturing where the joint products become individually identifiable. Any cost beyond that stage are called separable cost because they are part of joint process and can be exclusively identified with individual products. Examples, of joint products include chemicals, petroleum refining, and meat packing.

Joint cost

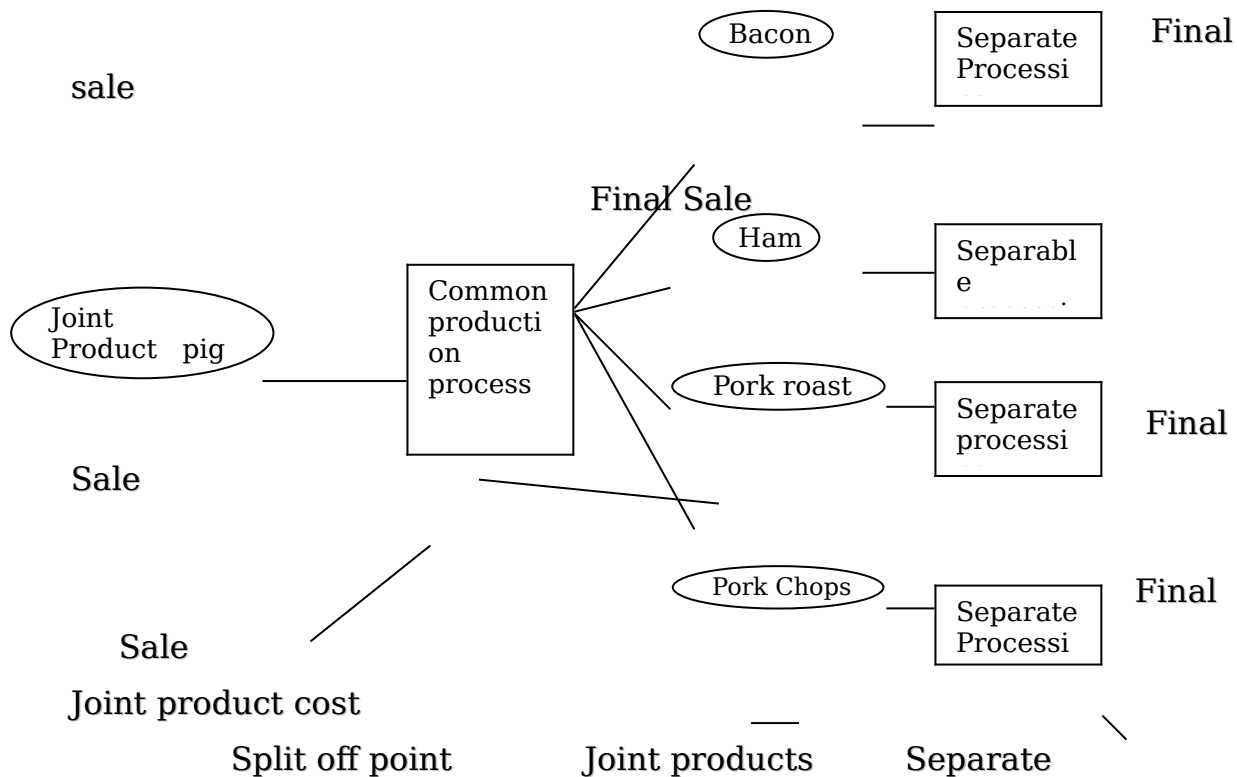


Fig. 1 Product Cost



Learning Activity 6.1

Answer the following questions.

1. _____ are the costs of the common

manufacturing process

2. _____ are the products produced from a common input and a common manufacturing process
3. _____ is the stage of the common manufacturing process where the joint products are separated.

6.3. JOINT COST ALLOCATION

A. Characteristics--a common manufacturing process simultaneously produces two or more products from a common input

1. Joint Costs--joint costs are the costs of the common manufacturing process

2. Joint Products--joint products are the products produced from a common input and a common manufacturing process

3. By-products--by-products are joint products that are relatively minor in quantity and/or value

4. Split-off Point--the split-off point is the stage of the common manufacturing process where the joint products are separated

B. Joint Cost Allocation--joint costs need to be allocated to the joint products for various reasons (such as inventory valuation for financial accounting purposes, measuring profitability of joint products, pricing decisions, cost reimbursement, etc.)

1. Physical Quantities Method--joint costs are allocated to the joint products based on their relative physical measure (such as volume, weight, etc.)

Illustration--a corporation incurred joint costs of \$2,400 in manufacturing Product A and Product B to the split-off point; Product A weighed 700 pounds and had a sales value at the split-off point of \$1,800; Product B weighed 300 pounds and had a sales value at the split-off point of \$1,200

Cost Allocation:

$$\text{Product A} = 700 / (700 + 300) \times 2,400 = 1,680$$

$$\text{Product B} = 300 / 1,000 \times 2,400 = \underline{720}$$

$$\underline{2,400}$$

Income Statement:

	<u>Product A</u>	<u>Product B</u>	<u>Total</u>
Sales	1,800	1,200	3,000
Cost of Goods Sold	(<u>1,680</u>)	(<u>720</u>)	(<u>2,400</u>)
Gross Margin	<u>120</u>	<u>480</u>	<u>600</u>

Gross Margin %:

$$\text{Product A} = 120 / 1,800 = 7\%$$

$$\text{Product B} = 480 / 1,200 = 40\%$$

$$\text{Total} = 600 / 3,000 = 20\%$$

2. Sales Value Method

a. Net Realizable Value Method--if the sales value at the split-off point is known, joint costs are allocated to the joint products based on their relative sales value at the split-off point

Illustration--a corporation incurred joint costs of \$2,400 in manufacturing Product A and Product B to the split-off point;

Product A weighed 700 pounds and had a sales value at the split-off point of \$1,800; Product B weighed 300 pounds and had a sales value at the split-off point of \$1,200

Cost Allocation:

$$\begin{aligned}\text{Product A} &= 1,800 / (1,800 + 1,200) \times 2,400 = 1,440 \\ \text{Product B} &= 1,200 / 3,000 \times 2,400 = \underline{960} \\ &\quad \underline{2,400}\end{aligned}$$

Income Statement:

	<u>Product A</u>	<u>Product B</u>	<u>Total</u>
Sales	1,800	1,200	3,000
Cost of Goods Sold	<u>1,440</u>	<u>960</u>	<u>2,400</u>
Gross Margin	<u>360</u>	<u>240</u>	<u>600</u>

Gross Margin %:

$$\text{Product A} = 360 / 1,800 = 20\%$$

$$\text{Product B} = 240 / 1,200 = 20\%$$

$$\text{Total} = 600 / 3,000 = 20\%$$

b. No Sales-value at Split-off Point--the sales value at the split-off point for one or more of the joint products is not known

1) Estimated Net Realizable Value Method--sales value at the split-off point of the joint products is estimated by taking the sales value of each joint product at the first point at which the products can be sold and deducting the processing costs that must be incurred after the split-off point up to the first point at which the products can be sold, and then joint costs are allocated to the joint products based on their relative estimated sales value at the split-off point

Illustration--a corporation incurred joint costs of \$2,400 in manufacturing Product A and Product B to the split-off point; Product A weighed 700 pounds and had a sales value of \$3,600 after incurring additional processing costs of \$675; Product B weighed 300 pounds and had a sales value of \$1,400 after incurring additional processing costs of \$425

Estimated Net Realizable Value:

$$\text{Product A} = 3,600 - 675 = 2,925$$

$$\text{Product B} = 1,400 - 425 = 975$$

Cost Allocation:

$$\text{Product A} = 2,925 / (2,925 + 975) \times 2,400 = 1,800$$

$$\text{Product B} = 975 / 3,900 \times 2,400 = 600$$

Cost of Goods Sold:

$$\text{Product A} = 1,800 + 675 = 2,475$$

$$\text{Product B} = 600 + 425 = 1,025$$

Income Statement:

	<u>Product A</u>	<u>Product B</u>	<u>Total</u>
Sales	3,600	1,400	5,000
Cost of Goods Sold	<u>2,475</u>	<u>1,025</u>	<u>3,500</u>
Gross Margin	<u>1,125</u>	<u>375</u>	<u>1,500</u>

Gross Margin %:

$$\text{Product A} = 1,125 / 3,600 = 31\%$$

$$\text{Product B} = 375 / 1,400 = 27\%$$

$$\text{Total} = 1,500 / 5,000 = 30\%$$

2) Constant Gross Margin Percentage Method--under the constant gross margin percentage method joint costs are allocated to the joint products in a way that results in the same gross margin percentage for each joint product

a) Computation

- i. Total Gross Margin Percentage--the gross margin percentage for all of the joint products is computed by dividing the excess of the sales value of all the joint products at the first point at which the products can be sold over the sum of the joint costs and the processing costs that must be incurred after the split-off point up to the first point at which the products can be sold by the

sales value of all the joint products at the first point at which the products can be sold

- II. Cost of Goods Sold--the cost of goods sold for each joint product is computed by multiplying the sales value for each joint product by one minus the total gross margin percentage for all the joint products
- III. Joint Cost Allocation--the joint costs allocated to each joint product is computed by subtracting the processing costs incurred after the split-off point for each joint product from its cost of goods sold

- b) Illustration--a corporation incurred joint costs of \$2,400 in manufacturing Product A and Product B to the split-off point; Product A weighed 700 pounds and had a sales value of \$3,600 after incurring additional processing costs of \$675; Product B weighed 300 pounds and had a sales value of \$1,400 after incurring additional processing costs of \$425

Constant Gross Margin Percentage:

$$\text{Total Sales} = 3,600 + 1,400 = 5,000$$

$$\text{Total Cost of Goods Sold} = 2,400 + 675 + 425 = 3,500$$

$$\text{Total Gross Margin} = 5,000 - 3,500 = 1,500$$

$$\text{Total Gross Margin Percentage} = 1,500 / 5,000 = 30\%$$

Cost of Goods Sold:

$$\text{Product A} = (1 - 30\%) \times 3,600 = 2,520$$

$$\text{Product B} = 70\% \times 1,400 = 980$$

Cost Allocation:

$$\text{Product A} = 2,520 - 675 = 1,845$$

$$\text{Product B} = 980 - 425 = \underline{555}$$

$$\underline{2,400}$$

Income Statement:

	<u>Product A</u>	<u>Product B</u>	<u>Total</u>
Sales	3,600	1,400	5,000
Cost of Goods Sold	<u>2,520</u>	<u>980</u>	<u>3,500</u>
Gross Margin	<u>1,080</u>	<u>420</u>	<u>1,500</u>

Gross Margin %:

$$\text{Product A} = 1,080 / 3,600 = 30\%$$

$$\text{Product B} = 420 / 1,400 = 30\%$$

$$\text{Total} = 1,500 / 5,000 = 30\%$$

**Learning Activity 6.2**

Answer the following question.

1. Why joint cost need to be allocated?

2. List and discuss the basic joint cost allocation methods?

C. Special Considerations

1. Decision Making

a. Short-run Decision--at the split-off point the decision to sell a joint product at the split-off point or to process the joint product beyond the split-off point before selling it is determined by comparing the additional

revenue generated from processing the joint product beyond the split-off point with the additional costs from processing the joint product beyond the split off point

Illustration

a) A corporation incurred joint costs of \$4,600 in manufacturing Product A and Product B to the split-off point; Product A can be sold at the split-off point for \$3,500 or for \$5,000 after incurring additional processing costs of \$1,200; Product B can be sold at the split-off point for \$2,500 or for \$3,000 after incurring additional processing costs of \$700 Additional Profit From Processing:

$$\text{Product A} = (5,000 - 3,500) - 1,200 = 300$$

Product A should be processed beyond the split-off point

$$\text{Product B} = (3,000 - 2,500) - 700 = (200)$$

Product B should not be processed beyond the split-off point.

$$\text{Profit at Split-off Point} = 3,500 + 2,500 - 4,600 = 1,400.$$

$$\text{Profit from Processing Product A} = 5,000 + 2,50 - (4,600 + 1,200) = 1,700$$

b) A corporation incurred joint costs of \$6,500 in manufacturing Product A and Product B to the split-off point; Product A can be sold at the split-off point for \$3,500 or for \$5,000 after incurring additional processing costs of \$1,200; Product B can be sold at the split-off point for \$2,500 or for \$3,000 after incurring additional processing costs of \$700 Additional Profit from Processing:

$$\text{Product A} = (5,000 - 3,500) - 1,200 = 300$$

Product A should be processed beyond the split-off point.

$$\text{Product B} = (3,000 - 2,500) - 700 = (200)$$

Product B should not be processed beyond the split-off point.

$$\text{Profit at Split-off Point} = 3,500 + 2,500 - 6,500 = (500)$$

$$\text{Profit from Processing Product A} = 5,000 + 2,500 - (6,500 + 1,200) = (200)$$

b. Long-run Decision-at the start of the manufacturing process the decision to manufacture or not is determine by comparing the total revenues generated from the manufacturing process with the total costs from the manufacturing process

Illustrations

a) A corporation estimated that it will incur joint costs of \$6,200 in manufacturing Product A and Product B to the split-off point; Product A can be sold at the split-off point for \$3,500 or for \$5,000 after incurring additional processing costs of \$1,200; Product B can be sold at the split-off point for \$2,500 or for \$3,000 after incurring additional processing costs of \$700

Additional Profit from Processing:

$$\text{Product A} = (5,000 - 3,500) - 1,200 = 300$$

Product A should be processed beyond the split- off point.

$$\text{Product B} = (3,000 - 2,500) - 700 = (200)$$

Product B should not be processed beyond the split-off point.

$$\text{Profit at Split-off Point} = 3,500 + 2,500 - 6,200 = (200)$$

$$\begin{aligned} \text{Profit from Processing Product A} &= 5,000 + 2,500 - \\ (6,200 + 1,200) &= 100 \end{aligned}$$

The joint products should be manufactured.

b) A corporation estimated that it would incur joint costs of \$6,500 in manufacturing Product A and Product B to the split-off point; Product A can be sold at the split-off point for \$3,500 or for \$5,000 after incurring additional processing costs of \$1,200; Product B can be sold at the split-off point for \$2,500 or for \$3,000 after incurring additional processing costs of \$700

Additional Profit from Processing:

$$\text{Product A} = (5,000 - 3,500) - 1,200 = 300$$

Product A should be processed beyond the split off point.

$$\text{Product B} = (3,000 - 2,500) - 700 = (200)$$

Product B should not be processed beyond the split-off point.

Profit at Split-off Point = $3,500 + 2,500 - 6,500 = (500)$

Profit from Processing Product A = $5,000 + 2,500 - (6,500 + 1,200) = (200)$

The joint products should not be manufactured.



Learning Activity 6.3

Answer the following question.

1. Explain the difference between joint product and by-product?

By-products--by product accounting attempts to reflect the economic relationship between the by-products and the joint products with a minimum of record keeping costs

a. Sales Value of By-product Sold--the proceeds from the sale of the by-product are treated either as a reduction of cost of goods sold or as other revenue

Illustration--a corporation incurred joint costs of \$16,000 in manufacturing Product A, Product B, and Product C to the split-off point; Product C is considered a by-product; joint costs are allocated to the joint products using their relative weights; Product A weighed 2,000 pounds and was processed beyond the split-off point at a cost of \$4,000; Product B weighed 3,000 pounds and was sold at the split-off point; Product C weighed 500 pounds and had an estimated net realizable value of \$1,000; 1,400 pounds of Product A were sold; 2,700 pounds of Product B were sold; 400 pounds of Product C were sold

Cost Allocation:

$$\text{Product A} = 2,000 / (2,000 + 3,000) \times 16,000 = 6,400$$

$$\text{Product B} = 3,000 / 5,000 \times 16,000 = \underline{9,600}$$
$$\underline{16,000}$$

Cost of Goods Sold:

$$\text{Product A} = 1,400 / 2,000 \times (6,400 + 4,000) = 7,280$$

$$\text{Product B} = 2,700 / 3,000 \times 9,600 = 8,640$$

$$\text{Product C} = 400 / 500 \times 1,000 = \underline{(800)}$$
$$\underline{15,120}$$

b. Net Realizable Value--the estimated realizable value of the by-product manufactured is treated as a reduction of the joint costs

Illustration--a corporation incurred joint costs of \$16,000 in manufacturing Product A, Product B, and Product C to the split-off point; Product C is considered a by-product; joint costs are allocated to the joint products using their relative weights; Product A weighed 2,000 pounds and was processed beyond the split-off point at a cost of \$4,000; Product B weighed 3,000 pounds and was sold at the split-off point; Product C weighed 500 pounds and had a estimated net realizable value of \$1,000; 1,400 pounds of Product A were sold; 2,700 pounds of Product B were sold; 400 pounds of Product C were sold

Cost Allocation:

$$\text{Product A} = 2,000 / (2,000 + 3,000) \times (16,000 - 1,000) = 6,000$$

$$\text{Product B} = 3,000 / 5,000 \times 15,000 = \underline{9,000}$$

$$\underline{15,000}$$

Cost of Goods Sold:

$$\text{Product A} = 1,400 / 2,000 \times (6,000 + 4,000) = 7,000$$

$$\text{Product B} = 2,700 / 3,000 \times 9,000 = \underline{8,100}$$



Learning Activity 6.4

Answer the following questions.

1. Define by products?

2. What is the need for accounting for by products?

6.4. ACCOUNTING FOR BY-PRODUCT

Processes that yield joint product often also yield what are frequently referred to as by-product-product that have a relatively low sales value compared with the sales value of the main or joint product (s)

I. Accounting for byproducts

- A. Presence of byproducts can affect allocation of joint costs although byproducts have much lower sales value than joint or main products
- B. Two methods of accounting for byproducts
 1. Method A: production method—byproducts recognized at time production is completed
 2. Method B: sale method—byproducts recognized at time of sale

A. NON-COST METHOD (SALES VALUE METHOD)

- Under these method costs are not assigned to the by-product for costing purposes. Instead any income resulting from the sale of the by-product is credited either to other income or the main product
- Non-cost method has the following variants:
 - 1) OTHER INCOME METHOD

- In this method any amount realized from the sale of the by-product is transferred to profit and loss account as sundry income.
- It is suitable when the value of the by product is quite small in relation to the main product.
- This method of accounting for by-products is simple, practical and requires no computation of cost for the by product.

II) BY PRODUCT SALES ADDED TO THE MAIN PRODUCT SALES

- In this method, the combined sales figure of the entire main and by product is computed and the total cost is deducted to arrive at the profit or loss figure.
- This method is based on the view that since it is physically impossible to produce one product without the other, then the accounting statement must reflect this by providing combined figures.

III) BY-PRODUCT SALES VALUE DEDUCTED FROM TOTAL COST

- In this method, the sales value of the by-product is deducted from the total cost. Thus the value of the byproduct reduces the cost of the main product.

Illustration

Dollar/Birr amount

Joint cost	5000	
Add Subsequent cost on main product		1500
	6500	
Less sale of by-product	400	
Less subsequent cost of by-product	100	
	300	
Less selling & distribution cost	50	250
Net cost of the main product	6250	
Add Selling and distribution cost of the main product	500	
Total cost of the main product		6750
Net profit	750	

Selling price of the main product

7500

B) REVERSE COST METHOD

- In this method, the cost of the by-product is obtained by deducting the following from the sales value of the by-product.
 - a) estimated profit margin
 - b) Selling and distribution expenses
 - c) After split off costs.
- This method is called a reverse method because the cost of the by product is arrived from the sales value by working back.
- The cost of the by-product so arrived at is deducted from the joint cost and the final figure is the cost of the main product.

Illustration:

In manufacturing the main product, a company processes the incidental waste into two by-products A and B. From the following data relating to the product you are required to prepare a comparative profit and loss statement showing the individual costs and other detail. The total costs up to separation point were 310,400 Birr.

	Main Product	By product	
		A	B
Sales	800,000	64,000	96,000
Cost after separation	80,000	12,800	14,400
Estimated net profit % age to sales value		20%	20%
Estimated selling expense as % of sales value	20%	10%	15%

- Use the reverse method for separation of joint cost

Solution:-

Cost allocated to by-product

		A		B	Total
Sales		64,000		96,000	
Less estimated net profit	12,800		19,200		
Estimated selling exp.	6,400		14,400		
Cost after separation	12,800	32,000	14,400	48,000	-
Cost included in a joint cost		<u>32,000</u>		<u>48,000</u>	<u>80,000</u>

Comparative profit and loss statement

	Main product	By product	
		A	B
Joint cost up to separation point	310,400		
Less cost allocated to By-product	80,000	32,000	48,000
	230,400		
Cost after separation	80,000	12,800	14,400
Selling expense	160,000	6,400	14,400
Total cost	470,400	51,200	76,800
Net profit	329,600	12,800	19,200
Sales	<u>800,000</u>	<u>64,000</u>	<u>96,000</u>

6.5. SUMMARY



II. Costing joint products

A. Basics

1. Joint costs: costs of production process that yields multiple products simultaneously
2. Split off point: juncture in joint production process when two or more products become separately identifiable
3. Separable costs: all costs (manufacturing, marketing, distribution, etc.) incurred beyond the split off point that are assignable to each of the specific products identified at split off point

B. Focus of joint costing

1. Assigning costs to individual products at split off point
2. Classifying outputs by sales value
3. Changing values of products over time and distinctions of terms in organizations

C. Purposes for allocating joint costs

1. Computation of inventoriable costs and cost of goods sold for financial accounting purposes and reports for income tax authorities
2. Computation of inventoriable costs and cost of goods sold for internal reporting purposes, used in division profitability analysis and affect evaluation of division managers' performance
3. Cost reimbursement under contracts for companies that have few, but not all, of products or services reimbursed under cost-plus contracts
4. Insurance-settlement computations for damage claims made on basis of cost information by company having joint products, main

- products, or byproducts
- 5. Rate regulation for one or more of the jointly produced products or services are subject to price regulation
- 6. Litigation in which costs of joint products are key inputs
- 7. Other reasons
- D. Approaches to allocating joint costs
 - 1. Market-based data, such as revenues, used as basis of allocation
 - 2. Physical measures data, such as weight or volume, of joint products
- E. Criterion to support use of market-based data as basis of joint cost allocation
 - 1. Cause-and-effect criterion not applicable by definition at individual product level
 - 2. Benefits-received criterion: revenues better indicator of benefits received than physical measures
- F. Basics
 - ✓ Joint costs: costs of production process that yields multiple products simultaneously
 - ✓ Split off point: juncture in joint production process when two or more products become separately identifiable
 - ✓ Separable costs: all costs (manufacturing, marketing, distribution, etc.) incurred beyond the split off point that are assignable to each of the specific products identified at split off point
- G. Focus of joint costing
 - ✓ Assigning costs to individual products at split off point
 - ✓ Classifying outputs by sales value
 - ✓ Changing values of products over time and distinctions of terms in organizations
- H. Purposes for allocating joint costs

- ✓ Computation of inventoriable costs and cost of goods sold for financial accounting purposes and reports for income tax authorities
- ✓ Computation of inventoriable costs and cost of goods sold for internal reporting purposes, used in division profitability analysis and affect evaluation of division managers' performance
- ✓ Cost reimbursement under contracts for companies that have few, but not all, of products or services reimbursed under cost-plus contracts
- ✓ Insurance-settlement computations for damage claims made on basis of cost information by company having joint products, main products, or byproducts
- ✓ Rate regulation for one or more of the jointly produced products or services are subject to price regulation
- ✓ Litigation in which costs of joint products are key inputs
- I. Presence of byproducts can affect allocation of joint costs although byproducts have much lower sales value than joint or main products
- J. Two methods of accounting for byproducts
 - ✓ Method A: production method
 - ✓ Method B: sale method

6.6 MODEL EXAM QUESTIONS

The following data apply to questions 1–5.

Brant Corporation manufactures two products out of a joint process—Scout and Andro. The joint (common) costs incurred are \$400,000 for a standard production run that generates 70,000 pounds of Scout and 30,000 pounds of Andro. Scout sells for \$9.00 per pound while Andro sells for \$7.00 per pound.

1. If there are no additional processing costs incurred after the split off point, the amount of joint cost of each production run allocated to Scout on a physical-quantity basis is
 - a. \$300,000.
 - b. \$280,000.
 - c. \$120,000.
 - d. \$100,000.
2. If there are no additional processing costs incurred after the splitoff point, the amount of joint cost of each production run allocated to Andro on a sales value at splitoff basis is
 - a. \$300,000.
 - b. \$225,000.
 - c. \$175,000.
 - d. \$100,000.
3. If additional processing costs beyond the splitoff point are \$1.00 per pound for Scout and $\$2.33\frac{1}{3}$ per pound for Andro, the amount of joint cost of each production run allocated to Andro on a physical quantity basis is
 - a. \$300,000.
 - b. \$280,000.
 - c. \$120,000.
 - d. \$100,000.
4. If additional processing costs beyond the splitoff point are \$1.00 per pound for Scout and $\$2.33\frac{1}{3}$ per pound for Andro, the amount of joint cost of each production run allocated to Andro on an estimated net realizable value basis is
 - a. \$80,000.
 - b. \$147,350.
 - c. \$175,000.
 - d. \$320,000.
5. Assume the same cost information as in question 4. The amount of joint cost of each production run allocated to Scout using the constant gross-margin percentage NRV method is
 - a. \$224,910.
 - b. \$260,120.
 - c. \$335,090.
 - d. \$405,090.

5. For purposes of allocating joint costs to joint products, the sales value at split off method could be used in which of the following situations?

	<u>No costs beyond split off</u>	<u>Cost beyond split off</u>
a.	Yes	No
b.	Yes	Yes
c.	No	Yes
d.	No	No

6. Products G and H are joint products developed from the same process with each being processed further. Joint costs are incurred until split off; the separable costs are incurred in further refining each product.

Sales values of G and H at split off are used to allocate joint costs. If the sales value of G at split off increases and all other costs and selling prices remain unchanged, the gross margin of

	<u>G</u>	<u>H</u>
a.	increases	increases
b.	increases	decreases
c.	decreases	decreases
d.	decreases	increases

7. Tanner Company manufactures products Katran and Klare from a joint process. Product Katran has been allocated \$7,500 of total joint costs of \$30,000 for the 1,500 units produced. Katran can be sold at the splitoff point for \$4 per unit, or it can be processed further with additional costs of \$2,000 and sold for \$7 per unit. If Katran is processed further and sold, the result would be
- a break-even situation.
 - an overall loss of \$1,500.
 - a gain of \$2,500 from further processing.
 - a gain of \$1,000 from further processing.

8. In accounting for byproducts, the value of the byproduct may be recognized at the time of

Production Sale

- | | | |
|----|-----|-----|
| a. | Yes | No |
| b. | Yes | Yes |
| c. | No | No |
| d. | No | Yes |
9. Mohler Corporation manufactures a product that yields the byproduct, Jep. The only costs associated with Jep are selling costs of \$0.10 for each unit sold. Mohler accounts for sales of Jep by deducting Jep's separable costs from Jep's sales and then deducting this net amount from the major product's cost of goods sold. Jep's sales were 200,000 units at \$1.00 each. If Mohler changes its method of accounting for Jep's sales of showing the net amount as additional sales revenue, the Mohler's gross margin would
- Increase by \$180,000.
 - Increase by \$200,000.
 - Increase by \$220,000.
 - Be unaffected.

Work out

1. Cross company produce a product used in preserving grain and other food products many of the firms product are made in joint production progress one of such group is called phenol group which resulted in a joint cost of Br. 240.000 and the following production quantities and cost after split off in the month of June.

Product	Output in kg	Selling price/kg	Cost after split off	NRV at split off
PH 01	60.000	Br. 4	Br. 60.000	120.000
PH 02	30.000	8	120.000	100.000

PH 03	10.000	12	30.000	80.000
Total	100.000		210.000	300.000

Required

1. Allocate the joint cost for joint products in each of the following allocation bases
 - a. Physical units allocation method
 - b. Sales value allocation method
 - c. NRV joint cost allocation method
 - d. Gross profit percentage method
2. XYZ Company produced 500 units at a unit cost of \$ 100. On March 4, 2000 inspection shows that 5 units have defects and have an estimated sales value of \$30 per unit.

Instructions:

- A. assuming that the units are spoiled , prepare journal entry to record the estimated value of the rejected units assuming that
 - i. the spoilage is normal and common to all jobs
 - ii. the spoilage is normal and peculiar to a specific job
 - iii. the spoilage is abnormal
- B. assuming that the units are defective instead of spoiled, prepare journal entry to record the total rework cost of \$190(raw materials, \$40; labor, \$100 and FOH applied, \$50).Assume that
 - i. the defective units are normal and common to all jobs
 - ii. the defective units are normal and peculiar to a specific job
 - iii. the defective units are abnormal
3. Rich supply corporation maintains a scrap inventory account for metal scrap recovered from operations in the cutting department. On December, 11, 2000, 5300 pounds of scrap with an estimated market value of \$ 2385 are transferred from the factory to the store room.

Instructions: prepare the necessary journal entries to record

- i. The storage of metal scrap
- ii. The sale of 1900 pounds of scrap at recorded value for cash
- iii. The sale of 2100 pounds of scrap at \$0.52 a pound on credit
- iv. The sale of 1300 pounds of scrap at \$0.39 a pound on credit

Assuming:

Case A) the scrap is a high value and can be identified to a specific job

Case B) the scrap is a low value and can be identified to a specific job

4. The manufacturing process in the Shaping Department of PARADISE Company results in a byproduct. The company accumulates the byproduct and periodically sells it. During April 20x4, byproduct with estimated sales of Br.1,300 were removed from the factory floor and stored in a warehouse. In May 20x4, the materials were sold for Br.1,220.

Instructions: Give journal entries to record the above facts assuming that

- i. Byproducts are recognized at the point of sales and treated as
 - a) as a cost reduction from the main product
 - b) as other income
- ii. Byproducts are recognized at the point of production and treated as
 - a) as a cost reduction from the main product
 - b) as other inc

5. In Shaping Department of Royal Company, a byproduct is removed. The material is further processed and then sold. The company uses the reversal cost method to account for the byproduct. Data for December 20x3 follow:

Byproduct removed, 8,200 kilograms.

Estimated sales price of the byproduct after further process, Br.1 per K.G.

Estimated manufacturing cost after separation, Br.0.30 per K.G.

Estimated selling and Administrative costs, 20% of sales price.

Estimated normal net profit, 6% of sales price.

Instruction:

- a) Compute the value to be assigned to the by product and removed from WIP at the point of separation.
- b) Make the necessary journal entries to:
 - i. Record the transfer of estimated costs incurred before separation to the by product.
 - ii. Record the additional processing costs after separation. Assume that costs to further process the byproduct follows:

Materials.....	Br. 1, 000
Labor.....	1,200
Overhead.....	260

6. In Fasika Machine Shop, 10 machine parts out of lot of 100 machine parts are spoiled. Costs assigned up to the point of inspection are Br. 4, 000 per unit. The current disposal price of the spoiled parts is estimated to Br 1, 200.

Instructions:

- a. Prepare the necessary journal entry as the spoiled units are identified and given that they are related to the particular jobs.
- b. Calculate the cost of good units.

UNIT SEVEN: ACTIVITY-BASED COSTING AND MANAGEMENT

Content

- 7.0. Introduction
- 7.1. Learning Objectives
- 7.2. Reasons for the development of ABC
- 7.3. Steps in application of ABC systems
- 7.4. Traditional Absorption Costing Vs ABC systems
- 7.5. When Using ABC might be more appropriate?
- 7.6. ABC and Decision Making
- 7.7. Advantages and Disadvantages of ABC
 - 7.7.1. Advantages of ABC:
 - 7.7.2. Disadvantages of ABC
- 7.8. Activity Based Management
- 7.9. Summary

7.0 INTRODUCTION



Dear learner, welcome to the sixth unit of the Cost and Management Accounting I course. Activity-based costing (ABC) is a methodology for more precisely allocating overhead to those items that actually use it. The system can be used for the targeted reduction of overhead costs. ABC works best in complex environments, where there are many machines and products, and tangled processes that are not easy to sort out. Conversely, it is of less use in a streamlined environment where production processes are abbreviated.

Activity Based Costing

- (a) Activity based costing (ABC) is a form of absorption costing. However, it differs from traditional absorption costing, because it takes a different approach to the apportionment and absorption of production overhead costs.
- (b) ABC involves the identification of the factors (cost drivers) which cause the costs of an organization's major activities. Support overheads are charged to products on the basis of their usage of an activity.
 - (i) For costs that vary with production level in the short term, the cost driver will be volume related (labor or machine hours).
 - (ii) Overheads that vary with some other activity (and not volume of production) should be traced to products using transaction-based cost drivers such as production runs or number of orders received.

7.1. LEARNING OBJECTIVES

Overview



Dear learner! At the end of the session you are expected to:

After completing this chapter, students will be able to:

- ✓ Explain the ABC concept and the reasons for development of ABC.
- ✓ Identify appropriate cost drivers under ABC.
- ✓ Calculate costs per driver and per unit using ABC.
- ✓ Compare ABC and traditional methods of overhead absorption based on production units, labor hours or machine hours.
- ✓ Explain when to use ABC is more appropriate.
- ✓ Explain how ABC can assist the decision making for management.
- ✓ Describe the advantages and disadvantages of ABC.

7.2. REASONS FOR THE DEVELOPMENT OF ABC

In recent years, there has been dramatic fall in the costs of processing information. And, with the advent of advanced manufacturing technology (AMT), overheads are likely to be far more important and in fact direct labor may account for as little as 5% of a product's cost. It therefore now appears difficult to justify the use of direct labor or direct material as the basis from absorbing overheads or to believe that errors made in attributing overheads will not be significant.

Many resources are used in non-volume related support activities, such as setting-up, production scheduling, inspection and data processing. These support activities assist the efficient manufacture of a wide range of products and are not, in general, affected by changes in production volume. They tend to vary in the long term according to the range and complexity of the products manufactured rather than the volume of output.

Example 1

The wider the range and the more complex the products, the more

support activities will be required. Consider, for example, factory X which produces 10,000 units of one product, the Alpha, and factory Y which produces 1,000 units each of ten slightly different versions of the Alpha. Support activities costs in the factory Y are likely to be a lot higher than in factory X but the factories produce an identical number of units. For example, factory X will only need to set-up once whereas factory Y will have to set-up the production run at least ten times for the ten different products. Factory Y will therefore incur more set-up costs for the same volume of production.

7.3. STEPS IN APPLICATION OF ABC SYSTEM

An ABC system operates as follows:

Step 1: Identify an organization's major activities.

Step 2: Identify the factors which determine the size of the costs of an activity/cause the costs of an activity. These are known as cost drivers.

Step 3: Collect the costs associated with each cost driver into what are known as cost pools.

Step 4: Charge costs 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.

It is not always obvious what the cost driver for an activity might be. A cost driver might be unique to the activity. Here are some examples.

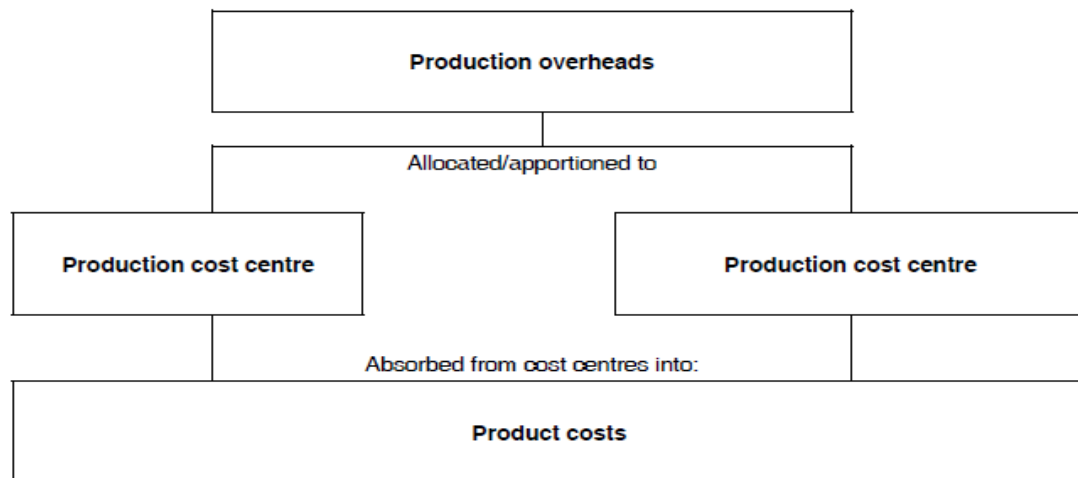
Activity	Possible cost driver
Materials handling and storage	Raw materials: purchases of materials

	Finished goods: volume of products made
Customer order processing	No. of customer orders
Materials purchasing	No. of purchase orders
Quality control and inspection	No. of inspections
Production planning	No. of production runs or batches
Repairs and maintenance	No. of machines, or machine hours operated

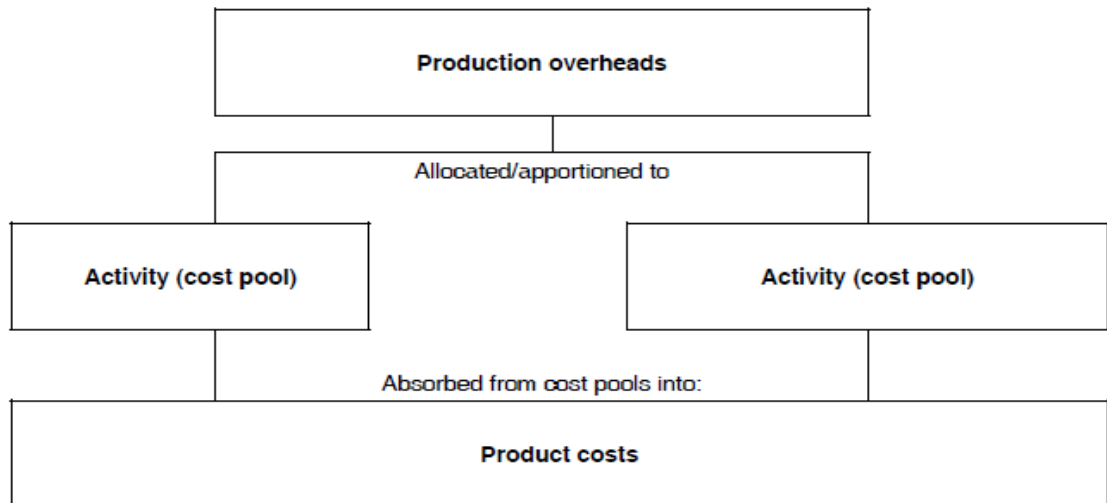
7.4. **TRADITIONAL ABSORPTION COSTING VS ABC SYSTEMS**

Traditional costing systems, which assume that all products consume all resources in proportion to their production volumes, tend to allocate too great a proportion of overheads to high volume products and too small a proportion of overheads to low volume products. ABC attempts to overcome this problem. The difference between traditional absorption costing and ABC is shown by the following diagrams:

Traditional absorption costing



Activity-based costing



Although ABC is a form of absorption costing, the effect of ABC could be to allocate overheads in a completely different way between products. Product costs and product profitability will therefore be very different with ABC compared with traditional absorption costing.

Example 2			
Entity Blue makes and sells two products, X and Y. Data for production and sales each month are as follows:			
		Product X	Product Y
Sales demand		4,000 units	8,000 units
Direct material cost/unit		\$20	\$10
Direct labor hours/unit		0.1 hour	0.2 hours
Direct labor cost/unit		\$2	\$4
Production overheads are \$500,000 each month. These are			

absorbed on direct labor hour basis.

An analysis of overhead costs suggests that there are four main activities that cause overhead expenditure.

Activity	Total cost	Cost driver	Total number	Product X	Product Y
	\$				
Batch setup	100,000	No. of set-ups	20	10	10
Order handling	200,000	No. of orders	40	24	16
Machining	120,000	Machine hours	15,000	6,000	9,000
Quality control	80,000	No. of checks	32	18	14
	<u>500,000</u>				

Required:

Calculate the full production costs for Product X and Product Y, using:

- (a) Traditional absorption costing
- (b) Activity based costing.

Solution:

Traditional absorption costing

The overhead absorption rate = $\$500,000 / (4,000 \times 0.1 + 8,000 \times 0.2) = \250

	Product X	Product Y	Total
	\$	\$	
Direct materials	20	10	
Direct labor	2	4	
Overhead (at \$250 per hour)	25	50	
Cost per unit	<u>47</u>	<u>64</u>	
No. of units	4,000	8,000	
Total cost	\$188,000	\$512,000	\$700,000

Activity based costing

Activity	Total cost	Cost driver		Product X	Product Y
	\$		\$	\$	\$
Batch setup	100,000	Cost/setup	5,000	50,000	50,000
Order handling	200,000	Cost/order	5,000	120,000	80,000
Machining	120,000	Cost/machine hour	8	48,000	72,000
Quality control	80,000	Cost/check	2,500	45,000	35,000
	<u>500,000</u>			<u>263,000</u>	<u>237,000</u>
		Product X	Product Y	Total	
		\$	\$	\$	
Direct materials		80,000	80,000		
Direct labor		8,000	32,000		
Overhead		263,000	237,000		
Total cost		<u>351,000</u>	<u>349,000</u>	<u>700,000</u>	
No. of units		4,000	8,000		
Cost per unit		\$87.75	\$43.625		
<p>Using ABC in this situation, the cost per unit of Product X is much higher than with traditional absorption costing and for Product Y the unit cost is much less.</p> <p>The difference is caused by the fact that Product X use only 20% of total direct labor hours worked, but much larger proportions of set-up resources, order handling resources, machining time and quality control resources. As a result, the overheads charged to each product are substantially different.</p> <p>This is an important feature of activity-based costing. The overheads charged to products, and so the overhead cost per unit of product, can be significantly different from the overhead cost per unit that would be obtained from traditional absorption costing.</p>					

7.5. WHEN TO USE ABC

Activity based costing could be suitable as a method of costing in the following circumstances:

- (a) In a manufacturing environment, where absorption costing is required for inventory valuations.
- (b) Where a large proportion of production costs are overhead costs, and direct labor costs are relatively small.
- (c) Where products are complex.
- (d) Where products are provided to customer specifications.
- (e) Where order sizes differ substantially, and order handling and dispatch activity costs are significant.



Learning Activity 7.1

Answer the following questions.

1. What is the difference between ABC costing and absorption costing?

2. When do we use ABC costing?

7.6. ABC AND DECISION MAKING

- ✓ The traditional cost behavior patterns of fixed cost and variable cost are felt by advocates of ABC to be unsuitable for longer-term decisions, when resources are not fixed and changes in the volume or mix of business can be expected to have an impact on the cost of all resources used, not just short-term variable costs.
- ✓ ABC attempts to relate the incidence of costs to the level of activities undertaken. A hierarchy of activities has been suggested.

Classification level	Cause of cost	Types of cost	Cost driver
Unit level	Production / acquisition of a single unit of product or delivery of single unit of service	Direct materials Direct labor	Units produced
Batch level	A group of things being made, handled or processed	Purchase orders Set-ups Inspection	Batches produced
Product level	Development, production or acquisition of different items	Equipment maintenance Product development	Product lines produced
Facility sustaining level	Some costs cannot be related to a particular line, instead they are related to maintaining the buildings and facilities. These costs cannot be related to cost objects with any degree of accuracy and are often excluded from ABC calculations for this reason.	Building depreciation Organizational advertising	None - supports the overall production or service process

7.7. ADVANTAGES AND DISADVANTAGES OF ABC

7.7.1. Advantages of ABC:

The fundamental advantage of using an ABC system is to more precisely determine how overhead is used. Once you have an ABC system, you can obtain better information about the following issues:

- ✓ **Activity costs.** ABC is designed to track the cost of activities, so you can use it to see if activity costs are in line with industry standards. If not, ABC is an excellent feedback tool for measuring the ongoing cost of specific services as management focuses on cost reduction.
- ✓ **Customer profitability.** Though most of the costs incurred for individual customers are simply product costs, there is also an overhead component, such as unusually high customer service levels, product return handling, and cooperative marketing agreements. An ABC system can sort through these additional overhead costs and help you determine which customers are actually earning you a reasonable profit. This analysis may result in some unprofitable customers being turned away, or more emphasis being placed on those customers who are earning the company its largest profits.
- ✓ **Distribution cost.** The typical company uses a variety of distribution channels to sell its products, such as retail, Internet, distributors, and mail order catalogs. Most of the structural cost of maintaining a distribution channel is overhead, so if you can make a reasonable determination of which distribution channels are using overhead, you can make decisions to alter how distribution channels are used, or even to drop unprofitable channels.
- ✓ **Make or buy.** ABC provides a comprehensive view of every cost

associated with the in-house manufacture of a product, so that you can see precisely which costs will be eliminated if an item is outsourced, versus which costs will remain.

- ✓ **Margins.** With proper overhead allocation from an ABC system, you can determine the margins of various products, product lines, and entire subsidiaries. This can be quite useful for determining where to position company resources to earn the largest margins.
- ✓ **Minimum price.** Product pricing is really based on the price that the market will bear, but the marketing manager should know what the cost of the product is, in order to avoid selling a product that will lose a company money on every sale. ABC is very good for determining which overhead costs should be included in this minimum cost, depending upon the circumstances under which products are being sold.
- ✓ **Production facility cost.** It is usually quite easy to segregate overhead costs at the plant-wide level, so you can compare the costs of production between different facilities.

7.7.2. Disadvantages of ABC

Many companies initiate ABC projects with the best of intentions, only to see a very high proportion of the projects either fail or eventually lapse into disuse. There are several reasons for these issues, which are:

- ✓ **Cost pool volume.** The advantage of an ABC system is the high quality of information that it produces, but this comes at the cost of using a large number of cost pools – and the more cost pools there are, the greater the cost of managing the system. To reduce this cost, run an ongoing analysis of the cost to maintain each cost pool, in comparison to the utility of the resulting information. Doing so

should keep the number of cost pools down to manageable proportions.

- ✓ **Installation time.** ABC systems are notoriously difficult to install, with multi-year installations being the norm when a company attempts to install it across all product lines and facilities. For such comprehensive installations, it is difficult to maintain a high level of management and budgetary support as the months roll by without installation being completed. Success rates are much higher for smaller, more targeted ABC installations.
- ✓ **Multi-department data sources.** An ABC system may require data input from multiple departments and each of those departments may have greater priorities than the ABC system. Thus, the larger the number of departments involved in the system, the greater the risk that data inputs will fail over time. This problem can be avoided by designing the system to only need information from the most supportive managers.
- ✓ **Project basis.** Many ABC projects are authorized on a project basis, so that information is only collected once; the information is useful for a company's current operational situation, and it gradually declines in usefulness as the operational structure changes over time. Management may not authorize funding for additional ABC projects later on, so ABC tends to be "done" once and then discarded. To mitigate this issue, build as much of the ABC data collection structure into the existing accounting system, so that the cost of these projects is reduced; at a lower cost, it is more likely that additional ABC projects will be authorized in the future.
- ✓ **Reporting of unused time.** When a company asks its employees to report on the time spent on various activities, they have a strong tendency to make sure that the reported amounts equal 100% of their time. However, there is a large amount of slack time in anyone's work day that may involve breaks, administrative

meetings, playing games on the Internet, and so forth. Employees usually mask these activities by apportioning more time to other activities. These inflated numbers represent misallocations of costs in the ABC system, sometimes by quite substantial amounts.

- ✓ **Separate data set.** An ABC system rarely can be constructed to pull all of the information it needs directly from the general ledger. Instead, it requires a separate database that pulls in information from several sources, only one of which is existing general ledger accounts. It can be quite difficult to maintain this extra database, since it calls for significant extra staff time for which there may not be an adequate budget. The best work-around is to design the system to require the minimum amount of additional information other than that which is already available in the general ledger.
- ✓ **Targeted usage.** The benefits of ABC are most apparent when cost accounting information is difficult to discern, due to the presence of multiple product lines, machines being used for the production of many products, numerous machine setups, and so forth – in other words, in complex production environments. If a company does not operate in such an environment, then it may spend a great deal of money on an ABC installation, only to find that the resulting information is not overly valuable.



Learning Activity 7.2

Answer the following questions.

1. Explain the major advantages and disadvantages of ABC costing?

7.8. ACTIVITY BASED MANAGEMENT

Although specifically designated as an accounting function, determination of product cost is a major concern for all managers. The profitability of a particular product or market, product pricing policies, and investments to support production are issues that extend beyond accounting to the areas of corporate strategy, marketing, and finance. In theory, the cost to produce a product or to perform a service would not matter if enough customers were willing to buy that product or service at a price high enough to cover its cost and provide a reasonable profit margin. In reality, customers purchase a product or service only if they perceive an acceptable value for the price.

Management, then, should be concerned about an equitable relationship between selling price and value. Activity-based management (ABM) is a business process model that focuses on controlling production or performance activities to improve customer value and enhance profitability. ABM includes a variety of concepts that help companies to

- ✓ produce more efficiently,
- ✓ determine costs more accurately, and
- ✓ Control and evaluate performance more effectively.

A primary component of activity-based management is activity analysis, which is the process of studying activities both to classify them and to devise ways of minimizing or eliminating the activities that increase costs but provide little or no customer value. In a business context, an activity is any repetitive action that is performed in fulfillment of a business function.

7.9. SUMMARY



- ✓ Activity based costing (ABC) is a form of absorption costing that differs from traditional absorption costing, because it takes a different approach to the apportionment and absorption of production overhead costs.
- ✓ The following steps are applied in ABC costing systems:
 - Step 1: Identify an organization's major activities.
 - Step 2: Identify the factors which determine the size of the costs of an activity/cause the costs of an activity. These are known as cost drivers.
 - Step 3: Collect the costs associated with each cost driver into what are known as cost pools.
 - Step 4: Charge costs 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.
- ✓ Traditional costing systems, which assume that all products consume all resources in proportion to their production volumes, tend to allocate too great a proportion of overheads to high volume products and too small a proportion of overheads to low volume products.
- ✓ Activity based costing could be suitable as a method of costing in the following circumstances:
- ✓ In a manufacturing environment, where absorption costing is required for inventory valuations.
 - 0 Where a large proportion of production costs are overhead costs, and direct labor costs are relatively small.
 - 0 Where products are complex.
 - 0 Where products are provided to customer specifications.
 - 0 Where order sizes differ substantially, and order handling and dispatch activity costs are significant.

7.10. MODEL EXAM QUESTIONS

1. What is the key difference between Activity based costing and Traditional absorption costing systems?
2. At what situation(s) companies is use of ABC costing systems is more appropriate? Why?
3. What are the advantages and disadvantages of ABC costing systems?
4. Triple Limited makes three types of gold watch - the Diva (D), the Classic (C) and the Poser (P). A traditional product costing system is used at present; although an activity based costing (ABC) system is being considered. Details of the three products for a typical period are:

	Hours per unit		Materials	Production
	Labor hours	Machine hours	Cost per unit (\$)	Units
Product D	0.5	1.5	20	750
Product C	1.5	1	12	1,250
Product P	1	3	25	7,000

Direct labor costs \$6 per hour and production overheads are absorbed on a machine hour basis. The overhead absorption rate for the period is \$28 per machine hour.

Required:

- (a) Calculate the cost per unit for each product using traditional methods, absorbing overheads on the basis of machine hours.

Total production overheads are \$654,500 and further analysis shows that the total production overheads can be divided as follows:

	%
Costs relating to set-ups	35
Costs relating to machinery	20
Costs relating to materials handling	15
Costs relating to inspection	30
Total production overhead	100

The following total activity volumes are associated with each product line for the period as a whole:

	Number of set ups	Number of movements of materials	Number of inspections
Product D	75	12	150
Product C	115	21	180
Product P	480	87	670
	670	120	1,000

Required:

- (b) Calculate the cost per unit for each product using ABC principles (work to two decimal places).
- (c) Explain why costs per unit calculated under ABC are often very different to costs per unit calculated under more traditional methods. Use the information from Triple Limited to illustrate.

- (d) Discuss the implications of a switch to ABC on pricing and profitability.

Answers of Learning Activities



Learning Activity 1.1

Answer

1. Purpose 1: Internal routine reporting to managers for (a) cost planning and control of operations, and (b) performance evaluation of people and activities.

Purpose 2: Internal routine reporting to managers on the profitability of products, brand categories, customers and distribution channels, and so on. This information is used in making decisions on resource allocation and in some cases decisions on pricing.

Purpose 3: Internal non-routine reporting to managers for strategic and tactical decisions on matters such as formulating overall policies and long-range plans, new products development -investing in equipment and special orders or special situations.

Purpose 4: External reporting through financial statements to investors, government authorities, and other outside parties. To satisfy external purposes, businesses must report income and inventory costs, in accordance with the generally accepted accounting principles that guide financial accounting.

2. As part of accounting, managerial accounting and financial accounting both deal with economic events and reports about them. But the two areas of

accounting are different in many ways, primarily because they serve different audiences. Managerial accounting serves internal managers in organizations. In businesses, managers associated with sales, production, finance, and accounting and top executives all use accounting data for planning and control, including decision making and performance evaluation. Whereas financial accounting primary focuses on primary users (such as Investors and Creditors)



Learning Activity 1.2

Answer

1.

Items of difference	Cost accounting	Management Accounting
Applicability	It is generally applicable to manufacturing concerns	Management accounting methods and techniques are applicable to all concerns
Accounting principles	It is used in accordance with the IFRS Double entry principles can be applied in cost accounting	It is not constrained by IFRS Double entry principle is not applied in the case of management accounting

Future activities	Cost accounting does not attach importance to future activities	Future activities are primarily considered.
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Learning Activity 1.3

Answer

3. A cost object is defined as any activity for which a separate measurement of costs is desired. Examples of cost objectives include departments, facilities, stores, divisions, products, sales territories, kilometers driven, patients seen, student hours taught, and product line
4. Cost accumulation involves the collection of cost data in an organized way be some “Natural” classification, whereas cost assignment is a general term that encompasses both cost tracing and cost allocation, cost tracing is the assigning of direct, costs, to the chosen cost object. Cost allocation is the assigning of indirect costs to the chosen cost object



Learning Activity 1.4

Answer

4. Total manufacturing cost = Direct Material + Direct Labor + Factory Overhead
5. Prime cost is the summation of direct material cost and direct labor cost where as conversion cost is the summation of direct labor and factory overhead costs.
6. **Marketing or selling costs:** include all costs necessary to secure customer orders and get the finished product or service into the hands of the customer.

Administrative costs: include all executive, organizational, and clerical costs associated with the general management of an organization rather than with manufacturing, marketing, or selling.



Learning Activity 1.5

Answer

3. Yes, since it is a cost that is not included in product costs. It is also a costs that is expensed on the income statement in the period in which it is incurred
4. Yes, since a particular cost may be direct or in direct depending on the cost object.



Learning Activity 1.6

Answer

4. It relates with the concept of **incremental cost**
5. It is a type of cost which is not useful for decision making and it is related to **irrelevant cost**
6. The opportunity cost of an asset in a specific alternative is the net benefit that would be received if the asset were utilized in its best alternative use. Accountants do not ordinarily record opportunity costs since it may be difficult to measure in practice since the best alternative may not be known



Learning Activity 1.7

Answer

3. when resources are not fixed and changes in the volume or mix of business can be expected to have an impact on the cost of all resources used, not just short-term variable costs.
4. **Answer**
 - A. Fixed Cost

- B. Variable Cost
- C. Mixed Cost
- D. Fixed Cost



Learning Activity 2.1

Answer

- 3. Material requisition form is a document up on which the production department supervisor requests the release of raw materials for production.
- 4. purchase requisitions are used as a formal request to purchasing department to order good where as material requisition is a formal request where the production department supervisor requests the release of raw materials for production



Learning Activity 2.2

Answer

- 3. First in First Out
- 4. Answer**
 - 1. Item by Item Method
 - 2. Major Category Method
 - 3. Whole Item Method



Learning Activity 2.3

Answer

- 6. It is a cost incurred for those employees who work in the factory and at the same time who are directly involved in the conversion of raw material into a finished good
- 7. It is a cost incurred for those employees who work in the factory but who are not directly involved in the conversion of raw material into a finished good



Learning Activity 2.4

Answer

1. Answer

A. Time booking is analysis of time in terms of departments, operations and production orders or jobs. It is the procedure for keeping records of time worked by each employee.

B. The payroll unit (or payroll department) is responsible for the following:

- ✓ Maintain details of job classification cost center and wage rate of each employee
- ✓ Maintain a list of mandatory deductions such as employee income taxes
- ✓ Maintain a list of voluntary deductions, such as credit association contribution,
- ✓ Determine for each employee the amount of income tax to be deducted from each employee's gross pay.
- ✓ Determine the net amount payable to each employee.
- ✓ Prepare wage sheets which form the basis for disbursement of wages
- ✓ Summarize the cost by cost center including the gross amount earned deductions, net pay hours, worked overtime premium incurred, incentive earned by each employee etc.

2. Time ticket is a document used to record the amount of time spent by each employee on the

job where as time card is a card used to record the total hour spent by each employee in the plant



Learning Activity 2.5

Answer

3. Fringe benefits are costs related to salaries and wages. These include vacation and holiday pay, compensation insurance of workers, hospitalization, insurance, life insurance e.t.c.
4. Fringe benefit costs are usually charged to manufacturing overhead



Learning Activity 2.6

Answer

1. Answer

- i. Direct allocation method
- ii. Step (Sequential) allocation method
- iii. Algebraic (Reciprocal) method



Learning Activity 2.7

Answer

1.

Product	Normal Capacity	Rate	Est. FOH	FOH Allocated
A	1000 units	0.1	7000 Br	700 Br
B	3000 units	0.3	7000 Br	2,100 Br
C	5000 units	0.5	7000 Br	3,500 Br
D	1000 units	0.1	7000 Br	700 Br
Total	10,000 units			7,000 Br



Learning Activity 3.1

Answers

1.

A.	Raw material -----	2500	
	Account Payable-----		2500
B.	FOH Control-----	300	
	Payable account-----		300
C.	FOH Control-----	1500	
	Acc. Depreciation-----		1500
D.	W/P-----	5600	
	Raw material-----		600
	Factory Payroll Clearing-----		5000
E.	W/P-----	2500	
	FOH Applied-----		2500
Where : (50% * 5000 = 2500)			



Learning Activity 4.1

Answers

- The types of industries that commonly use process costing system are those that produce essentially homogenous (i.e., uniform) products on a continuous basis, such as bricks, cement, corn flakes, paper, etc.
- Answer
 - ✓ The same basic purposes exist in both systems, which are to assign material, labor and overhead cost to products and to provide a mechanism for computing unit costs.
 - ✓ Both systems maintain and use the same basic manufacturing accounts, including manufacturing overhead, raw materials, work in process, and finished goods.
 - ✓ The flow of costs through the manufacturing accounts is basically the same in both systems
- Under process costing costs are accumulated on department basis.



Learning Activity 4.2

Answers

1. Requisitions for direct material are recorded in a materials requisition journal.
2. The same time card and payroll procedures are used as in the job order cost system. Since these are no individual jobs, a daily time ticket for each worker is used to accumulate the data required for charging labor costs to departments
- 3.



Learning Activity 4.3

Answers

1. The costs that might be added to the work in process account of the firing department includes those costs which are transferred from the mixing department plus costs incurred by firing department for those units which were started and not completed during the previous period and costs of production inputs incurred during the current period by the firing department.
2. The equivalent units of productions are the sum of the units transferred out of the department during the period and the equivalent units in ending work in process inventory at the end of the period.
- 3.

	Units to be produced to complete Beginning WIP	+	Units Started And Completed	+	Equivalent Units of Ending WIP	=	Equivalent units of production using FIFO
Material	12,000		160,000		12,000 (15,000*80		184,000 Units

	(30,000*40%)			%)	
Conversion	21,000		160,000	6,000	187,000
Cost	(30,000*70%)			(15,000*40 %)	Units



Learning Activity 5.1

Answers

7. Normal Spoilage is a spoilage that arises under efficient operating conditions; it is an inherent result of the particular production process whereas Abnormal Spoilage is spoilage that is not expected to arise under efficient operating conditions; abnormal spoilage is usually regarded as avoidable and controllable.

8. A. Normal spoilage

9. B. False

10.

Answer

Manufacturing Overhead	4,000
(200 x (4 + 8 + 100% x 8))	
Materials	800
(200 x 4)	
Wages Payable	1,600
(200 x 8)	
Applied Overhead	1,600
(200 x 8)	

$$\text{Cost per Unit} = 10,000 \times 45 / 10,000 = 45$$

11.

Answer

Work in Process	4,000
-----------------	-------

(200 x (4 + 8 + 100% x 8))	
Materials	800
(200 x 4)	
Wages Payable	1,600
(200 x 8)	
Applied Overhead	1,600
(200 x 8)	

$$\text{Cost per Unit} = (10,000 \times 45 + 4,000) / 10,000 = 45.40$$

12.

Answer

Loss from Abnormal Defective Units	4,000	
(200 x (4 + 8 + 100% x 8))		
Materials		800
(200 x 4)		
Wages Payable		1,600
(200 x 8)		
Applied Overhead	1,600	
(200 x 8)		

$$\text{Cost per Unit} = 10,000 \times 45 / 10,000 = 45$$



Learning Activity 5.2

Answers

1. Answer

Manufactured Overhead	8,000
(200 x (45 - 5))	
Spoiled Inventory	1,000
(200 x 5)	

Work in Process	9,000
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Cost per Unit = $(10,000 \times 45 - 9,000) / (10,000 - 200) = 45$

2. Answer

Spoiled Inventory	1,000
(200 x 5)	
Work in Process	1,000

Cost per Unit = $(10,000 \times 45 - 1,000) / (10,000 - 200) = 45.82$

3. Answer

Loss from Abnormal Spoilage	8,000
(200 x (45 - 5))	
Spoiled Inventory	1,000
(200 x 5)	
Work in Process	9,000

Cost per Unit = $(10,000 \times 45 - 9,000) / (10,000 - 200) = 45$

4. Answer

Manufacturing Overhead	4,000
(200 x (4 + 8 + 100% x 8))	
Materials	800
(200 x 4)	
Wages Payable	1,600
(200 x 8)	
Applied Overhead	1,600
(200 x 8)	

Cost per Unit = $10,000 \times 45 / 10,000 = 45$

5. Answer

Loss from Abnormal Defective Units	4,000
(200 x (4 + 8 + 100% x 8))	
Materials	800
(200 x 4)	
Wages Payable	1,600
(200 x 8)	
Applied Overhead	1,600
(200 x 8)	

Cost per Unit = $10,000 \times 45 / 10,000 = 45$



Learning Activity 6.1

Answers

4. Joint costs
5. Joint Products
6. Split off Point
- 7.



Learning Activity 6.2

Answers

1. Joint cost need to be allocated for:
 - ✓ Inventory valuation purpose
 - ✓ For financial accounting purpose
 - ✓ To measure profitability of products

- ✓ For pricing decision and likes
- 2. The following are the basic methods which could be used to allocate joint cost to the joint products:
 - 1. Physical Quantity Method
 - 2. Sales Value Method
 - 3. Net Realizable value Method
 - 4. Estimated Constant Gross Margin Percentage Method



Learning Activity 6.3

Answers

- 1. Processes that yield joint product often also yield what are frequently referred to as by-product-product that have a relatively low sales value compared with the sales value of the main or joint product (s)



Learning Activity 6.4

Answers

- 3. By-products are joint products that are relatively minor in quantity and/or value
- 4. By-products accounting attempts to reflect the economic relationship between the by-products and the joint products with a minimum of record keeping costs



Learning Activity 7.1

Answers

3. Activity based costing (ABC) is a form of absorption costing. However, it differs from traditional absorption costing, because it takes a different approach to the apportionment and absorption of production overhead costs

4. Answer

✓ The following steps are applied in ABC costing systems:

Step 1: Identify an organization's major activities.

Step 2: Identify the factors which determine the size of the costs of an activity/cause the costs of an activity. These are known as cost drivers.

Step 3: Collect the costs associated with each cost driver into what are known as cost pools.

Step 4: Charge costs 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.



Learning Activity 7.2

Answers

1. Answer

Advantages of ABC

- Activity costs
- Customer profitability
- Distribution cost
- Make or buy
- Margins
- Minimum price
- Production facility cost

Disadvantages of ABC

- Cost pool volume
- Installation time
- Multi-department data sources
- Project basis
- Reporting of unused time
- Separate data set
- Targeted usage