

SECTION - B
ACTIVITY BASED COSTING

Activity Based Costing

2

This Module includes:

- 2.1 Traditional Cost System
- 2.2. Definition and Meaning of Activity Based Costing (ABC)
- 2.3. Steps in ABC System
- 2.4. Cost Pools and Cost Drivers
- 2.5. Merits and Demerits of ABC System
- 2.6. Activity Based Information and Decision Making

Activity Based Costing

SLOB Mapped against the Module

To appreciate the fundamental concepts of management accounting and its role in a dynamic business environment. (CMLO 1a, b) and to develop understanding of costing frameworks (CMLO 3a)

Module Learning Objectives:

After studying this module, the students will be able to

- ✦ Understand the fundamental problem in absorption costing system and how that paves way for the Activity Based Costing system.
- ✦ Conceptualise the nuances of the Activity Based Costing system.
- ✦ Comprehend impact of the Activity Based Information on the decision making process.

Traditional Cost System

2.1

The *traditional costing method* uses an allocation of expenses based on the volume of resources used during the production of goods. This method typically uses machine hours or man-hours consumed as the basis for estimating costs of production. This is a common costing method used in situations where the processes are highly automated, and where direct labour costs are very low and/or tightly controlled.

Traditional costing is the allocation of factory overhead to products based on the volume of production resources consumed. Under this method, overhead is usually applied based on either the amount of direct labour hours consumed or machine hours used. The trouble with traditional costing is that factory overhead may be much higher than the basis of allocation, so that a small change in the volume of resources consumed triggers a massive change in the amount of overhead applied. This is a particularly common issue in highly automated production environments, where factory overhead is quite large and direct labour is close to nonexistent.

Calculating Overhead Rates with A Traditional Costing System

A traditional costing system depends on calculating overhead rates and applying the rates to a specific variable. Traditional costing methods use estimated overhead rates against a cost driver. Calculating costs using the traditional costing method involves six steps.

These steps are:

1. Identifying indirect overhead costs, such as payroll for maintenance personnel and building rent.
2. Estimating overhead cost for a specific tracking period, for example a calendar month or semi-annually.
3. Select a cost driver that is linked to production of your product or service.
4. Estimate a defined number for the cost of driver. For example, if you are using man hours (labor hours) for a single month, you would multiply the number of hours worked per week by the number of employees. Then multiply that total by 52 (the number of weeks per year) and divide by 12 (the number of months in a year).
5. Calculate the overhead rate using the following formula:
Overhead Costs / Estimated Cost Driver = Overhead Rate
6. Apply overhead rate to your product.

The wider the range and the more complex the products, the more support services will be required. Consider, for example, factory X which produces 10,000 units of one product, the Gama, and factory Y which produces 1,000 units each of 10 slightly different versions of the Gama. Support activity 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.

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 (which cause relatively little diversity and hence use fewer support services) and too small a proportion of overheads to low volume products (which cause greater diversity and therefore use more support services).

Activity based costing (ABC) attempts to overcome this problem.

Overhead rate based on volume and its limitations:

Volume-Based Overhead Rate

The factory overhead rate in a volume-based costing system is either a single over-head rate for the entire operation (plant wide rate) or a set of overhead rates with various rates for different departments or divisions (department rates). These overhead rates use an output-volume-based activity or activities to assign (or to spread) factory overhead costs to products or services. An output-volume-based costing system spreads costs evenly so that each cost object (product or service) receives the same amount.

Illustration 1 (Applying the overhead absorption rate)

Let us now recap the various overheads rates that are used in the context of absorption of overheads costs to the products/ jobs/ customer/ work-order, etc.

There are several different methods which can be used to absorb overheads. The following data to determine the total production cost of job number M 626:

Total cost centre overhead	₹62,100
Production output	13,800 units
Direct labour hours	27,000 hours
Machine hours	34,500 hours
Direct wages cost	₹17,250
Direct materials cost	₹49,680
Prime Cost	₹66,930

Solution:

The overhead absorption rates under various methods are as under:

- ✦ Rate per unit produced = ₹62,100 ÷ 13,800 units = ₹ 4.5
- ✦ Direct hour labour rate = ₹62,100 ÷ 27,000 hours = ₹ 2.3
- ✦ Machine hour rate = ₹62,100 ÷ 34,500 hours = ₹1.8
- ✦ Percentage cost of direct wages cost = ₹62,100 ÷ ₹17,250 × 100 = 360% of direct wages
- ✦ Percentage of direct materials cost = ₹62,100 ÷ ₹49,680 × 100 = 125% of direct materials cost
- ✦ Percentage of Prime Cost = ₹62,100 ÷ ₹ 66,930 x 100 = 93% of prime cost

Drawback of Traditional Costing System:

- a. Different products utilize different amount of resources, which is not recognized in traditional costing system.
- b. Overheads now constitute the largest share of cost, often greater than 50% and are typically applied to products as percentage of the smallest cost (direct labour) leading to serious distortion of product cost.

- c. By relying on volume-related measures to determine product costs, traditional costing system do poor job in reflecting supporting costs for manufacturing and distribution of products or services. More and more factory overheads, such as set-up cost, materials handling cost, and product design and research and development costs, are unrelated to the number of units produced.
- d. Traditional costing system tends to overcast standard, high volume products and undercost low-volume products, leading to incorrect pricing and product-mix decisions.
- e. It creates a bias toward direct labour reduction as a cost reduction rather than overall productivity improvement.
- f. It provides no information useful in either identifying productivity improvement opportunities or determining if productivity improvement efforts have yielded significant results. Indeed, often traditional costing system indicates higher cost in the presence of known productivity improvement or vice versa.

Thus, companies that apply plant wide and departmental overhead rates to assign costs to products often do not produce reliable cost data. Conventional product costing system follows a cost smoothening or peanut-butter costing which describes a costing approach that uses broad averages for distributing the costs of resources uniformly to cost objects (such as product or services) when the individual products or services, in fact, use those resources in a non-uniform way. For some companies, product cost distortions can be damaging, particularly for those characterized by intense or increasing competitive pressures, continuous improvement, total quality management, total customer satisfaction and sophisticated technology. As firms operating in this competitive environment adopt new strategies to achieve competitive excellence, their cost accounting systems often must change to keep pace. Cost accounting systems that worked reasonably well in the past may no longer be acceptable. The traditional product cost model distorts product cost for several reasons:

- a. Factory overhead costs are allocated rather than traced to products.
- b. The total overhead component of product cost has historically grown faster than direct costs. As overhead becomes a larger percentage of product cost, the distortion inherent in the allocation process causes the total product cost to increase.
- c. Generally Accepted Accounting Principles (GAAP) often dictate or influence cost accounting practices. One of these principles — the conservatism principle — is inconsistent with accurate product cost determination in two important ways:
 - (i) The conservatism principle requires that reported cost be based on precise and easily verifiable data, whereas management often needs costs that are based on forecasts and plans.
 - (ii) The conservatism principle encourages expensing many costs in the current period that should be capitalized. This practice distorts life-cycle costs.
- d. Many activities included in selling, general and administration are traceable to specific products.

In order to understand the concept, let us take an example:

Illustration 2

A Company is manufacturing two products, Product A and Product B and the annual outputs of the two products are 10,000 units and 20,000 units respectively. Total annual overheads of the company is ₹3,00,000. The machine hours required for Product A are 20,000 hours and that of Product B are 10,000 hours, respectively. Then the overhead absorption rates under traditional costing system, using machine hours as the basis can be computed, as under:

Particulars	Product A	Product B
1. Annual Outputs (units)	₹10,000	₹20,000
2. Total Machine Hours	₹20,000	₹10,000
3. Overhead Absorption Rate on the basis of Machine Hours (Total Overheads/ Total Machine Hours) = (₹3,00,000/30,000) = ₹10 per hour		
4. Total Overheads Costs on the basis of machine hours (No. of machine hours × Rate per machine hour)	₹2,00,000	₹1,00,000
5. Overheads Cost per unit (4 ÷ 1)	₹20	₹5

From the above, the following inferences can be made for the Traditional Cost System:

- The finished products consume resources in proportion to the production volume.
- The proper identification of value added and non-value added activities cannot be made.
- It does not facilitate the control over those activities, which cause fixed overhead costs.
- A Single/ Blanket rate is used to absorb the overheads costs to the cost objects, causing cost distortion.
- It is a subjective approach, since this system uses arbitrary bases for apportionment of overheads costs over the cost objects.

Definition and Meaning of Activity Based Costing (ABC)

2.2

Activity-based costing is an effective costing system that focuses on activities. ABC is a refined costing system, or a more specific way to assign costs to cost objects. The system avoids using big, generic categories, such as splitting a cost evenly between divisions. Instead, it allocates indirect costs to the activities that generate those costs. The result is likely to be more accurate costing and product pricing.

ABC Basic Premises:

- ✦ Cost objects consume activities.
- ✦ Activities consume resources.
- ✦ This consumption of resources is what derives costs.

ABC emphasizes the importance of linking indirect costs to activity in the cost allocation exercise. It argues that cost is derived from activities. When there are more activities, more costs will be incurred. Based on this logic, cost should be allocated according to the activities that drive costs to the cost object. Cost objects are the defined objects for allocation of indirect costs, e.g., product portfolio, customers, or business units. Cost pools are the costs gathered to serve similar functions, e.g., production, marketing units, and finance department. Cost drivers are the key attributes or proxies which are the causes of spending, e.g., no. of purchase orders for purchase department, service hours for engineering department, and no. of employees for human resource units. Cost drivers serve as allocation base for allocation of cost to cost objects, and the degree of costs allocated rests with the level of activity (in terms of the consumption base). Using this allocation method, cost can be more accurately allocated to the cost object.

Activity-based costing plays an important role in companies' strategies and long-range plans to develop a competitive cost advantage. While activity - based costing focuses attention on activities in allocating overhead costs to products, activity-based management focuses on managing activities to reduce costs. Cost reduction generally requires a change in activities. Top management can send notices to company employees to reduce costs, but the implementation requires a change in activities. An entity cannot know the effect of a change in activities on costs without the type of cost information provided by activity-based costing.

Activity-Based Costing (ABC) is that costing in which costs begin with tracing of activities and then to producing the product. In other words, it is the process of costing system which focuses on activities performed to produce products. This system assumes that activities are responsible for the incurrence of costs and products creates the demand for activities. Costs are charged to products based on individual product's use of each activity.

ABC aims at identifying as many costs as possible to be subsequently accounted as direct cost of production. Any cost that is traced to a particular product via its consumption of activity becomes direct of the product. For instance, in conventional costing system, cost of setup and adjustment time is considered as factory overhead and subsequently assigned to different products on the basis of direct labour hours, but in Activity-Based Costing, set-up and adjustment time is determined for each product and its costs are directly charged to each product. Thus, by emphasizing activities, ABC tries to ascertain the factors that cause each major activity, cost of such activities and the relationship between activities and products produced.

Activity-Based Costing had its genesis in the increasing importance of indirect costs in the manufacturing operations. The direct processing costs which are easier to handle are being relegated to the background with each passing day due to automation. In this changing scenario where indirect costs outweigh the direct processing costs in many a situation, one cannot be content with rough and ready methods of dealing with indirect costs.

The concept of ABC was first defined in the late 1980s by Robert Kaplan and William Burns. Initially ABC focused on manufacturing industry where technological developments and productivity improvements had reduced the proportion of direct labour and material costs, but increased the proportion of indirect or overhead costs. ABC is generally used as a tool for understanding cost and profitability of individual products.

ABC costing will enable management to better understand the cause of costs, and from here action can be taken to control and reduce costs through controlling and reducing the demand for cost causing activities.

According to CIMA Official Terminology, Activity Based Costing is ‘An approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities, and activities to cost objects based on consumption estimates. The latter utilize cost drivers to attach activity costs to outputs.’

An ABC system assigns overheads to each major activity (rather than departments). With ABC systems, many activity-based cost centres (alternatively known as activity cost pools) are established, whereas with traditional systems overheads tend to be pooled by departments, although they are normally described as cost centres.

Activities consist of the aggregation of many different tasks, events or units of work that cause the consumption of resources. Typical support activities include: schedule production, set-up machines, move materials, purchase materials, inspect items, process supplier records, expedite and process customer orders. Production process activities include machine products and assemble products. Within the production process, activity cost centres are sometimes identical to the cost centres used by traditional cost systems. Support activities are also sometimes identical to cost centres used by traditional systems, such as when the purchasing department and activity are both treated as cost centres. Overall, however, ABC systems will normally have a greater number of cost centres compared with traditional systems.

The second stage of the two-stage allocation process allocates costs from cost centres (pools) to products or other chosen cost objects. Traditional costing systems trace overheads to products using a small number of second stage allocation bases (normally described as overhead allocation rates), which vary directly with the volume produced. Instead of using the terms ‘allocation bases’ or ‘overhead allocation rates’ the term ‘cost driver’ is used by ABC systems. Direct labour and machine hours are the allocation bases that are normally used by traditional costing systems. In contrast, ABC systems use many different types of second-stage cost drivers, including non-volume-based drivers, such as the number of production runs for production scheduling and the number of purchase orders for the purchasing activity.

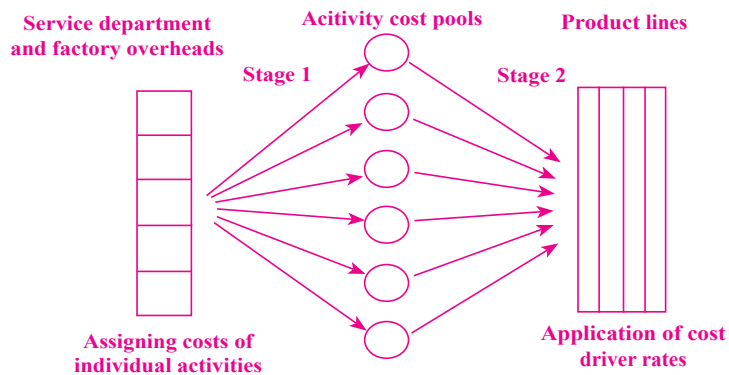


Figure 2.2: Application of ABC System

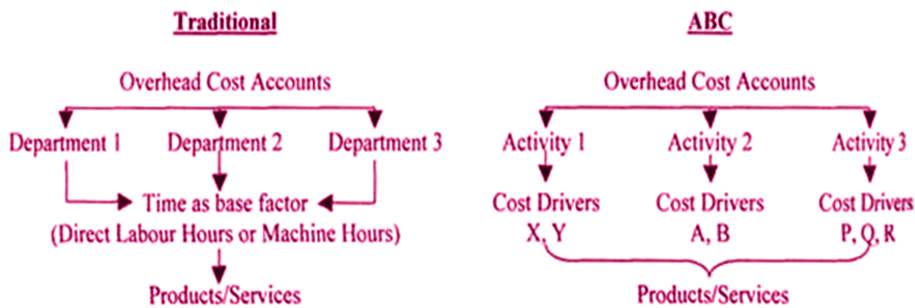


Figure 2.3: Traditional vs. ABC Costing System

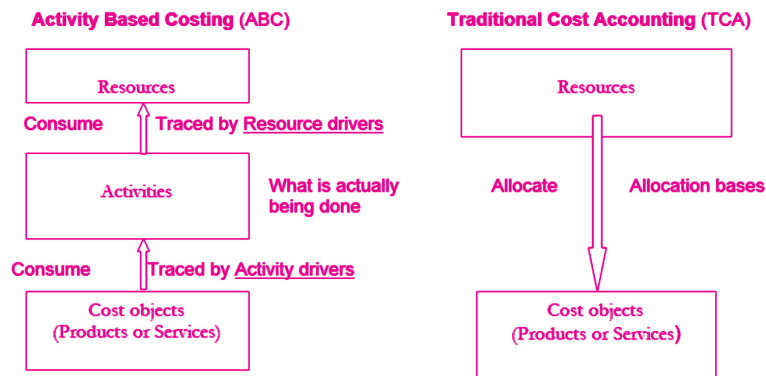


Figure 2.4: How ABC and Traditional Costing allocate Costs to Cost Objects

Emergence of Activity-based Costing

The purpose of moving from a traditional costing system to an ABC system must be based on the premise that the new information provided will lead to action that will increase the overall profitability of the business. This is most likely to occur when the analysis provided under the ABC system differs significantly from that which was provided under the traditional system, which is most likely to occur under the following conditions:

- (i) When production overheads are high relative to direct costs, particularly direct labour.
- (ii) Where there is great diversity in the product range.
- (iii) Where there is considerable diversity of overhead resource input to products.
- (iv) When consumption of overhead resources is not driven primarily by volume.

Information from an ABC analysis may indicate opportunities to increase profitability in a variety of ways, many of which are long term. For example, an activity-based analysis often reveals that small-batch items are relatively expensive to produce, and are therefore unprofitable at current prices. A number of responses to this information could be adopted. The first response might be to consider stopping production of such items, and concentrate on the apparently more profitable high-volume lines. Another approach would be to investigate how the production process could be organized in such a way as to bring the cost of producing small-batch items closer to that of producing high-volume goods. By identifying the cost of carrying out particular activities, the new approach provides opportunities for directing attention to matters of cost control. It can therefore be viewed as a much longer-term technique than

the word 'costing' in the title suggests. The establishment of an ABC product cost may thus be considered to be merely the beginning of a process, rather than an end in itself. The recent use of the term activity-based management suggests this forward-looking orientation, which is assuming increasing importance.

Traditional product costing systems were designed when most of the companies manufactured a narrow range of products. Direct materials and direct labour were the dominant factors of production then. Companies were in the sellers' market. Overheads were relatively small and distortions due to inappropriate treatment were not significant. Cost of processing information was high.

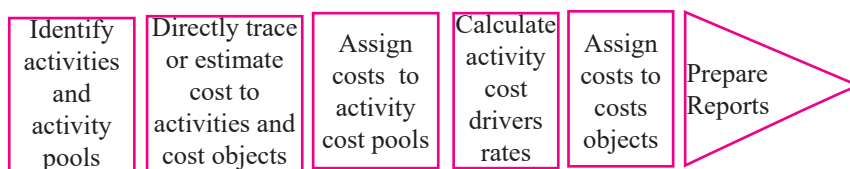
Today, companies produce a wide range of products. Overheads are of considerable importance. Simple methods of apportioning overheads based on direct labour are not justified. Intense global competition calls for correct costing of products to avoid errors in decision-making. Traditional systems can measure volume related costs. Non-volume related activities like material handling, set-up etc. are important and their costs cannot be apportioned on volume basis. Hence, the need for emergence of activity based costing arises.

Steps in ABC System

2.3

Steps to develop Activity Based Costing

To use activity-based costing, the process for assigning costs to activities must be understood.



- I. First, identify which activities are necessary to create a product.
- II. Then, separate each activity into its own cost pool, which is a group of individual costs associated with an activity. Determine the total overhead of each cost pool. For example, purchasing could be its own cost pool.
- III. Next, assign activity cost drivers to each cost pool. Cost drivers are things (e.g., units, hours, parts, etc.) that control the changes in costs. For example, purchasing costs are driven by the number of parts purchased.
- IV. Divide the total overhead in each cost pool by the total cost drivers to get your cost driver rate.
- V. Lastly, compute how many hours, parts, units, etc. that the activity used and multiply it by the cost driver rate.

Step # 1. Identifying the Activities:

The first step in ABC is to identify the major activities which take place in an organisation. The number of activities in production may differ from product to product and organisation to organisation. An activity may be a very small activity but it should justify the cost incurred for it. An activity may be a single activity or combination of several activities. Cost-benefit analysis of each and every activity may be undertaken to judge the worthiness of activity

Step # 2. Determining Cost Pool/Cost Centres for Each Major Activity:

Cost pool means grouping of total cost for each major activity. It simply means allocation and apportionment of various costs to a particular activity or group of activities. For example, total cost of placing orders may be grouped under ordering cost.

Step # 3. Determining Cost Driver for Each Major Activity:

Cost drivers are that activities which determine the cost. These activities result in occurrence of Overhead cost. Thus, cost driver is a factor or an event which results in consequential change in the total cost of the object.

Some of the examples of cost driver are:

- i. Number of setups is cost driver for setup related cost.
- ii. Number of production runs is cost driver for production cost.
- iii. Number of purchase orders is the cost driver for ordering cost.
- iv. Quality inspection is the cost driver for inspection cost.

Step # 4. Calculation of Activity Cos Driver Rate

Next step would be to obtain activity cost driver rate by dividing the total cost of an activity by cost driver as shown below –

Activity driver rate = Total cost of an activity/Cost driver

Step # 5. Assigning costs to the cost objects:

The formula for assigning costs to the cost objects is –

$$\text{Cost} = \text{Resources Consumed} \times \text{Activity Coast Driver Rate}$$

Example:1 Consider Company ABC that has a ₹50,000 per year electricity bill. The number of labour hours has a direct impact on the electric bill. For the year, there were 2,500 labour hours worked, which in this example is the cost driver. Calculating the cost driver rate is done by dividing the ₹50,000 a year electric bill by the 2,500 hours, yielding a cost driver rate of ₹20. For Product XYZ, the company uses electricity for 10 hours. The overhead costs for the product are ₹200, or Rs.20 times 10.

Example:2 The total cost of inspection related activity is ₹1, 00,000. A batch of product consisting 10 items in a batch requires 10 inspection activities. The cost drives rate will be –

Inspection cost driver rate = ₹ 1, 00,000/10 = ₹ 10,000 per batch.

The inspection related cost to each product will be ₹ 1000 (10000 for a batch of 10 items in a batch). Similarly, cost of other activities will be charged to the product to calculate total cost incurred.

Cost Object:

It is an item for which cost measurement is required e.g. a product or a customer.

Illustration 3 (Traditional vs. Activity Based Costing)

ABC Company manufactures three products: A, B, and C. Data for the period just ended is as follows:

Particulars	A	B	C
Production (units)	20,000	25,000	2,000
Sales price (per unit)	₹20	₹20	₹20
Material cost (per unit)	₹5	₹10	₹10
Labour hours (per unit)	2 hours	1 hour	1 hour

(Labour is paid at the rate of ₹5 per hour)

Overheads for the period were as follows: Amount (₹)

Set-up costs	90,000
Receiving	30,000
Despatch	15,000
Machining	<u>55,000</u>
	<u>1,90,000</u>

Cost driver data	A	B	C
Machine hours per unit	2	2	2
Number of set-up	10	13	2
Number of deliveries received	10	10	2
Number of orders dispatched	20	20	20

- Calculate the cost and profit per unit, absorbing all the overheads on the basis of labour hours.
- Calculate the cost and profit per unit absorbing the overheads using an Activity Based Costing approach.

Solution:

(a) Total overheads ₹1,90,000

Total labour hours:

$$A = (20,000 \times 2) = 40,000$$

$$B = (25,000 \times 1) = 25,000$$

$$C = (2,000 \times 1) = \underline{2,000}$$

$$\underline{67,000}$$

$$\text{Overhead Absorption Rate} = ₹1,90,000 \div 67,000 \text{ hours} = ₹2.836 \text{ per hour} = ₹2.84 \text{ per hour}$$

Statement of Cost and Profit

(Amount in ₹)

Particulars		A	B	C
Materials		5	10	10
Labour		10	5	5
Overheads (at ₹2.84 per hr)		<u>5.68</u>	<u>2.84</u>	<u>2.84</u>
		20.68	17.84	17.84
Selling price		20	20	20
Profit / Loss		<u>(0.68)</u>	<u>2.16</u>	<u>2.16</u>
(b)	Total	A	B	C
Set-up costs	₹90,000	36,000	46,800	7,200
(Cost per set up= ₹90,000÷25)				
Receiving	₹30,000	13,636	13,636	2,728
(Cost per delivery = ₹30,000÷22)				
Dispatch				
(Cost per order = ₹ 15,000÷60)	₹ 15,000	5,000	5,000	5,000
Machining	₹ 55,000	23,404	29,256	2,340
(Cost per machine hour =₹ 55,000÷ 94,000)				
Total	₹1,90,000	78,040	94,692	17,268
Number of units		20,000	25,000	2,000
Overheads p.u.		₹3.90	₹3.79	₹8.63

Statement of Cost and Profit

(Amount in ₹)

Particulars	A	B	C
Materials	5	10	10
Labour	10	5	5
Overheads	3.90	3.79	8.63
	<u>18.90</u>	<u>18.79</u>	<u>23.63</u>
Selling price	<u>20.00</u>	<u>20.00</u>	<u>20.00</u>
Profit/(Loss)	<u>₹1.10</u>	<u>₹1.21</u>	<u>(₹3.63)</u>

Cost Pools and Cost Drivers

2.4

Cost Pool:

The term cost pools are used to describe a location to which overhead costs are initially assigned. Normally cost centres consist of departments, but in some cases they consist of smaller segments such as separate work centres within a department. A cost pool is a grouping of individual costs, typically by department or service center. Cost allocations are then made from the cost pool. For example, the cost of the maintenance department is accumulated in a cost pool and then allocated to those departments using its services.

Cost pools are commonly used for the allocation of factory overhead to units of production, as required by several accounting frameworks. They are also used in activity-based costing to allocate costs to activities. A business that wants to allocate costs at a highly-refined level may choose to do so using a number of cost pools.

The various Cost Pools may be as under in a manufacturing company:

- Purchasing Department
- Receiving Department
- Material Handling
- Set-up of Machines
- Inspection and Quality Control
- Research and Developments
- Customer Service
- Production Control

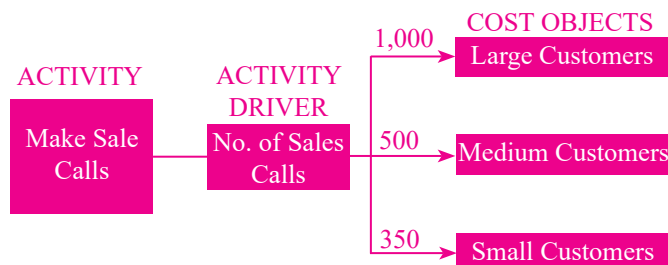


Figure 2.5 : Allocation of Cost to Cost Objects in ABC

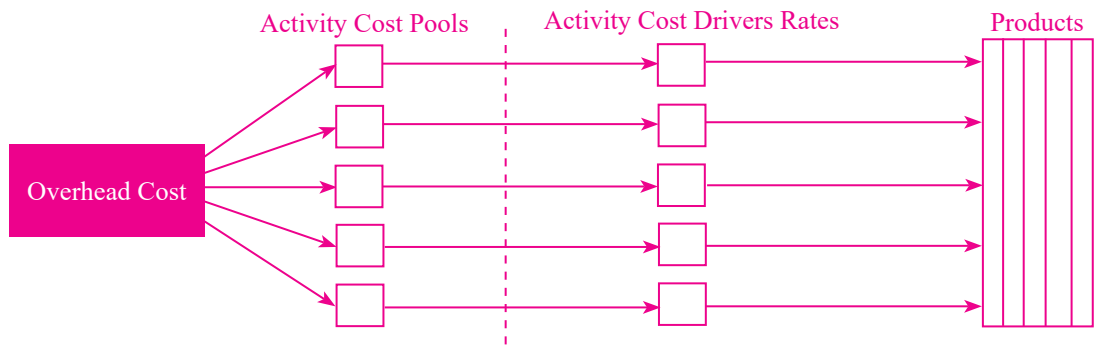


Figure 2.6 : Allocation of overhead cost to products through Activity Cost Pools and Cost Drivers under ABC

Cost Driver:

It is a factor that causes a change in the cost of an activity.

Categories of cost driver:

⦿ Resource Cost Driver

It is a measure of the quantity of resources consumed by an activity. It is used to assign the cost of a resource to an activity or cost pool. For example, number of purchase orders placed will influence the cost of materials to be purchased.

⦿ Activity Cost Driver:

It is a measure of the frequency and intensity of demand, placed on activities by cost objects. It is used to assign activity costs to cost objects. Activity cost drivers can be transaction drivers (e.g. No. of purchase orders processed, no. of customer orders processed, etc.) as well as duration drivers (it represent amount of time required to perform an activity e.g. Setup hours, inspection hours, etc.)

⦿ Volume Based Cost Drivers

They assume that a product's consumption of overhead is directly related to units produced i.e. in case of Machine hours, if volume is increased by 10%, machine hours will increase by 10% hence energy cost will increase by 10%.

⦿ Non-Volume Based Cost Drivers

They are in contrast of volume based cost drivers. Non-volume based activities are not performed each time a unit of the product or service is produced e.g. number of production runs for production scheduling & the number of purchase orders for the purchasing activity.

Some Cost Drivers that are used in the context of Activity Based Costing:

- ⤴ Number of requisitions rose
- ⤴ Number of machine set-up
- ⤴ Number of machine hours
- ⤴ Number of production runs
- ⤴ Number of processed orders

- ✦ Number of purchase orders
- ✦ Number of orders completed
- ✦ Number of labour hours
- ✦ Number of orders packed and delivered
- ✦ Number of inspections
- ✦ Number of customers visit, etc.

Cost object:

It is an item for which cost ascertainment is required. For example, a product, a service, a job, a work order no, or a customer, etc.

Merits and Demerits of ABC System

2.5

Merits of ABC:

- a. ABC recognizes the increased complexity of modern businesses with its multiple cost drivers, many of which are transaction based rather than volume based.
- b. ABC is concerned with all overhead costs, including such 'non-factory floor' costs as quality control and customer service, and so it takes cost accounting beyond its 'traditional' factory floor boundaries.
- c. ABC gives a meaningful analysis of costs which should provide a suitable basis for decisions about pricing, product mix, design and production.
- d. ABC helps with cost reduction because it provides an insight into causal activities and allows organisations to consider the possibility of outsourcing particular activities, or even of moving to different areas in the industry value chain.
- e. ABC can be used in conjunction with customer profitability analysis (CPA) to determine more accurately the profit earned by serving particular customers.
- f. ABC can be used by service and retail organisations. Many service and retail businesses have characteristics very similar to those required for the successful application of ABC in modern manufacturing industry.

The main advantages of ABC can further be summarized under the following points:

- a. To link the cost to its causal factor – i.e. the Cost Driver
- b. To identify costs of activities rather than cost centres
- c. To ascertain product costs with greater accuracy by relating overheads to activities
- d. To overcome the inherent limitations of traditional absorption costing and use of blanket overhead rates
- e. To assist managers in budgeting and performance measurement
- f. To provide the links between the activities, the organizational acts and the resources consumed, and illustrate the differences between resource consumption and resource provision
- g. To help in cost control and cost reduction, as well as improved profitability.
- h. To provide valuable economic information to support a company's operational improvement and customer satisfaction programs.
- i. To furnish many significant benefits over traditional costing techniques:
 - (i) most accurate data about product cost;
 - (ii) more comprehensive cost information for performance measurement;

- (iii) relevant data for management's decision-making;
- (iv) more potential for sensitivity analysis;
- (v) providing a model prospect on value-adding organizational transactions and activities.

ABC can be applied most effectively in the following situations:

- (i) A highly competitive market
- (ii) Diversity of products, processes and customers
- (iii) Significant overhead costs which are not easily assigned to individual products
- (iv) Demands placed on overhead resources by individual products and customers, which are not proportional to volume.

Demerits of ABC:

The demerits of ABC are as follows:

- a. The cost of obtaining and interpreting the new information may be considerable. ABC should not be introduced unless it can provide additional information for management to use in planning or control decisions.
- b. Some arbitrary cost apportionment may still be required at the cost pooling stage for items like rent, rates and building depreciation. If an ABC system has many cost pools, the amount of apportionment needed may be greater than ever.
- c. Many overheads relate neither to volume nor to complexity. The ability of a single cost driver to fully explain the cost behaviour of all items in its associated pool is questionable.
- d. There will have to be a trade-off between accuracy, the number of cost drivers and complexity.
- e. ABC tends to burden low-volume (new) products with a punitive level of overhead costs and hence threatens opportunities for successful innovation if it is used without due care.
- f. Some people have questioned the fundamental assumption that activities cause cost; they suggest that decisions cause cost or the passage of time causes cost or that there may be no clear cause of cost.

The main drawbacks of ABC can also be summarized under the following points:

- a. Implementing an ABC system requires substantial resources, which is costly to maintain.
- b. Activity Based Costing is a complex system which needs lot of record for calculations.
- c. In small organisation managers are accustomed to use traditional costing systems to run their operations and traditional costing systems are often used in performance evaluations.
- d. Activity based costing data can be easily misinterpreted and must be used with care when used in decision making. Managers must identify which costs are really relevant for the decisions at hand.
- e. Reports generated by these systems do not conform to generally accepted accounting principles (GAAP). Consequently, an organisation involved in activity based costing should have two cost systems - one for internal use and one for preparing external reports.

Activity Based Information and Decision Making

2.6

Use of ABC in Decision Making

- a. For decisions like relocation or opening of a new distribution center, reduction in freight or other logistics costs can offset the expense of a new facility, staff or equipment. ABC system can identify the specific cost elements being targeted, providing a much clearer picture according to which management can decide and act accordingly.
- b. ABC is a complement to Total Quality Management (TQM) and it provides quantitative data that can track the financial impact of improvements implemented as part of the TQM initiative.
- c. Using traditional absorption system, overheads may get distributed equally across all product lines. ABC system traces the costs back to the activity and the consumption of resources by each product. This helps in analyzing the costs and profits of existing and new products in a more realistic manner.
- d. ABC can augment decision support for human resources. ABC can present a number of options, including outsourcing, productivity improvements through automation and determination of employee/revenue ratios.

Further the areas in which Activity based information is used for decision making are as under:

- ▲ Product line profitability
- ▲ Capital Investment decisions
- ▲ Transfer Pricing
- ▲ Pricing of products
- ▲ Market Segmentation and Distribution Channels
- ▲ Make-or-Buy decisions and outsourcing
- ▲ Plant shut-down decisions
- ▲ Evaluation of off-shore production, etc.

ABC supports corporate strategy in the following manner:

- ▲ Accurate information on product costs enables better decisions to be made on pricing, marketing, product design, product mix etc.
- ▲ Performance based accurate feedback can be provided to cost center managers.
- ▲ ABC system can effectively support the management by furnishing data, at the operational and as well as strategic level.
- ▲ ABC system can change the method of evaluation of new process technologies, to reduce setup times, proved plant layout and thereby lowering material handling costs, quality improvement.

ABC supports corporate strategy in many ways such as:

- ✦ ABC system can effectively help the management by furnishing data at the operational level and strategic level. Accurate product costing will help the management to compare the profits that various customers, product lines, brands or regions generate and to decide on pricing strategy, dropping unprofitable products, lines etc.
- ✦ Information generated by ABC system can also encourage management to re-design the products for improving their quality.
- ✦ ABC systems can change the system of evaluation of new process technologies, to reduce setup times, rationalization of plant layout in order to reduce or lower material handling cost, improve quality etc.
- ✦ ABC analysis helps managers focus their attention and energy on improving activities.
- ✦ The cost driver rates established by ABC system can be used to measure activity performance and efficiency and provide a more suitable basis for budgeting.
- ✦ The accurate feedback can be provided to cost center managers on their performance based on their consumption of resources during a period rather than the allocations of cost over which they have no control.
- ✦ ABC system provide accurate information on product costs which enables better decisions to be made on pricing, marketing, product design and product mix.

When to use ABC?

In discussing the question ‘Does your company need a new cost system?’ Cooper suggested that the managers should ask themselves ‘Do I really know what my products cost?’ If the answer to this question is ‘no’, he urged that managers should consider whether it is necessary to undertake a detailed analysis of their cost accounting system, but rather than undertaking a major and costly analysis in every case, he suggested that managers look for the following symptoms which are indicative of a need for ABC:

- ✦ Products that are very difficult to produce are reported to be very profitable, even though they are not premium-priced. Cooper argues that products are difficult to produce should be expected to cost more and, therefore, to be profitable only if they are priced at a premium.
- ✦ Profit margins cannot be easily explained. If managers believe certain products to be more profitable than the accounting system suggest, it may be necessary to analyze costs using ABC.
- ✦ Some products, not sold by competitors, have high reported margins. Competitors would normally be expected to produce products, which are more profitable. Why are they not producing these products? They may consider the cost to be too high. It calls for examining of the costing system.
- ✦ Competitors’ high volume products are priced at apparently unrealistically low levels. If competitors are able to price their products at levels, which appear unrealistically low, it may be that the firm’s costing system needs examining.
- ✦ Suppliers offer to produce parts at prices considerably lower than expected.
- ✦ Managers considering buying in parts currently produced internally who find that suppliers offer them at unexpectedly low prices should examine their costing systems.
- ✦ Cost pools are too large and contain machines that have very difficult overhead structures. This creates considerable complexity and could mean that the procedures for allocating the overheads will be too simplistic.
- ✦ The cost of marketing and delivering the products varies dramatically by distribution channel, and yet the cost accounting system effectively ignores marketing costs.

Managers should look for these symptoms and ask themselves whether they have confidence in their product cost information. As symptoms may have other explanations, it is important to consider: the range of possibilities and

to evaluate which is more likely. However, even if it appears that, existing product costs are misleading it may not always be necessary to incorporate ABC into the accounting system. It must be remembered that the introduction of the ABC system involves major expense and thus managers must ask themselves whether the benefits to be derived from the superior information exceed the cost of the new accounting system.

In the present industrial scenario, it becomes difficult in the industry to survive unless the overhead costs are correctly accounted for, controlled and reduced so as to sustain, remain and grow in the industry. We cannot reduce the direct cost of the product, (unless materials of cheaper value are used) but we can control very much the overheads. This can be done only when one has the information of the cost centers with respect to function or activity. The overhead costs involved, for a product do not usually give a clear picture so as to control and reduce these costs. Therefore, it becomes necessary to have a costing system based on activity done, because of this need for ABC arises. Thus ABC has a wide scope in the context of cost reduction and cost control.

It may be made clear that ABC cannot be applied where a distinction cannot be made for the costs attached to various activities or functions. Implementation of ABC should be made from shop floor to managerial level. If ABC is applied correctly at the correct place and time, the company can attain more profits than before.

Although the activity based approach looks attractive, it is unlikely to be practical to relate all overheads to specific activities. Moreover, the approach implicitly assumes a sense co-operative behaviour among operating units and between operating units and service functions. It does not acknowledge the possibility of conflict over the allocation process of overheads. Apart from their narrow concern over efficiency and optimal profitability, the advocates of activity based approach have not attempted to explain why firms insist on using simple methods of allocation of overheads.

However, ABC system has been widely implemented in large organisations in US and Europe. ABC system can be successfully used in other segments of the organisation i.e., administration, selling, distribution etc. It can equally be applied in service sectors like banks, insurance, hospitals and other institutions providing services.

ABC has the same objectives in service firms as in manufacturing organisations. ABC can prove very useful to many service organizations such as airlines, insurance companies, banks, hospitals, hotels, railways, financial service firms. In these service organisations, managers need accurate information about the cost of services being provided by them. Further, such service firms require using this information to improve their operations and to fulfill the needs of their customers in a more cost effective manner.

Large-scale service organizations have a number of features that have been identified as being necessary to derive significant benefits from the introduction of ABC:

- (i) They operate in a highly competitive environment;
- (ii) They incur a large proportion of indirect costs that cannot be directly assigned to specific cost objects;
- (iii) Products and customers differ significantly in terms of consuming overhead resources;
- (iv) They market many different products and services.

The uses for ABC information for service industries are similar to those for manufacturing organisations:

- (i) It leads to more accurate product costs as a basis for pricing decisions when cost-plus pricing methods are used;
- (ii) It results in more accurate product and customer profitability analysis statements that provide a more appropriate basis for decision-making;
- (iii) ABC attaches costs to activities and identifies the cost drivers that cause the costs. Thus, ABC provides a better understanding of what causes costs and highlights ways of performing activities more effectively by reducing cost driver transactions. Costs can therefore be managed more effectively in the long term. Activities can also be analyzed into value added and non-value added activities and by highlighting the costs of non-value added activities attention is drawn to areas where there is a potential for cost reduction without reducing the products' service potentials to customers.

Illustration 4 (Traditional Method of Overhead Allocation vs. ABC)

A company manufactures the following two products:

X - A standard product

Y - A low volume complex product requiring specialized skills and activities

Cost of production is as under (₹ 000):

Materials (equal for both)	300
Labour (5000 hrs. @ ₹10/hr.)	50
Overheads	<u>100</u>
Total	<u>450</u>

To apply ABC, the following information was collected after detailed analysis of operation:

Activities	Prod-X	Prod-Y	Cost
Set-ups	5 Times	10 Times	20.00
Material Handling	30%	70%	15.00
Inspection	45%	55%	35.00
Maintenance Requests	15 Times	20 Times	30.00
Total cost ('000)			100.00

Activities	Prod-X	Prod-Y
Materials	150.00	150.00
Labour	30.00	20.00
Overheads		
Set Ups	6.60	13.40
Material Handling	4.50	10.50
Inspection	15.75	19.25
Maintenance Requests	12.90	17.10
Total Cost as - ABC System	219.75	230.25
Total Cost - Traditional System	240.00*	210.00*
Percentage (Decrease)/Increase	(8.44%)	9.64%

As a Management Accountant of the Company, you are required to comment on the impact of pricing of the two products. Overheads are recovered under Traditional system on the basis of labour hour rate.

* Notes:

Activities	X	Y
Materials	150	150
Labour @ 0.01 × hours		
X 0.01 × 3000	30	
Y 0.01 × 2000		20
Overheads		
X 0.02 × 3000	60	
Y 0.02 × 2000		40
Total	240	210

Solution:

From the above computation, it is evident that, when the Company uses Traditional Costing Method, the Product- X is over-cost and Product- Y is under-cost, as compared to ABC System. This is mainly because of using a Single/ Blanket Rate of Labour, for absorbing overheads to the products.

Product X requires more labour hours and overheads are absorbed on the basis of volume only, without considering the activities and the costs of Product X is more as compared to ABC System.

On the other side, since Product Y - a low volume complex product requiring specialized skills and activities, the Costs are more as per ABC System.

So, it can be said that since, ABC System recognises the use of multiple overheads rates, based on Cost Drivers and hence distortion of costs can be avoided and pricing of the products can be done on a more rational way and thereby reflecting the true profitability of the products and also the overall profitability of the Organization.

Decision Making: Using ABC Product Cost Information to Reduce Cost

ABC Ltd. assembles and sells a Product. Activity-based product information for each treadmill is as follows:

Activity	Activity-Base Usage (hrs. per unit) × Activity Rate per Hour = Activity Cost		
Motor assembly	1.50	20	30.00
Final assembly	1.00	18	18.00
Testing	0.25	22	5.50
Rework	0.40	22	8.80
Moving	0.20	15	3.00
Activity cost per unit			65.30

All of the activity costs are related to labour. Management must remove 2.00 of activity cost from the product in order to remain competitive.

Rework involves disassembling and repairing a unit that fails testing. Not all units require rework, but the average is 0.40 hours per unit. Presently, that testing is done on the completed assembly but much of the rework has been related to motors to test the motor independently, prior to assembling it into the final product. Thus, motor assembly issues can be diagnosed and solved without having to disassemble the completed product. This change will reduce the average rework per unit by one quarter.

As a Management Accountant of the company, determine the new activity cost per unit under the rework improvement scenario.

The average rework per unit will be improved by one-quarter, or 25%. Thus, the new average rework time will be reduced from 0.40 to 0.30 hours $[0.40 \times (1 - 0.25)]$.

Activity	Activity-Base Usage (hrs. per unit) × Activity Rate per Hour = Activity Cost		
Motor assembly	1.50	20	30.00
Final Assembly	1.00	18	18.00
Testing	0.25	22	5.50
Rework	0.30	22	6.60
Moving	0.20	15	3.00
			63.10

Remark:

From the above calculations, it is evident that, the Company is able to reduce that cost by ₹ 2.20, with application of ABC System and this will improve that overall profitability of the Company.

Solved Illustrations & Cases**Illustration 5**

You are the Cost Controller of ABC Company Limited. You are vouching for the introduction of Activity Based Costing in the Company and in the meeting with other executives of the Company, you said ‘Why is using a single plant wide allocation rate not always accurate?’

You are required to give your view, in support of the above statement.

Solution:

As a Cost Controller of ABC Company Limited, the following points are to be noted, in favour of implementation of Activity Based Costing, in the Company:

1. Using a single plant wide allocation rate is not always accurate because it is based on only one allocation base and uses that same allocation base to allocate overhead to all products.
2. The allocation base selected might not accurately reflect the way products actually use a company’s resources (there might not be a direct cause-and-effect relationship with overhead costs).
3. In contrast, activity-based costing (ABC) identifies multiple activities, each with its own allocation base, to more accurately reflect the way products actually use a company’s resources (activities).
4. Thus ABC costs are closer to the true cost of making products. One should feel more comfortable making decisions using ABC cost data.

Illustration 6

Your Cost Controller is not happy about the existing system of charging overheads to its Products, A and B. You have been newly appointed as a Management Accountant of the company and you are asked to implement the ABC Costing for allocation of overheads to the Products. You have identified the following activities, budgeted costs, and activity consumption cost drivers as follows:

Activity	Budgeted Cost	Activity Consumption Cost Driver
Engineering	₹ 1,25,000	Engineering hours
Setups	3,00,000	Number of setups
Machine operation	15,00,000	Machine-hours
Packing	75,000	Number of packing orders
Total	₹ 20,00,000	

You have also gathered the following operating data pertaining to each of its products:

Particulars	Product A	Product B	Total
Engineering hour	5,000	7,500	12,500
Number of setups	200	100	300
Machine hours	50,000	1,00,000	1,50,000
Number of packing orders	5,000	10,000	15,000

You are now required to provide with necessary calculations and relevant information, in the form of a report to the Cost Controller about the allocation of overheads costs to the products.

Solution:

Basic Calculations and Workings:

Activity Consumption Cost Driver	Budgeted Cost	Budgeted Activity Consumption	Activity Consumption Rate
Engineering hours	₹ 1,25,000	12,500	₹ 10 per hour
Number of setups	3,00,000	300	1,000 per setup
Machine hours	15,00,000	1,50,000	10 per hour
Number of packing Orders	75,000	15,000	5 per order

Factory overhead costs are assigned to both products by these calculations:

Product A (5,000 units)

Activity Consumption	Activity Consumption	Rate Activity Consumption Total Overheads	Cost Driver	Overheads per unit
Engineering hours	₹10	5,000	₹50,000	₹ 10
Number of Setups	1,000	200	2,00,000	40
Machine hours	10	50,000	5,00,000	100
Number of packing orders	5	5,000	25,000	5
Overhead cost per unit				<u>155</u>

Product B (20,000 units)

Activity Consumption Cost Driver	Activity Consumption Rate	Activity Consumption	Total Overheads	Overheads per unit
Engineering hours	₹10	7,500	₹ 75,000	₹ 3.75
Number of setups	1,000	100	1,00,000	5.00
Machine hours	10	1,00,000	10,00,000	50.00
Number of packing orders	5	10,000	50,000	2.50
Overhead cost per unit				<u>61.25</u>

The report should cover the above calculations and necessary explanations, about the selection of Cost Drivers and calculation of Cost Driver rates, for the allocations of overheads to the Products A and B.

Illustration 7

Large service organisations, such as Insurance, Banks and Hospitals, used to be noted for their lack of standard costing systems, and their relatively unsophisticated budgeting and control systems compared with large manufacturing organisations, but this is changing and many large service organisations are now revising their use of management accounting techniques.

Requirements:

- a. Explain which features of large-scale service organisations encourage the application of activity-based approaches to the analysis of cost information.
- b. Explain which features of service organisations may create problems for the application of activity-based costing.
- c. Explain the uses for activity-based cost information in service industries.
- d. Many large service organisations were at one time state-owned, but have been privatized. Examples in some countries include electricity supply and telecommunications. They are often regulated. Similar systems of regulation of prices by an independent authority exist in many countries, and are designed to act as a surrogate for market competition in industries where it is difficult to ensure a genuinely competitive market.

Explain which aspects of cost information and systems in service organisations would particularly interest a regulator, and why these features would be of interest.

Solution:

- a. Large-scale service organisations have a number of features that have been identified as being necessary to derive significant benefits from the introduction of ABC:
 - (i) They operate in a highly competitive environment;
 - (ii) They incur a large proportion of indirect costs that cannot be directly assigned to specific cost objects;
 - (iii) Products and customers differ significantly in terms of consuming overhead resources;
 - (iv) They market many different products and services. Furthermore, many of the constraints imposed on manufacturing organisations, such as also having to meet financial accounting stock valuation requirements, or a reluctance to change or scrap existing systems, do not apply.

Many service organisations have only recently implemented cost systems for the first time. This has occurred at the same time as when the weaknesses of existing systems and the benefits of ABC systems were being widely publicized.

These conditions have provided a strong incentive for introducing ABC systems.

- b. The following may create problems for the application of ABC:
 - (i) Facility sustaining costs (such as property rents etc.) represent a significant proportion of total costs and may only be avoidable if the organisation ceases business. It may be impossible to establish appropriate cost drivers;
 - (ii) It is often difficult to define products where they are of an intangible nature. Cost objects can therefore be difficult to specify;
 - (iii) Many service organisations have not previously had a costing system and much of the information required to set up an ABC system will be nonexistent. Therefore, introducing ABC is likely to be expensive.
- c. The uses for ABC information for service industries are similar to those for manufacturing organisations:

- (i) It leads to more accurate product costs as a basis for pricing decisions when cost-plus pricing methods are used;
- (ii) It results in more accurate product and customer profitability analysis statements that provide a more appropriate basis for decision-making;
- (iii) ABC attaches costs to activities and identifies the cost drivers that cause the costs. Thus, ABC provides a better understanding of what causes costs and highlights ways of performing activities more effectively by reducing cost driver transactions.

Costs can therefore be managed more effectively in the long term. Activities can also be analyzed into value-added and non-value added activities and by highlighting the costs of non-value added activities attention is drawn to areas where there is a potential for cost reduction without reducing the products' service potentials to customers.

d. The following aspects would be of most interest to a regulator:

- (i) The costing method used (e.g. marginal, traditional full cost or ABC). This is of particular importance to verify whether or not reasonable prices are being set and that the organisation is not taking advantage of its monopolistic situation.

Costing information is also necessary to ascertain whether joint costs are fairly allocated so that cross-subsidization from one service to another does not apply;

- (ii) Consistency in costing methods from period to period so that changes in costing methods are not used to distort pricing and profitability analysis;
- (iii) In many situations a regulator may be interested in the ROI of the different services in order to ensure that excessive returns are not being obtained. A regulator will therefore be interested in the methods and depreciation policy used to value assets and how the costs of assets that are common to several services (e.g. corporate headquarters) are allocated.

The methods used will influence the ROI of the different services.

Illustration 8

Hamid & Co, make laptop computers for use in dangerous environments. The company's main customers are organisations like oil companies and the military that require a laptop that can survive rough handling in transport to a site and can be made to their unique requirements.

The company started as a basic laptop manufacturer but its competitors grew much larger and RL had to find a niche market where its small size would not hinder its ability to compete. It is now considered one of the best quality producers in this sector.

Hamid & Company had the same finance director for many years who preferred to develop its systems organically. However, due to fall in profitability, a new chief executive officer (CEO) has been appointed who wishes to review Hamid's financial control systems in order to get better information with which to tackle the profit issue.

The CEO wants to begin by thinking about the pricing of the laptops to ensure that selling expensive products at the wrong price is not compromising profit margins. The laptops are individually specified by customers for each order and pricing has been on a production cost plus basis with a mark-up of 45 per cent. The company uses an absorption costing system based on labour hours in order to calculate the production cost per unit.

The main control system used within the company is the annual budget. It is set before the start of the financial year and variances are monitored and acted on by line managers.

The CEO has been reading about major companies that have stopped using budgets and wants to know how such a radical move works and why a company might take such a step. He has been worried by moves by competitors into Hamid's market with impressive new products. This has created unrest among the staff at Hamid with two experienced managers leaving the company.

Required:

An evaluation of the current method of costing against an activity-based costing (ABC) system.

Solution:

The evaluations are based on the following points:

- ▲ The direct costs are identical for both costing methods.
- ▲ Direct labour is a relatively minor cost but the existing method that allocates overhead costs on the basis of direct labour hours overstates their importance.
- ▲ The existing method is based on the assumption that there is a cause-and-effect relationship between overheads and labour hours. This assumption appears to be unlikely based on the information given in the question. If this assumption is incorrect then misleading results will be reported.
- ▲ ABC attempts to allocate overheads based on using several different cost drivers rather than the single base used with the existing method.
- ▲ ABC seeks to assign overheads based on cause-and-effect cost drivers. The accuracy of the reported ABC product costs depends on the extent to which the cause-and-effect assumption is correct.

Illustration 9

“The basic idea justifying the use of Activity-Based Costing (ABC) and Activity-Based Budgeting (ABB) are well publicized, and the number of applications has increased. However, there are apparently still significant problems in changing from existing systems”.

Requirements:

- a. Explain which characteristics of an organisation, such as its structure, product range, or environment, may make the use of activity based techniques particularly useful.
- b. Explain the problems that may cause an organisation to decide not to use, or to abandon use of, activity based techniques.
- c. Some categorizations of cost drivers provide hierarchical models:
 - (i) unit-level activities, (ii) batch activities, (iii) product sustaining activities, (iv) facility sustaining activities.

Other analyses focus on ‘value adding’ and ‘non-value adding’ activities.

Explain what is meant by ‘non-value adding activities’, and discuss the usefulness of this form of analysis.

Solution:

- a. Activity-based costing (ABC) is a costing method that identifies activities in an organisation and assigns the cost of each activity to all products and services according to the actual consumption by each. Therefore, this model assigns more indirect costs (overhead) into direct costs compared to conventional costing.

ABC system is a very valuable tool of control. It offers a number of advantages to the management and the following are the main advantages:

- (i) It brings accuracy and reliability of the costing data in determination of the cost of the products.
 - (ii) It facilitates cause and effect relationship to exercise effective cost control.
 - (iii) It provides necessary cost information to the management to take decisions on any matter, relating to the business.
 - (iv) It is much helpful in fixing the cost and selling price of a product.
 - (v) It facilitates overhead costs allocate directly to the specific product.
 - (vi) It enables to manage the activities rather than costs.
 - (vii) It helps to remove all types of wastages and inefficiencies.
 - (viii) It provides valuable information to evaluate on the relative efficiencies of various plants and machinery.
 - (ix) Cost Driver Rates will help in significant impact on the development of new products or modification of existing products.
- b. This will arise when the products manufactured by the manufacturing companies are not standardized and labour hours are predominating. Further a clear distinction between value added and non-value added activities are difficult to make.
- c. For solution to this part read the relevant portion of this Study Material.

Illustration 10

State with a brief reason whether you would recommend an activity based system of costing in each of the following independent situations:

- (i) Company Dee produces one product. The overhead costs mainly consist of depreciation.
- (ii) Company BC produces 5 different products using different production facilities.
- (iii) A consultancy firm consisting of lawyers, accountants and computer engineers provides management consultancy services.
- (iv) Company Simens produces two different labour intensive products. The contribution per unit in both products is very high. The BEP is very low. All the work is carried on efficiently to meet the target costs.

Solution:

- (i) ABC is not applicable. One product situation- for allocation of overhead, ABC is not required. ABC for cost reduction not beneficial since most of the overhead is depreciation.
- (ii) Multi product situation, production facilities are different - ABC is required for allocation of overhead. ABC is necessary for pricing, Cost drivers are likely to be different, and Cost reduction may be possible through ABC.
- (iii) Variety of services and hence ABC is required for cost allocation.
- (iv) Different products, but labour intensive. Hence, overhead allocation based on readily traceable direct labour cost will be accurate. Hence, ABC is not required for cost allocation.

Illustration 11

State whether each of the following independent activities is value-added or non-value-added:

- (i) Polishing of furniture used by a systems engineer in a software firm.
- (ii) Maintenance by a software company of receivables management software for a banking company
- (iii) Painting of pencils manufactured by a pencil factory

- (iv) Customers' computer key board cleaning by a computer repair centre.
 (v) Providing, brake adjustments in cars received for service by a car service center.

Solution:

- (i) Non-Value Added
 (ii) Value Added
 (iii) Value-Added
 (iv) Value-Added
 (v) Value-Added

Illustration 12

ABC Ltd. uses activity based costing and accumulates overhead costs in the following cost pools:

- ▲ Human Resources
- ▲ Parts management
- ▲ Purchasing
- ▲ Quality Control
- ▲ Equipment set-up
- ▲ Training employees
- ▲ Assembly department
- ▲ Receiving department

You are to find out for each cost pool whether the cost pool would be unit-level, batch-level, product-level or facility level.

Solution:

Activity Cost Pool	Level
Human Resources	Facility-level
Parts management	Product-level
Purchasing	Batch-level
Quality Control	Unit-level
Equipment set-up	Unit-level
Training employees	Facility-level
Assembly department	Unit-level
Receiving department	Batch-level

Illustration 13

Particulars	Percentage (%)
Costs relating to sets-up	35
Costs relating to materials handling	15
Costs relating to inspection	50
Total production overhead	100

The following total activity volumes are associated with each product line for the period as a whole:

Product	No. of Set-up	No. of movement of materials	No. of Inspections
A	75	12	150
B	115	21	180
C	480	87	670
	670	120	1,000

Required:

Identify the cost drivers for each of the cost mentioned above.

Solution:

Category	Cost Driver
Set-up costs	Number of set-up.
Materials handling costs	Material movements
Inspection costs	Number of inspections

Illustration 14

Total Overheads	₹1,00,000
Costs relating to set ups	50%
Costs relating to inspections	50%
Number of Set ups	100
Number of Inspections	50

Required

Calculate the various Cost Driver Rates.

Solution:

Step 1 – Pooling the costs

Category	Working	Cost Pool (₹)
Set-up costs	(1,00,000 × 50%)	50,000
Inspection costs	(1,00,000 × 50%)	50,000
Total Overheads		1,00,000

Step 2 – Calculation of Cost per Driver

Category	Number of drivers	Cost Pool (₹)	Working	Cost per Driver Rate (₹)
Set-up costs	100	50,000	(₹50,000 ÷ 100)	500
Inspection costs	50	50,000	(₹50,000 ÷ 50)	1000

Illustration 15

ABC & Associates provides consulting and tax preparation services to its clients. It charges a ₹100 fee per hour for each service. The firm's revenues and costs for the month March 2022 are shown in the following income statement:

Particulars	Tax Preparation	Tax Consulting	Total
Revenue - Amount (₹)	1,30,000	2,70,000	4,00,000
Expenses:			
Secretarial support			80,000
Supplies			72,000
Computer costs, etc			40,000
Profit			1,92,000

The firm uses ABC and the following are the cost drives:

Overhead Cost	Cost Driver	Tax Preparation	Tax Consulting
Secretarial support	Number of clients	72	48
Supplies	Transactions with clients	200	300
Computer costs	Computer hours	1,000	600

Required:

- Complete the income statement using activity-based costing and the firm's three cost drivers.
- Recompute the income statement using direct-labour hours as the only allocation base: 1,300 hours for tax preparation; 2,700 hours for tax consulting.
- How might the firm's decisions be altered if it were to allocate all overhead costs using direct labour hours?
- Under what circumstances would the about-based allocation and activity-based costing (using the three cost drivers) result in similar profit results?

Solution:

Activity-based versus Traditional Costing

(a)

Particulars	Tax Preparation Amount ₹	Consulting Amount ₹	Total Amount ₹
Revenue	1,30,000	2,70,000	4,00,000
Less: Expenses Secretarial support	48,000	32,000	80,000
Supplies	28,800	43,200	72,000
Computer Depreciation	25,000	15,000	40,000
Profit	28,200	1,79,800	2,08,000

Working Notes:

- $\text{₹}80,000 \div 120 \text{ clients} = \text{₹}666.67 \text{ per client}$
- $\text{₹}72,000 \div 500 \text{ transactions} = \text{₹}144 \text{ per transaction}$
- $\text{₹}40,000 \div 1,600 \text{ hours} = \text{₹}25 \text{ per computer hour}$
- $\text{₹}666.67 \text{ per client} \times 72 \text{ clients} = \text{₹}48,000$
- $\text{₹}144 \text{ per hour} \times 200 \text{ transactions} = \text{₹}28,800$
- $\text{₹}25 \text{ per computer hour} \times 1,000 \text{ hours} = \text{₹}25,000$

(b)

Particulars	Tax Preparation (₹)	Tax Consulting (₹)	Total (₹)
Revenue	1,30,000	2,70,000	4,00,000
Expenses	62,400	1,29,600	1,92,000
Profit	67,600	1,40,400	2,08,000

Working Notes:

- (i) ₹48 per labour hour = ₹1,92,000 total expenses ÷ 4,000 labour hours
(4,000 labour hours = ₹ 4,00,000 revenue ÷ ₹100 per labour hour)
- (ii) ₹62,400 = ₹48 per labour hour × 1,300 hours of labour
- (iii) 2,700 labour hours × ₹48 per labour hour = ₹1,29,600
- (c) Under the labour-based overhead allocation, tax preparation appears to be more profitable than it does under ABC, and might lead the firm to concentrate more heavily on tax preparation.
- (d) ABC and traditional costing systems generally yield comparable product-line profits when overhead is a small portion of costs, or when cost drivers are highly correlated with direct-labour hours.

In this case, labour hours were distributed 32.5% to Preparation and 67.5% to Consulting. If firm's three cost drivers were each also distributed 32.5% to preparation and 67.5% to Consulting, the labour-hour and ABC allocation would be identical.

Illustration 16

A manufacturing company has three accounts clerks responsible for processing purchase invoices of suppliers. Each clerk is paid a salary of ₹1,50,000 per annum and is capable of processing 5,000 purchase invoices per year. In addition to the salary, the company spends ₹45,000 per year for printing of forms, postage etc. (assuming that 15,000 purchase invoices are processed).

During the year, 12,500 purchase invoices were processed. You are required to:

- Calculate the activity rate for the purchase order activity. Break the activity rate into fixed and variable components.
- Calculate the total activity availability and break this into activity usage and unused activity.
- Calculate the total cost of resources supplied and break this into activity usage and unused activity.

Solution:

- Activity Rate = $[(3 \times ₹1,50,000) + ₹45,000] \div 15,000 = ₹33$ per invoice
Fixed Activity Rate = $₹4,50,000 \div 15,000 = ₹30$ per invoice
Variable Activity Rate = $₹45,000 \div 15,000 = ₹3$ per invoice.
- Activity availability = Activity usage + Unused Activity
15,000 invoices = 12,500 invoices + 2,500 invoices
- Cost of resources supplied = Cost of activity used + Cost of unused activity
or, $₹4,50,000 + (₹3 \times 12,500) = (₹33 \times 12,500) + (₹30 \times 2,500)$
or, $₹4,87,500 = ₹4,12,500 + ₹75,000$

Illustration 17

ABC Company manufactures four products, A, B, C and D, using the same manufacturing process. The following data are available relating to a production period:

Product	Volume	Material Cost per unit (₹)	Direct Labour per unit	Machine Time per unit	Labour Cost per unit (₹)
A	500	5	0.5 hour	¼ hour	3
B	5,000	5	0.5 hour	¼ hour	3
C	600	16	2 hours	1 hour	12
D	7,000	17	2.5 hours	1.5 hours	9

Total Production Overheads are as under:

Particulars	₹
Machine related Costs	37,749
Set-up Costs	4,250
Ordering Costs	1,920
Material Handling Costs	7,560
Spare parts Administration Costs	8,400
	<u>59,879</u>

The Company absorbs factory overheads to the products by machine hour rate method and the hourly rate per machine hour is ₹4.80. The overheads cost of the products are as under:

Product	₹
A	1.2
B	1.2
C	4.8
D	<u>7.2</u>

The production overheads activities for the period reveal the following:

Products	No. of Set-ups	No. of Materials Orders	No. of times Materials handled	Number of Spare parts
A	1	1	2	2
B	6	4	10	5
C	2	1	3	1
D	8	4	12	4

Prepare a Statement of Overhead Cost for all the Products, by using Activity Based Costing and compare the results with Traditional Costing.

Solution:

No. of Activities:

$$\text{Set-ups} = (1+6+2+8) = 17$$

$$\text{Ordering} = (1+4+1+4) = 10$$

$$\text{Handling} = (2+ 10+ 3 +12) = 27$$

$$\text{Spare parts} = (2+ 5+ 1 + 4) = 12$$

$$\text{Machine Hours} = (125 + 1250 + 600 + 10,500) = 12,475$$

ABC Cost Pool

Overhead Costs	Amount (₹)	Cost Driver	Activity Nos.	Cost Driver Rate (₹)
Machine related	37,749	Machine Hours	12,475	3.0259
Set-up Costs	4,250	No. of Set-ups	17	250
Ordering Costs	1,920	No. of Orders	10	192
Spare parts	8,400	No. of Spares	12	700
Material Handling	7,560	No. of times	27	280

Statement of Overhead Costs

(₹)

Product	A	B	C	D
No of Units	<u>500</u>	<u>5,000</u>	<u>600</u>	<u>7,000</u>
Overhead Costs:	250	1,500	500	2,000
Set-up Costs @ ₹250				
Material Ordering@ ₹192	192	768	192	768
Material Handling@ ₹280	560	2,800	840	3,360
Spare parts @ ₹700	1,400	3,500	700	2,800
Machine related@ ₹3.0259	378	3,782	1,816	31,773 (Balance)
Total Overheads	2,780	12,350	4,048	40,701
Overheads Cost /unit (ABC)	5.56	2.47	6.75	5.81
Overheads Cost /unit (Traditional)	<u>1.20</u>	<u>1.20</u>	<u>4.80</u>	<u>7.20</u>
Difference	<u>4.36</u>	<u>1.27</u>	<u>1.95</u>	<u>(1.39)</u>

Illustration 18

C Ltd manufactures four products W, X, Y and Z. Output and cost data for the period just ended are as follows:

Products	Output units	Material Cost per unit ₹	Labour Cost per unit ₹	Machine Time per unit (Hours)
W	3,000	50	50	0.50
X	500	70	60	0.50
Y	300	160	100	2.00
Z	1,000	180	75	4.00

Products	W	X	Y	Z	Total
No. of Set-up	10	1	2	5	18
No. of Purchase Orders	6	1	1	5	13
No. of Material Handling	12	1	2	15	30

The following are the Overhead Costs:

Particulars	₹
Set-up Costs	9,000
Purchase Ordering Costs	10,400
Handling Costs	6,000
Other Factory Overhead Costs	<u>1,27,000</u>
	<u>1,52,400</u>

Presently overheads costs are charged to the products on the basis of Machine Hours.

Prepare the Cost Statements under Traditional and ABC.

Solution:

Working Notes:

Total Machine Hours = 1,500 + 250 + 600 + 4,000 = 6,350 hours

Overheads per machine hour = ₹ (9,000 + 10,400 + 6,000 + 1,27,000) ÷ 6,350 = ₹ 24

No. of Set-up = 18

Cost per set-up = ₹ 9,000 ÷ 18 = ₹ 500

No. of Purchase Orders = 13

Cost per Purchase Order = ₹ 10,400 ÷ 13 = ₹ 800

No. of Materials Handled = 30

Cost per Material Handled = ₹ 6,000 ÷ 30 = ₹ 200

Other Factory Overheads on the basis of Machine Hours = ₹ 1,27,000 ÷ 6,350 hours = ₹ 20.

Statement of Total Costs per unit under Traditional Method

(₹)

Products	W	X	Y	Z
Material Cost	50	70	160	180
Labour Cost	50	60	100	75
Overheads (on the basis of Machine hour rate)	12	12	48	96
Total Costs	112	142	308	351

Statement of Total Costs per unit under ABC Method

(₹)

Products	W	X	Y	Z
Material Cost	50.00	70.00	160.00	180.00
Labour Cost	50.00	60.00	100.00	75.00
Set-up Cost (₹ 500)	1.67	1.00	3.33	2.50
Purchase Ordering Costs (₹ 800)	1.60	1.60	2.67	4.00
Handling Costs (₹ 200)	0.80	0.40	1.33	3.00
Other Factory Overheads (₹ 20)	10.00	10.00	40.00	80.00
Total Costs	114.07	143.00	307.33	344.50

Workings:

Product

W: Set-up cost/ unit = $10 \times ₹ 500 \div 3,000 = ₹ 1.67$

X : Set-up cost/ unit = $1 \times ₹ 500 \div 500 = ₹ 1$

Y: Set-up cost/ unit = $2 \times ₹ 500 \div 300 = ₹ 3.33$

Z: Set-up cost/ unit = $5 \times ₹ 500 \div 1,000 = ₹ 2.50$

Product

W: Purchase Ordering Costs / unit = $6 \times ₹ 800 \div 3,000 = ₹ 1.60$

X: Purchase Ordering Costs / unit = $1 \times ₹ 800 \div 500 = ₹ 1.60$

Y: Purchase Ordering Costs / unit = $1 \times ₹ 800 \div 300 = ₹ 2.67$

Z: Purchase Ordering Costs / unit = $5 \times ₹ 800 \div 1,000 = ₹ 4.00$

Product

W: Handling Costs / unit = $12 \times ₹ 200 \div 3,000 = ₹ 0.80$

X: Handling Costs / unit = $1 \times ₹ 200 \div 500 = ₹ 0.40$

Y: Handling Costs / unit = $2 \times ₹ 200 \div 300 = ₹ 1.33$

Z: Handling Costs / unit = $15 \times ₹ 200 \div 1,000 = ₹ 3$

Product

W: Machining Costs / unit = $3,000 \times 0.50 \times ₹ 20 \div 3,000 = ₹ 10$

X: Machining Costs / unit = $500 \times 0.50 \times ₹ 20 \div 500 = ₹ 10$

Y: Machining Costs / unit = $300 \times 2 \times ₹ 20 \div 300 = ₹ 40$

Z: Machining Costs / unit = $1,000 \times 4 \times ₹ 20 \div 1,000 = ₹ 80$

Illustration 19

A.Ltd. manufactures four products, namely A, B, C and D using the same plant and process. The following information relates to a production period:

Product	A	B	C	D
Output in units	720	600	480	504
Cost per unit (₹): Direct Material	42	45	40	48
Direct labour	10	9	7	8
Machine hours per unit	4 hrs	3 hrs	2 hrs	1 hr

The four products are similar and are usually produced in production runs of 24 units and sold in batches of 12 units. Using machine hour rate currently absorbs the production overheads. The total overheads incurred by the company for the period is as follows:

Particulars	₹
Machine operation and Maintenance cost	63,000
Setup costs	20,000
Store receiving	15,000
Inspection	10,000
Material handling and dispatch	<u>2,592</u>
	<u>1,10,592</u>

During the period the following cost drivers are to be used for the overhead cost:

Cost	Cost driver
Setup cost	No. of production runs
Store receiving	No. of Requisition raised
Inspection	No. of production runs
Material handling and dispatch	Orders executed

It is also determined that:

- ✦ Machine operation and maintenance cost should be apportioned between setup cost, store receiving and inspection activity in 4:3:2.
- ✦ Number of requisition raised on store is 50 for each product and the no. of order executed is 192, each order being for a batch of 12 of a product.

Required:

- (i) Calculate the total costs of each product, if all overhead costs are absorbed on machine hour rate basis.
- (ii) Calculate the total costs of each product using activity base costing.
- (iii) Comment briefly on differences disclosed between overhead traced by present system and those traced by activity based costing.

Solution:

(a) Total cost of different products (overhead absorption on Machine hour basis) (₹)

Particulars	A	B	C	D
Direct material	42	45	40	48
Direct labour	10	09	07	08
Overhead	72	54	36	18
Cost of production per unit	124	108	83	74
Output (in units)	<u>720</u>	<u>600</u>	<u>480</u>	<u>504</u>
Total cost	<u>89,280</u>	<u>64,800</u>	<u>39,840</u>	<u>37,296</u>

Working Note:

Machine hours $(720 \times 4 + 600 \times 3 + 480 \times 2 + 504 \times 1) = 6,144$ hours.

Rate per hour = ₹ $1,10,592 \div 6,144$ hours = ₹ 18 per hour.

(b) Activity based costing system (₹)

Particulars	A	B	C	D
Direct material	30,240	27,000	19,200	24,192
Direct labour	7,200	5,400	3,360	4,032
Setup	15,000	12,500	10,000	10,500
Store receiving	9,000	9,000	9,000	9,000
Inspection	7,500	6,250	5,000	5,250
Material handling and dispatch	810	675	540	567
Total cost	69,750	60,825	47,100	53,541
Per unit cost	96.875	101.375	98.125	106.23

Working Note:

Particulars	Cost (₹)	Drivers	No	Cost per unit of driver (₹)
Set-up*	48,000	Production runs	96	500
Store receiving**	36,000	Requisitions raised	200	180
Inspection***	24,000	Production runs	96	250
Material handling etc.	2,592	Orders	192	13.50

Production Run for A ($720/24$) = 30; B ($600/24$) = 25; C ($480/24$) = 20; D ($504/24$) = 21.

Total Production Run = $30 + 25 + 20 + 21 = 96$.

* Setup = $20,000 + (63,000 \times 4/9) = 48,000$; ** Store Receiving = $15,000 + (63,000 \times 3/9) = 36,000$;

*** Inspection = $10,000 + (63,000 \times 2/9) = 24,000$.

(c)

Particulars	A	B	C	D
Cost per unit (₹) (a)	124	108	83	74
Cost per unit (₹) (b)	96.88	101.38	98.13	106.23
Difference (₹) (b - a)	(27.12)	(6.62)	15.13	32.23

The total overheads which are spread over the four products have been apportioned on different bases, causing the product cost to differ substantially, in respect of product A and D a change from traditional machine hour rate to an activity system may have effect on price and profits to the extent that pricing is based on cost plus approach.

Illustration 20

Kalyani Manufacturing Company has three salaried accounts payable clerks responsible for processing purchase invoices. Each clerk is paid a salary of ₹30,000 and is capable of processing 5,000 invoices per year (working efficiently).

In addition to the salaries, Kalyani spends ₹9,000 per year for forms, postage and so on (assuming 15,000 invoices are processed). During the year, 12,500 invoices were processed.

Required

- Calculate the activity rate for the purchase order activity. Break the activity into fixed and variable components.
- Compute the total activity availability, and break this into activity usage and unused activity.
- Calculate the total cost of resources supplied, and break this into activity usage and unused activity.

Solution:

- a. Activity rate $[(3 \times ₹ 30,000) + ₹ 9,000] \div 15,000 = ₹ 6.60$ per invoice
 Fixed activity rate = $₹ 90,000 \div 15,000 = ₹ 6.00$ per invoice
 Variable activity rate = $₹ 9,000 \div 15,000 = ₹ 0.60$ per invoice
- b. Activity availability = Activity usage + Unused activity
 15,000 invoices = 12,500 invoices + 2,500 invoices
- c. Cost of resources supplied = Cost of activity used + Cost of unused activity
 $₹ 90,000 + (₹ 0.60 \times 12,500) = (₹ 6.60 \times 12,500) + (₹ 6.00 \times 2,500)$
 $₹ 97,500 = ₹ 82,500 + ₹ 15,000$

Illustration 21

Information relating to the four products made and sold by a company is as follows for one period.

Particulars	A	B	C	D
Output in units	120	100	80	120
Direct material (₹ per unit)	40	50	30	60
Direct labour (₹ per unit)	28	21	14	21
Machine hours per unit	4	3	2	3

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

The total of the production overhead for the period has been analysed as follows:

Particulars	Amount (₹)
Machine department costs (rent, business rates, depreciation and supervision)	10,430
Set-up costs	5,250
Stores receiving	3,600
Inspection/quality control	2,100
Materials handling and dispatch	4,620
	26,000

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

Cost pools	Cost driver
Set-up cost	Number of production runs
Stores receiving	Requisitions raised
Inspection/quality control	Number of production runs
Materials handling and dispatch	Orders executed

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

Calculate the production costs per unit, using ABC.

Solution:

Cost drivers

Machine dept. cost per hour = ₹10,430/1,300= ₹8.02

No. of production runs = Outputs/20 = 420/20 = 21

Set up and inspection/QC costs per run = (₹5,250+₹ 2,100) ÷ 21= ₹350

Stores receiving cost per requisition= ₹3,600/80 =₹45

Materials handling cost per order =₹4,620/42= ₹110

Workings:

Machine department costs:

These costs will be absorbed on the basis of machine hours

The costs can now be summarized as follows:

Particulars	A	B	C	D
Machine hours	480	300	160	360
Overhead absorbed (@ ₹8.02/hr.) (₹)	3,851	2,407	1,284	2,888

Workings:

Other overhead costs:	A	B	C	D	Total
Number of production runs	6	5	4	6	21
Set-up and inspection/quality control cost absorbed (₹)	2,100	1,750	1,400	2,100	7,350
Requisitions raised	20	20	20	20	80
Stores receiving cost absorbed (₹)	900	900	900	900	3,600
Orders executed (Output/10)	12	10	8	12	42
Material handling cost absorbed (₹)	1,320	1,100	880	1,320	4,620

The costs can now be summarized as follows:

Particulars	A	B	C	D
Direct material (₹)	4,800	5,000	2,400	7,200
Direct labour (₹)	3,360	2,100	1,120	2,520
Prime cost (₹)	8,160	7,100	3,520	9,720
Production overheads:				
Machine department (₹)	3,851	2,407	1,284	2,888
Set-up and inspection/QC (₹)	2,100	1,750	1,400	2,100
Stores receiving (₹)	900	900	900	900
Materials handling and dispatch (₹)	1,320	1,100	880	1,320
Total production cost (₹)	16,331	13,257	7,984	16,928
Production cost per unit (₹)	136.09	132.57	99.80	141.07

EXERCISE**Theoretical Questions****⊙ Multiple Choice Questions**

1. Which of the following is a correct definition of activity-based management?
 - A. An approach to the costing and monitoring of activities which involves tracing resource consumption and costing final outputs. Resources are assigned to activities and activities to cost objects based on consumption estimates. The latter utilize cost drivers to attach activity costs to outputs.
 - B. The identification and evaluation of the activity drivers used to trace the cost of activities to cost objects. It may also involve selecting activity drivers with potential to contribute to the cost management function with particular reference to cost reduction.
 - C. A method of budgeting based on an activity framework and utilizing cost driver data in the budget-setting and variance feedback processes.
 - D. A system of management which uses activity-based cost information for a variety of purposes including cost reduction, cost modeling and customer profitability analysis.
2. Which of the following characteristics would be an indicator that a company would benefit from switching to activity based costing?
 - A. Only one homogenous product is produced on a continuous basis
 - B. The existing cost system is reliable and has produced excellent results
 - C. Overhead costs are high and increasing and no one seems to know why
 - D. The costs of implementing ABC out-weigh the benefits
3. According to the Chartered Institute of Management Accountants (CIMA), cost attribution to cost units on the basis of benefits received from indirect activities e.g. ordering, setting up, and assuring quality is known as:
 - A. Absorption costing
 - B. Marginal costing
 - C. Activity-based costing
 - D. Job costing
4. In an ABC system, which of the following is likely to be classified as a batch level activity?
 - A. Machine set-up
 - B. Product design
 - C. Inspection of every item produced
 - D. Production manager's work
5. Activity based costing:
 - A. Uses a plant wide overhead rate to assign overhead
 - B. Is not expensive to implement

- C. Typically applies overhead costs using direct labour hours
 - D. Uses multiple activity rates
6. Which of the following activities is not a batch level activity?
- A. Processing purchase orders
 - B. Designing products
 - C. Receive raw materials from suppliers
 - D. Setting up equipment
7. Which of the following is not included in batch level activities?
- A. Material ordering cost
 - B. Machine set-up cost
 - C. Inspection cost
 - D. Designing the product
8. Assigning overhead using ABC often:
- A. Shifts overhead costs from high-volume products to low-volume products
 - B. Shifts overhead costs from low-volume products to high-volume products
 - C. Provides the same results as traditional costing
 - D. Requires one predetermined overhead rate
9. In Activity Based Costing:
- A. Non-manufacturing costs may not be assigned to products
 - B. Some manufacturing costs may be excluded from product costs
 - C. Allocation bases are the same as those used in traditional costing methods
 - D. Similar to traditional costing, ABC only uses one overhead cost pool
10. In an ABC system, the allocation bases that are used for applying costs to services or procedures are called:
- A. Cost Pool
 - B. Cost Driver
 - C. Cost Absorption
 - D. Cost Object
11. Which of the following would not be deducted from sales in a management report prepared using ABC?
- A. Direct materials
 - B. Direct labour
 - C. Variable selling and administration costs
 - D. Shipping costs

12. an item for which cost measurement is required e.g. product, job or a customer
- A. Cost Pool
 - B. Cost Driver
 - C. Cost Absorption
 - D. Cost Object
13. Which of the following is different in ABC when compared to traditional costing?
- A. Traditional costing and ABC costing usually yield very similar product costs
 - B. In an ABC costing system, costs are only assigned to products that actually required work that gave rise to a particular cost
 - C. In ABC, batch-level costs are applied to products using unit-level bases
 - D. Under traditional costing, batch-level costs are shifted from high-volume products to low-volume products
14. Process of Cost allocation under Activity Based Costing is
- A. Cost of Activities—Activities—Cost Driver – Cost allocated to cost objects
 - B. Cost Driver — Cost of Activities— Cost allocated to cost objects – Activities
 - C. Activities— Cost of Activities—Cost Driver – Cost allocated to cost objects
 - D. Activities—Cost Driver – Cost allocated to cost objects — Cost of Activities
15. Cost of maintaining a building is
- A. Unit Level Cost
 - B. Batch Level Cost
 - C. Product Level Cost
 - D. Facility Level Cost
16. ----- should be subtracted from net product revenues instead of an arbitrary and illogical apportionment.
- A. Facility Level Cost
 - B. Product Level Cost
 - C. Organizational Level Cost
 - D. High Level Cost
17. The basis of apportionment of overheads which takes into account the profitability of various departments is called:
- A. FIFO basis
 - B. LIFO basis
 - C. Ability to pay basis
 - D. Activity basis

18. Which of the following is the main cost driver of customer order processing activity?
- A. Flow of the product from the assembly line
 - B. Order value
 - C. Number of problem suppliers
 - D. Number of machine charges
19. Painting the product would be an example of which activity level groups
- A. Facility-level activity
 - B. Product-level activity
 - C. Unit-level activity
 - D. Batch-level activity
20. Which of the following tasks is not normally associated with an activity-based costing system?
- A. Calculation of cost application rates
 - B. Identification of cost pools
 - C. Preparation of allocation matrices
 - D. Identification of cost drivers
21. All of the following are examples of batch level activities except:
- A. Purchase order processing
 - B. Setting up equipment
 - C. The clerical activity associated with processing purchase orders to produce an order for a standard product
 - D. Worker recreational facilities
22. Plant depreciation is an example of which activity-level group?
- A. Unit-level activity
 - B. Facility-level activity
 - C. Batch-level activity
 - D. Product-level activity
23. Under activity-based costing, 'material ordering' is considered as —
- A. Unit-level activity
 - B. Batch level activity
 - C. Product level activity
 - D. Facility level activity

24. Samsung an appliance manufacturer is developing a new line of ovens that uses controlled-laser technology. Research and testing costs associated with the new ovens is said to arise from a:
- A. Unit Level Activity
 - B. Competitive Level Activity
 - C. Facility Level Activity
 - D. Product Sustaining Activity
25. The salaries of a manufacturing plant's management are said to arise from:
- A. Unit Level Activities
 - B. Batch Level Activities
 - C. Product Sustaining Activities
 - D. Facility Level Activities
26. The division of activities into unit level, batch level, product sustaining level, and facility level categories is commonly known as a
- A. Cost Object
 - B. Cost Application Method
 - C. Cost Hierarchy
 - D. Cost Estimation Method
27. The main reason for the usage of Activity Based Costing, by replacing the traditional costing system is that:
- A. The overhead recovery rates used in traditional costing systems are inappropriate for decision-making.
 - B. The companies deal with more number of products at present
 - C. No scope for cause and effect relationship in traditional costing
 - D. The new manufacturing technology needs information for feedback of performance even the product is in progress.
28. Costs that are caused by a group of things being made or processed at a single time are referred to as:
- A. Product-level costs
 - B. Cost pool
 - C. Organizational-level costs
 - D. Batch level costs
29. The following statements have been made in relation to activity-based costing:
- (1) A cost driver is a factor which causes a change in the cost of an activity
 - (2) Traditional absorption costing tends to under-estimate overhead costs for high volume products
- Which of the above statements is/are true?
- A. 1 only

- B. 2 only
 - C. Neither 1 nor 2
 - D. Both 1 and 2
30. Which of the following statements is true about activity-based costing (ABC)?
- A. ABC is a costing method designed to provide managers with cost information for strategic and other decisions that potentially affect capacity and therefore “fixed” costs
 - B. ABC is an ordinary replacement, rather than a supplement for, the company’s usual costing system
 - C. Most organizations that use ABC have only one costing system that serves the needs of external reports and internal decision-making
 - D. In practice, ABC can only be done one way correctly, meaning that different “flavors” are not allowed
31. To calculate activity rates, all of the following are necessary except:
- A. Determine the total activity for each cost pool that would be required to produce the current product mix
 - B. Determine the total activity for each cost pool that would be required to serve present customers
 - C. Calculate activity rates by dividing the total cost for each activity by its total activity
 - D. Calculate activity rates by dividing the total cost for each activity by the percentage of the activity allocated to the product
32. Activity-based costing:
- A. Uses a plant-wide overhead rate to assign overhead
 - B. Is not expensive to implement
 - C. Typically applies overhead costs using direct labor-hours
 - D. Uses multiple activity rates
33. Cost attribution to cost units on the basis of benefit received from indirect activities, such as ordering, setting-up, assuring quality is known as:
- A. Allocation
 - B. Activity-based costing
 - C. Always better control
 - D. Absorption
34. In activity-based costing, the allocation basis used for applying costs to services or products is called—
- A. Cost driver
 - B. Cost object
 - C. Allocation
 - D. Application

35. In activity-based costing, an item for which cost measurement is required is called —
- A. Cost driver
 - B. Cost object
 - C. Allocation
 - D. Cost pool
36. A homogeneous cost pool is one that:
- A. Does not change over time
 - B. Needs many activity drivers to be allocated to a cost object
 - C. Can be explained with a single activity driver
 - D. Has only one type of material assigned to it
37. Review cost of commercial loan applications is cost.
- A. Unit level
 - B. Facility level
 - C. Batch level
 - D. Product sustaining
38. In Traditional absorption costing system cost are first traced to:
- A. Activities
 - B. Organizational unit
 - C. Products
 - D. Cost centers
39. An Activity-Based Costing, an inspection of the product is a ----- level activity:
- A. Unit
 - B. Batch
 - C. Product
 - D. Facility
40. ABC is defined as cost attribution to _____ on the basis of benefit received from indirect activities.
- A. Cost units
 - B. Cost objects
 - C. Cost centres
 - D. Production units

41. Which of the following is not a correct match?

Activity	Cost Drivers
A. Production scheduling	Number of production runs
B. Dispatching	No. of Dispatch orders
C. Goods receiving	Goods received order
D. Inspection	Machine hours

42. Basic types of cost pool allocations include:

- A. Allocation of costs to segments, products, and services
- B. Determining inputs for CVP models
- C. Establishing cash flows for capital budgeting analyses
- D. Reallocation of costs among service departments

43. Activity based cost systems would probably provide the greatest benefits for organizations that use

- A. Job order costing
- B. Process costing
- C. Standard costing
- D. Historical costing

44. Under a traditional costing system, which of the following costs would likely be classified as indirect with respect to the various products manufactured?

- A. Plant maintenance
- B. Factory supplies
- C. Machinery depreciation
- D. All of the above

45. PKS Ltd. is changing from a traditional costing system to an activity based system. As a result of this action, which of the following costs would likely change from indirect to direct?

- A. Direct materials, factory supplies
- B. Production setup, finished-goods inspection & direct materials
- C. Production setup, finished-goods inspection and product shipping
- D. All of the above

46. Which of the following statements about activity based costing is false?

- A. Activity based costing cannot be used by service businesses.

- B. In comparison with traditional costing systems, activity based costing tends to use more cost pools and more cost drivers.
 - C. In comparison with traditional costing systems, activity based costing results in less cost averaging of various diversified activities.
 - D. In comparison with traditional-costing systems, activity based costing results in more costs being classified as direct costs.
47. Which of the following is least likely to be classified as a batch level activity in an activity based costing system?
- A. Quality assurance
 - B. Receiving and inspection
 - C. Property taxes
 - D. Production set-up

Answer:

1-D; 2-C; 3-C; 4-A; 5-D; 6-B; 7-D; 8-A; 9-B; 10-B; 11-D; 12-D; 13-B; 14-C; 15-D; 16-C; 17-D; 18-B; 19-C; 20-C; 21-D; 22-B; 23-B; 24-D; 25-D; 26-C; 27-B; 28-D; 29-A; 30-A; 31-D; 32-D; 33-B; 34-A; 35-B; 36-C; 37-A; 38-B; 39-B; 40-A; 41-D; 42-A; 43-A; 44-D; 45-C; 46-A; 47-C.

⊙ **State True or False**

1. The purpose of moving from a traditional costing system to an ABC system must therefore be based on the premise that the new information provided will lead to action that will increase the overall profitability of the business.
2. Traditional product costing systems were designed when most of the companies manufactured a narrow range of products.
3. Activities comprise of units of work or tasks.
4. Unit-level activities (also known as volume-related activities) are performed each time a unit of the product or service is produced.
5. The term cost pools are used to describe a location to which overhead costs are initially assigned.
6. An ABC analysis cannot reveal the cost of each activity within an organization.
7. ABC recognizes the increased complexity of modern businesses with its multiple cost drivers, many of which are transaction based rather than volume based.
8. ABC tends to burden low-volume (new) products with a punitive level of overhead costs and hence threatens opportunities for successful innovation if it is used without due care.
9. ABC is not a complement to Total Quality Management (TQM) and it provides quantitative data that can track the financial impact of improvements implemented as part of the TQM initiative.
10. Activity based costing is not expensive to implement.

Answer:

1-True; 2-True; 3-True; 4-True; 5-True; 6-False; 7-True; 8-True; 9-False; 10-False;

⊙ **Fill in the Blanks**

1. Designing products activity is not a
2. LG an appliance manufacturer is developing a new line of ovens that uses controlled-laser technology. Research and testing costs associated with the new ovens is said to arise from a.....
3. Costs that are caused by a group of things being made or processed at a single time are referred to as.....
4. Activity-based costing uses
5. An item for which cost measurement is required in ABC is called.....
6. A method of allocating indirect costs to cost objects that correlate a product's consumption of overhead resources with the number of units produced is known as.....
7. A two-stage cost assignment assigns resource costs to activity and then to
8. Value-added activities- for which are willing to pay.
9. Basic types of cost pool allocations include.....
10. A activity supports the production of a specific product or service.

Answer:

1-Batch level activities; 2-Product sustaining activities; 3-Batch level cost; 4-Multiple activity rates; 5-Cost object; 6-Volume based cost drivers; 7-Cost pools, cost objects; 8-Customers; 9-Allocation of costs to segments, products & services; 10-Product - level.

⊙ **Short Essay Type Questions**

1. What is the main purpose of Activity-Based Costing (ABC)?
2. What are the benefits of activity based costing?
3. What is a 'Cost Driver'? What is the role of cost driver in tracing cost to products?
4. How to calculate activity-based overhead rate?
5. What is an activity center?
6. Describe the ABC cost hierarchy.
7. Distinguish between resource cost drivers and activity cost drivers.
8. Give two examples for each of the following categories in activity based costing:
 - (i) Unit Level activities
 - (ii) Batch Level activities
 - (iii) Product Level activities
 - (iv) Facility Level activities

⊙ **Essay Type Questions**

1. Explain the concept of activity based costing. How ABC system supports corporate strategy?
2. What are the areas in which activity based information is used for decision making?
3. What is the fundamental difference between Activity Based Costing System (ABC) and Traditional Costing System? Why more and more organizations in both the manufacturing and non-manufacturing industries are adopting ABC?

4. Explain the concept of cost drivers and indicate what you will consider as cost drivers for the following business function: Research & development; and Customer service.
5. Differentiate between 'Value-added' and 'Non-value-added' activities in the context of Activity-based costing. Give examples of Value-added and Non-value-added activities.
6. How do managers use ABC systems to price goods or services?
7. Discuss the steps in applying Activity Based Costing?
8. How are activities grouped in a manufacturing company?
9. Distinguish between Traditional Costing System and Activity Based Costing.
10. What factors led to the emergence of ABC systems?
11. Describe the circumstances when traditional costing systems are likely to report distorted costs.
12. Describe each of the four stages involved in designing ABC systems.
13. The traditional methods of cost allocation, cost apportionment and absorption into products are being challenged by some writers who claim that much information given to management is misleading when these methods of dealing with fixed overheads are used to determine product costs. You are required to explain what is meant by cost allocation, cost apportionment and absorption and to describe briefly the alternative approach of activity-based costing in order to ascertain total product costs.
14. (a) Why are conventional product costing systems more likely to distort product costs in highly automated plants? How activity does based costing deal with such a situation?
(b) 'Attributing direct costs and absorbing overhead costs to the product/service through an activity-based costing approach will result in a better understanding of the true cost of the final output.' You are required to explain and comment on the above statement.

Practical Problems

⊙ Multiple Choice Questions:

1. A company makes two products using the same type of materials and skilled workers. The following information is available:

Particulars	Product A	Product B
Budgeted volume (units)	1,000	2,000
Material per unit (₹)	10	20
Labour per unit (₹)	5	20

Fixed costs relating to material handling amount to ₹1,00,000. The cost driver for these costs is the volume of material purchased.

General fixed costs, absorbed on the basis of labour hours, amount to ₹1,80,000.

Using activity-based costing, what is the total fixed overhead amount to be absorbed into each unit of product B (to the nearest whole ₹) ?

- A. ₹113
- B. ₹120
- C. ₹40
- D. ₹105

2. A company uses traditional standard costing system. The inspection and set-up costs are actually ₹1,760 against a budget of ₹2,000. ABC system is being implemented and accordingly the number of batches is identified as the cost driver for inspection and set up. The budgeted production is 10,000 units in batches of 1,000 units whereas actually 9,000 units were produced in 11 batches. The cost per batch under ABC system will be
 - A. ₹160
 - B. ₹200
 - C. ₹180
 - D. ₹220

3. X Company uses activity-based costing for Product B and Product D. The total estimated overhead cost for the parts administration activity pool was ₹5,50,000 and the expected activity was 2000 part types. If Product D requires 1200 part types, the amount of overhead allocated to product D for parts administration would be:
 - A. ₹2,75,000
 - B. ₹3,00,000
 - C. ₹3,30,000
 - D. ₹3,45,000

4. Fast Ltd. manufactures three types of products A, B, and C following ABC System. During a period, the company incurred ₹73,000 as inspection cost and it was worked for 10, 20 and 9 production runs respectively for producing products A, B, and C. The inspection costs for product B under the ABC system was:
 - A. ₹ 15,000
 - B. ₹ 40,000
 - C. ₹ 18,000
 - D. ₹ 24,000

5. A company manufactures and sells packaging machines. It recently introduced activity-based costing to refine its existing system. Each packaging machine requires direct materials costs of ₹50,000; 50 equipment parts; 12 machine hours; 15 assembly line hours and 4 inspection hours. The details about the cost pools, allocation bases and allocation rates are given below:

Indirect cost pool	Cost allocation base	Budgeted allocation rate
Material handling	No. of component parts	₹8 per part
Machining	Machine hours	₹68 per machine hour
Assembly	Assembly line hours	₹75 per assembly hour
Inspection	Inspection hours	₹104 per inspection hour

The company has received an order for 40 can-packaging machines from a customer. Using activity-based costing, indirect costs allocated to the order of the customer would be:

- A. ₹1,30,850
- B. ₹1,25,280
- C. ₹1,15,050
- D. ₹1,10,280

6. A company operates an activity based costing (ABC) system to attribute its overhead costs to cost objects. In its budget for the year-ending 31st August, 2022. The company expected to place a total of 2000 purchase orders at a total cost of ₹1,00,000. This activity and its related costs were budgeted to occur at a constant rate throughout the budget year which is divided into 13 four week periods.

During the four-week period ended 30th June 2021, a total of 200 purchase orders were placed at a cost of ₹ 9,000. The over recovery of these costs for the four-week period was

- A. ₹ 2,000
 B. ₹ 3,000
 C. ₹1,500
 D. ₹ 1,000
7. The following information relate to ABC

Activity level	60%	80%
Variable costs (₹)	12,000	16,000
Fixed costs (₹)	20,000	22,000

The differential cost for 20% capacity is

- A. ₹4,000
 B. ₹2,000
 C. ₹6,000
 D. ₹5,000
8. A company manufactures 500 units of product AX the material cost to manufacture is ₹ 1,50,000, Labour cost ₹2,65,000. Material reordering cost is ₹4,500, Material handling cost is ₹2,500 Material order – 35, Material movement – 20.

Total Material cost under Activity based costing is.

- A. ₹554
 B. ₹4,22,000
 C. ₹1,57,000
 D. ₹1,084

Answer:

1-B; 2-B; 3-C; 4-B; 5-D; 6-D; 7-C; 8-C.

⊙ **Comprehensive Numerical Questions**

1. Quality Ltd. is engaged in production of three types of ice-cream products: Coco, Strawberry and Vanilla. The company presently sells 50,000 units of Coco @ ₹ 25 per unit, Strawberry 20,000 @ ₹ 20 per unit and Vanilla 60,000 units @ ₹ 15 per unit. The demand is sensitive to selling price it has been observed that every reduction at ₹ 1 per unit in selling price increases the demand for each product by 10% to the previous level. The company has the production capacity of 60,500 units of Coco, 24,200 units of Strawberry and 72,600 units of Vanilla. The company marks up 25% on cost of the product.

The Company management decides to apply ABC analysis. For this purpose, it identifies four activities and the rate as follows:

Activity	Cost Rate
Ordering	₹ 800 per purchase order
Delivery	₹ 700 per delivery
Shelf stocking	₹ 199 per hour
Customer support and assistance	₹ 1.10 p.u sold

The other relevant information for the products are as follows:

Particulars	Coco	Strawberry	Vanilla
Direct Material p.u (₹)	8	6	5
Direct Labour p.u (₹)	5	4	3
No. of Purchase Orders	35	30	15
No. of Deliveries	112	66	48
Shelf Stocking Hours	130	150	160

Under the traditional costing system, store support costs are charged @ 30% of prime cost. In ABC these costs are coming under customer support and assistance.

- A. Calculate the total cost and unit cost of each product at the maximum level using traditional costing.
 - B. Calculate the total cost and unit cost of each product at the maximum level using activity based costing.
 - C. Compare the cost of each product calculated in (1) and (2) above and comment on it.
2. Analyst Ltd. makes a single product with the following details:

Description	Current Situation	Proposed Change
Selling Price (₹/unit)	10	
Direct Costs (₹/unit)	5	
Present number of setups per production period, (before each production run, setup is done)	42	
Cost per set-up (₹)	450	Decrease by ₹90
Production units per run	960	1,008
Engineering hours for production per period	500	422
Cost per engineering hour (₹)	10	

The company has begun Activity Based Costing of fixed costs and has presently identified two cost drivers, viz. production runs and engineering hours. Of the total fixed costs presently at ₹ 96,000, after the above, ₹ 72,100 remains to be analyzed. There are changes as proposed above for the next production period for the same volume of output. Required:

- (i) How many units and in how many production runs should Catalyst Ltd. produce in the changed scenario in order to break-even?
 - (ii) Should Analyst Ltd. continue to break up the remaining fixed costs into activity based costs? Why?
3. M Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed CMA has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (₹)
Stores Receiving	Purchase Requisitions	2,96,000
Inspection	Number of Production Runs	8,94,000
Dispatch	Orders Executed	2,10,000
Machine Set-up	Number of Set-up	12,00,000

The following information is also supplied:

Particulars	Product A	Product B	Product C
No. of Set-up	360	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	50	1,050	1,200
No. of Purchase Requisitions	300	450	500

Calculate activity based production cost of all the three products.

4. Zee Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	P	Q	R
Machine hours per unit	10	18	14
Direct Labour hours per unit @ 20	4	12	8
Direct Material per unit (₹)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is ₹6 per hour. The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analyzed as under:

Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

- Calculate the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.
- Calculate the cost per unit of each product using activity based costing principles.

5. Lime Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

Particulars	₹
Machine Department expenses	18,48,000
Assembly Department expenses	6,72,000
Set-up costs	90,000
Stores receiving cost	1,20,000
Order processing and dispatch	1,80,000
Inspect and Quality control cost	36,000

The data related to the three products during the period is as under:

Particulars	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked (hrs.)	30,000	48,000	54,000
Assembly hours worked (direct labour hours)	15,000	-	27,000
Customers orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40	30	50

Required:

Prepare a statement showing details of overhead costs allocated to each product type using activity based costing.

6. A company produces four products, viz. P, Q, R and S. The data relating to production activity are as under

Product	Quantity of production	Material cost/ unit (₹)	Direct labour hours/unit	Direct Labour cost/unit (₹)	Machine hours/unit
P	1,000	10	1	6	0.50
Q	10,000	10	1	6	0.50
R	1,200	32	4	24	2.00
S	14,000	34	3	18	3.00

Production overheads are as under:	₹
(i) Overheads applicable to machine oriented activity	1,49,700
(ii) Overheads relating to ordering materials	7,680
(iii) Set-up costs	17,400
(iv) Administration overheads for spare parts	34,380
(v) Material handling costs	30,294

The following further information has been compiled:

Product	No. of set -up	No. of materials orders	No. of times materials handled	No. of spare parts
P	3	3	6	6
Q	18	12	30	15
R	5	3	9	3
S	24	12	36	12

Required:

- (i) Select a suitable cost driver for each item of overhead expense and calculate the cost per unit of cost driver.
 - (ii) Using the concept of activity based costing, compute the factory cost per unit of each product.
7. The cost accountant of XYZ Manufacturing attended a workshop on activity-based costing and was impressed by the results. After consulting with the production personnel, he prepared the following information on cost drivers and the estimated volume for each driver:

Products	A	B	C	Total
Units produced	25,000	15,000	5,000	45,000
Direct materials Cost Per Unit in ₹	40.0	30.0	55.0	
Direct labour in ₹	15.0	15.0	15.0	

Cost driver	Cost driver volume			
	A	B	C	Total
Number of setups	125	75	50	250
Machine Hours	2,500	1,500	2,000	6,000
Direct labour hours	25,000	15,000	5,000	45,000
Number of Inspection	50	25	25	100

The cost accountant also determined how much overhead costs were incurred in each of the four activities as follows:

Activity	Overhead costs in ₹
Machining- Set-up	1,50,000
Machining	7,50,000
Assembly	3,60,000
Inspection	90,000

Required:

- (i) Determine the cost driver rate for each activity cost pool.
- (ii) Use the activity-based costing method to determine the unit cost for each product.

8. The information and data in the following tables will be used to determine cost drivers and calculate overheads.

Product X	Product Y	Product Z
High volume	Medium volume	Low volume
Large batches	Medium batches	Small batches
Few purchase orders placed	Medium purchase orders placed	Many purchase orders placed
	Medium components	Many components
Few customer orders placed	Medium customer orders placed	Many customer orders placed

	Product X	Product Y	Product Z	Total
Typical batch size	2,000	600	325	
No. of production runs	25	50	50	125
No. of inspections	25	50	50	125
Purchase orders placed	25	100	200	325
Customer orders received	10	100	200	310
Analysis of indirect labour	₹000	Total	₹000	

Machining:

Supervision	100	
Set-up	400	
Quality control	400	900
Assembly:		
Supervision	200	
Quality control	400	600
Purchasing/order processing:		
Resource procurement	300	
Customer liaison/expediting	300	600
Factory management:		
General administration	100	2,200

Prepare an ABC analysis and calculate product costs.

9. Blue Star Company manufactures two products, Deluxe and Regular, and uses a traditional two-stage cost allocation system. The first stage assigns all factory overhead costs to two production departments A and B, based on machine-hours. The second stage uses direct labour-hours to allocate overhead to individual products.

For 2022, the firm budgeted ₹10,00,000 total factory overhead cost for these operations.

Particulars	Production Department A	Production Department B
Machine-hours	4,000	16,000
Direct labour-hours	20,000	10,000

The following information relates to the firm's operations for the month of January:

Particulars	Deluxe	Regular
Units produced and sold	200	800
Unit cost of direct materials	₹100	₹50
Hourly direct labour wage rate	₹25	₹20
Direct labour-hours in Department A per unit	2	2
Direct labour-hours in Department B per unit	1	1

The Company is considering implementing an activity-based costing system. Its management accountant has collected the following information for activity cost analysis for 2022:

Activity	Budgeted Overheads (₹)
Material movement	7,000
Machine setups	400,000
Inspections	588,000
Shipment	5,000
	10,00,000

Particulars	Budgeted Quantity	Driver Consumption	
		Deluxe	Regular
Number of production runs	350	15	20
Number of setups	500	25	50
Number of units	19,600	200	800
Number of shipments	250	50	100

Required

- (i) Calculate the unit cost for each of the two products under the existing volume-based costing system.
 - (ii) Calculate the overhead per unit of the cost driver under the proposed ABC system.
 - (iii) Calculate the unit cost for each of the two products if the proposed ABC system is adopted.
10. Company ABC has the following information applicable to its products:

Total Overheads = ₹1,00,000

Total machine Hours = 50,000

Product	A	B
Units of Production	2,500	5,000
Material Cost per/unit (₹)	30	50
Labour Cost per unit (₹)	20	16
Machine Hrs. Per/unit	10	5

Particulars	Percentage Overheads (%)
Set-up Costs	35
Inspections	45
Materials Handling	20

Particulars	A	B	Total
No. of Set-up	300	50	350
No. of Inspections	500	250	750
No. of Movements of Goods	300	700	1000

What is the Cost per unit of A and B?

- (i) Under Traditional Absorption Costing.
- (ii) Under ABC.

⊙ Unsolved Cases

1. You have recently been employed by STU Ltd. as their Management Accountant. The senior partner, Mr. X, has doubts about the usefulness of the figures produced by the previous accountant. He has heard that Activity Based Costing (ABC) may be an appropriate system for the firm to adopt.

In response to the request from Mr. X, you are required to prepare a brief report on how Activity Based Costing System (ABC) works and what benefits the company can expect from introducing the ABC system. Explain with the help of a simple illustration.

2. ABC Industries manufactures Industrial tools after creating a mould for each newly designed tool. ABC Industries inspects every unit during the trial run of a new mould and 10 percent of the units manufactured in the first three batches.

Some of the activities of the firm are as under:

- a. Designing moulds
- b. Creating moulds
- c. Inspecting moulds
- d. Modifying moulds
- e. Setting up production
- f. Requesting and moving materials
- g. Machining
- h. Insuring equipment
- i. Paying suppliers
- j. Heating the factory

You are a newly appointed Cost Accountant, having knowledge in ABC approach, are requested by the Managing Director to classify the above activities into unit-level, batch-level, product-level or facility-level activity and also to identify a proper cost driver for each activity.

Key Terms:

Activity - based costing (ABC) is a costing approach that assigns resource costs to cost objects based on activities performed for the cost objects.

A two - stage cost assignment assigns resource costs to activity cost pools and then to cost objects.

An activity is a specific task or action of work done.

A resource is an economic element needed or consumed in performing activities.

A resource consumption cost driver is a measure of the amount of resources consumed by an activity.

An activity consumption cost driver measures how much of an activity a cost object uses.

A unit- level activity is performed for each unit of the cost object.

A batch- level activity is performed for each batch or group of products or services.

A product- level activity supports the production of a specific product or service.

A facility- level activity supports operations in general.

Batch- related activities- Activities that are performed each time a batch of goods is produced.

Business- sustaining activities- Activities performed to support the organization as a whole, also known as facility-sustaining activity.

Consumption ratio-the proportion of each activity consumed by a product.

Facility-sustaining activities- Activities performed to support the organization as a whole, which are normally not affected by a decision that is to be taken. It is also known as business-sustaining activities.

Resource cost driver- A cause-and-effect cost driver used to allocate shared resources to individual activities.

Volume-based cost drivers- A method of allocating indirect costs to cost objects that correlate a product's consumption of overhead resources with the number of units produced.

Value-added activities- for which customers are willing to pay.

Non-value added activities- for which customers are not willing to pay.

