# CHAPTER-5
# ACTIVITY BASED COSTING

**Q1.** **[SMN1]** ABC Ltd. is a multiproduct company, manufacturing three products A,B and C. The budgeted costs and production for the year ending 31st March, 20X8 are as follows:

| | A | B | C |
|---|---|---|---|
| Production quantity (Units) | 4,000 | 3,000 | 1,600 |
| Resources per Unit: | | | |
| - Direct Materials (Kg.) | 4 | 6 | 3 |
| - Direct Labour (Minutes) | 30 | 45 | 60 |

The budgeted direct labour rate was Rs.10 per hour, and the budgeted material cost was Rs. 2 per kg. Production overheads were budgeted at Rs.99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed an Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

**1. Budgeted overheads were analysed into the following:**

| | Rs. |
|---|---|
| Material handling | 29,100 |
| Storage costs | 31,200 |
| Electricity | 39,150 |

**2. The cost drivers identified were as follows:**

| | |
|---|---|
| Material handling | Weight of material handled |
| Storage costs | Number of batches of material |
| Electricity | Number of Machine operations |

**3. Data on Cost Drivers was as follows:**

| | A | B | C |
|---|---|---|---|
| For complete production: | | | |
| Batches of material | 10 | 5 | 15 |
| Per unit of production: | | | |
| Number of Machine operators | 6 | 3 | 2 |

You are requested to:

1. Prepare a statement for management showing the unit costs and total costs of each product using the absorption costing method.
2. Prepare a statement for management showing the product costs of each product using the ABC approach.
3. What are the reasons for the different product costs under the two approaches?

**Q2.** **[SMN2]**MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

| Activity | Cost Driver | Capacity | Cost |
|---|---|---|---|
| Power | Kilowatt hours | 50,000 kilowatt hours | Rs.2,00,000 |
| Quality Inspections | Number of Inspections | 10,000 Inspections | Rs.3,00,000 |

The company makes three products M, S and T. For the year ended March 31, 20X4, the following consumption of cost drivers was reported:

| Product | Kilowatt hours | Quality Inspections |
|---|---|---|
| M | 10,000 | 3,500 |
| S | 20,000 | 2,500 |
| T | 15,000 | 3,000 |

**Required:**

(i) Compute the costs allocated to each product from each activity.

(ii) Calculate the cost of unused capacity for each activity.

(iii) Discuss the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate. **[R-M-19/4]**

**Q3.** **[SMN3]**ABC Ltd. Manufactures two types of machinery equipment Y and Z and applies/absorbs overheads on the basis of direct-labour hours. The budgeted overheads and direct-labour hours for the month of December, 20X6 are Rs.12,42,500 and 20,000 hours respectively. The information about Company's products is as follows:

| | Equipment | Equipment |
|---|---|---|
| | Y | Z |
| Budgeted Production volume | 2,500 units | 3,125 units |
| Direct material cost | Rs.300 per unit | Rs.450 per unit |
| Direct labour cost | | |
| Y : 3 hours @ Rs.150 per hour | Rs.450 | |
| X : 4 hours @ Rs.150 per hour | | Rs.600 |

ABC Ltd.'s overheads of Rs.12,42,500 can be identified with three major activities:

Order Processing (Rs.2,10,000), machine processing (Rs.8,75,000), and product inspection (Rs.1,57,500). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

| | Orders processed | Machine hours Worked | Inspection hours |
|---|---|---|---|
| Y | 350 | 23,000 | 4,000 |
| Z | 250 | 27,000 | 11,000 |
| Total | 600 | 50,000 | 15,000 |

**Required:**

(i) Assuming use of direct-labour hours to absorb/apply overheads to production, compute the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.

(ii) Assuming use of activity-based costing, compute the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.

(iii) ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, calculate the amount of cost distortion (under-costed or over costed) for each equipment. **[INTER/M19/3(B)-Similar]**

**Q4.** **[SMP1]**RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

(i) General Supermarket Chains
(ii) Drugstore Chains
(iii) Chemist Shops

The following data for the month of April, 20X7 in respect of RST Limited has been reported:

| | General Supermarket Chains (Rs.) | Drugstore Chains (Rs.) | Chemist Shops (Rs.) |
|---|---|---|---|
| Average revenue per Delivery | 84,975 | 28,875 | 5,445 |
| Average cost of goods sold per delivery | 82,500 | 27,500 | 4,950 |
| Number of deliveries | 330 | 825 | 2,750 |

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity –based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

| Activity Area | Cost Driver |
|---|---|
| Customer purchase order processing | Purchase orders by customers |
| Line-item ordering | Line-items per purchase order |
| Store delivery | Store deliveries |
| Cartons dispatched to stores | Cartons dispatched to a store per delivery |
| Shelf-stocking at customer store | Hours of shelf-stocking |

The April, 20X7 operating costs (other than cost of goods sold) of RST Limited are Rs. 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 20X7 are as follows:

| Activity Area | Total costs in April, 20X7 (Rs.) | Total Units of Cost Allocation Base used in April, 20X7 |
|---|---|---|
| Customer purchase order processing | 2,20,000 | 5,500 orders |
| Line-item ordering | 1,75,560 | 58,520 line items |
| Store delivery | 1,95,250 | 3,905 store deliveries |
| Cartons dispatched to store | 2,09,000 | 2,09,000 cartons |
| Shelf-stocking at customer store | 28,160 | 1,760 hours |

**Other data for April, 20X7 include the following:**

| | General Supermarket Chains | Drugstore Chains | Chemist Shops |
|---|---|---|---|
| Total number of orders | 385 | 990 | 4,125 |
| Average number of line items per Order | 14 | 12 | 10 |
| Total number of store deliveries | 330 | 825 | 2,750 |
| Average number of cartons shipped per store delivery | 300 | 80 | 16 |
| Average number of hours of shelf stocking per store delivery | 3 | 0.6 | 0.1 |

**Required:**

(i) Compute for April, 20X7 gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.

(ii) Compute the April, 20X7 rate per unit of the cost-allocation base for each of the five activity areas.

(iii) Compute the operating income of each distribution channel in April, 20X7 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?

(iv) Describe four challenges one would face in assigning the total April, 20X7 operating costs of Rs.8,27,970 to five activity areas.

**Q5.** **[SMP2]**Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at Rs.90 per case and sells to retail customers at a list price of Rs.108 per case. The data pertaining to five customers are:

| | Customers | | | | |
|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** |
| Cases sold | 4,680 | 19,688 | 1,36,800 | 71,550 | 8,775 |
| List Selling Price | Rs.108 | Rs.108 | Rs.108 | Rs.108 | Rs.108 |
| Actual Selling Price | Rs.108 | 106.20 | Rs.99 | Rs.104.40 | Rs.97.20 |
| Number of Purchase orders | 15 | 25 | 30 | 25 | 30 |
| Number of Customer visits | 2 | 3 | 6 | 2 | 3 |
| Number of deliveries | 10 | 30 | 60 | 40 | 20 |
| Kilometers travelled per delivery | 20 | 6 | 5 | 10 | 30 |
| Number of expedited deliveries | 0 | 0 | 0 | 0 | 1 |

Its five activities and their cost drivers are:

| Activity | Cost Driver Rate |
|---|---|
| Order taking | Rs.750 per purchase order |
| Customer visits | Rs.600 per customer visit |
| Deliveries | Rs.5.75 per delivery Km travelled |
| Product handling | Rs.3.75 per case sold |
| Expedited deliveries | Rs.2,250 per expedited delivery |

**Required:**

(i) Compute the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.

(ii) What insights are gained by reporting both the list selling price and the actual selling price for each customer? **[INTER/N19/2(A)-Similar]**

**Q6.** PQR Pens Ltd. manufactures two products – 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

| Product | Annual Output (Units) | Total Machine Hours | Total number of purchase orders | Total number of set-ups |
|---|---|---|---|---|
| Gel Pen | 5,500 | 24,000 | 240 | 30 |
| Ball Pen | 24,000 | 54,000 | 448 | 56 |

**The annual overheads are as under :**

| Particulars | Rs. |
|---|---|
| Volume related activity costs | 4,75,020 |
| Set up related costs | 5,79,988 |
| Purchase related costs | 5,04,992 |

Calculate the overhead cost per unit of each Product – Get Pen and Ball Pen on the basis of :

(i) Traditional method of charging overheads

(ii) Activity based costing method and

(iii) Find out the difference in cost per unit between both the methods. **[INTER-M18/4(A)][M-10]**

**Q7.** G-2020 Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

| Particulars | Product A | Product B | Product C | |
|---|---|---|---|---|
| Direct Materials | 50 | 40 | 40 | Rs./u |
| Direct Labour @ Rs. 10/ hour | 30 | 40 | 50 | Rs./u |
| Production Overheads | 30 | 40 | 50 | Rs./u |
| Total Cost | 110 | 120 | 140 | Rs./u |
| Quantity Produced | 10,000 | 20,000 | 30,000 | Units |

G-2020 Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant 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 (Rs.) |
|---|---|---|
| Stores Receiving | Purchase Requisitions | 2,96,000 |
| Inspection | Number of Production Runs | 8,94,000 |
| Dispatch | Orders Executed | 2,10,000 |
| Machine Setup | Number of Setups | 12,00,000 |

The following information is also supplied:

| Details | Product A | Product B | Product C |
|---|---|---|---|
| No. of Setups | 360 | 390 | 450 |
| No. of Orders Executed | 180 | 270 | 300 |
| No. of Production Runs | 750 | 1,050 | 1,200 |
| No. of Purchase Requisitions | 300 | 450 | 500 |

**Required** CALCULATE activity based production cost of all the three products. **[R-M18/4]**

# ADDITIONAL QUESTIONS FOR PRACTICE

**Q8.** **(C1)**Biscuit Lit. Manufactures 3 types of biscuits, A, B, and C, in a fully mechanized factory. The company has been following conventional method of costing and wishes to shift to Activity Based Costing System and therefore wishes to have the following data presented under both the systems for the month.

| | | |
|---|---|---|
| Inspection cost | Rs p.m. | 73,000 |
| Machine Repairs & Maintenance | Rs p.m. | 1,42,000 |
| Dye cost | Rs p.m. | 10,250 |
| Selling overheads | Rs p.m. | 1,62,000 |

| **Product** | **A** | **B** | **C** |
|---|---|---|---|
| Prime Cost (Rs per unit) | 12 | 9 | 8 |
| Selling Price (Rs per unit) | 18 | 14 | 12 |
| Gross Production (units/production run) | 2,520 | 2,810 | 3,010 |
| No. of defective units/production run | 20 | 10 | 10 |
| Inspection: | | | |
| No. of hours/Production run | 3 | 4 | 4 |
| Dye cost/Production run (Rs) | 200 | 300 | 250 |
| No. of machine hours/production run | 20 | 12 | 30 |
| Sales – No. of units/month | 25,000 | 56,000 | 27,000 |

The following additional information is given:

(i) No accumulation of inventory is considered. All good units produced are sold.

(ii) All manufacturing and selling overheads are conventionally allocated on the basis of units sold.

(iii) Product A needs no advertisement. Due to its nutritive value, it is readily consumed by diabetic Patients of a hospital. Advertisement cost in included in the total selling overhead is Rs 83,000

(iv) Product B needs to be specially packed before being sold, so that it meets competition. Rs 54,000 was the amount spent for the month in specially packing B, and this has been included in the total selling overhead cost given.

You are required to present product wise profitability of statements under the conventional system and the ABC system and accordingly rank the products.

**Q9.** **(C2)**AML Ltd. is engaged in production of three types of icecream products: Coco, Strawberry and Vanilla.

The company presently sells 50,000 units of Coco @ Rs 25 per unit, Strawberry 20,000 @ Rs 20 per unit and Vanilla 60,000 units @ Rs 15 per units. The demand is sensitive to selling price and it has been observed that every reduction of Rs 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, 24200 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 rates as follows:

| Activity | Cost Rate |
|---|---|
| Ordering | Rs 800 per purchase order |
| Delivery | Rs 700 per delivery |
| Shelf stocking | Rs 199 per hour |

Customer support and assistance Rs 1.10 per unit sold.

The other relevant information for the products are as follows:

| | Coco | Strawberry | Vanilla |
|---|---|---|---|
| Direct Material per unit (Rs) | 8 | 6 | 5 |
| Direct Labour per unit (Rs) | 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 cost are changed @ 30% of prime cost. In ABC these costs are coming under customer support and assistance.

**Required:**

(i) Calculate target cost for each product after a reduction of selling price required to achieve the sales equal to the production capacity.

(ii) Calculate the total cost and unit cost of each product at the maximum level using traditional costing.

(iii) Calculate the total cost and unit cost of each product at the maximum level using activity based costing.

(iv) Compare the cost of each product calculated in (i) and (ii) with (iii) and comment on it.

**Q10.** **(C3)** Computo Ltd. manufactures two parts 'P' and 'Q' for Computer Industry.

P: annual production and sales of 1,00,000 units at a selling price of Rs 100.05 per unit.

Q: annual production and sales of 50,000 units at a selling price of Rs 150 per unit.

| | P | Q | Total |
|---|---|---|---|
| Direct Material cost (variable) | 4,200 | 3,000 | 7,200 |
| Labour cost (variable) | 1,500 | 1,000 | 2,500 |
| Direct-Machining cost (See Note) | 700 | 550 | 1,250 |
| **Indirect Costs:** | | | |
| Machine set up cost | | | 462 |
| Testing cost | | | 2,375 |
| Engineering cost | | | 2,250 |
| | | | 16,037 |

**Note:** Direct machining costs represent the cost of machine capacity dedicated to the production of each product. These costs are fixed and are not expected to vary over the long-run horizon.

**Additional information is as following:**

| | P | Q |
|---|---|---|
| Production Batch Size | 1,000 units | 500 units |
| Set up time per batch | 30 hours | 36 hours |
| Testing time per unit | 5 hours | 9 hours |
| Engineering cost incurred on each product | 8.40 lacs | 14.10 lacs |

A foreign competitor has introduced product very similar to 'P'. To maintain the company's share and profit, Computo Ltd. has to reduce the price to Rs 86.25. The company calls for a meeting and comes up with a proposal to change design of product 'P'. The expected effect of new design is as follows:

- Direct Material cost is expected to decrease by Rs 5 per unit.
- Labour cost is expected to decrease by Rs 2 per unit.
- Machine time is expected to decrease by 15 minutes; previously it took 3 hours to produce 1 unit of 'P'. The machine will be dedicated to the production of new design.
- Set up time will be 28 hours for each set up.
- Time required for testing each unit will be reduced by 1 hour.
- Engineering cost and batch size will be unchanged.

***Required:***

(a) Company management identifies that cost driver for Machine set-up costs is 'set up hours used in batch setting' and for testing costs is 'testing time'. Engineering costs are assigned to products by special study. Calculate the full cost per unit for 'P and 'Q' using Activity-Based Costing.

(b) What is the Mark-up on full cost per unit of P?

(c) What is the Target cost per unit for new design to maintain the same mark up percentage on full cost per unit as it had earlier? Assume cost per unit of cost drivers for the new design remains unchanged.

(d) Will the new design achieve the cost reduction target?

(e) List four possible management actions that the Computo Ltd. should take regarding new design.

**Q11.** **(C4)** ABC electronics makes audio player model 'AB 100'. It has 80 components. ABC sells 10,000 units each month at Rs 3,000 per unit. The cost of manufacturing is Rs 2,000 per unit or Rs 200 lakhs per month for the production of 10,000 units. Monthly manufacturing costs incurred are as follows:

| | **(Rs Lakhs)** |
|---|---|
| Direct material costs | 100.00 |
| Direct manufacturing labour costs | 20.00 |
| Machining Costs | 20.00 |
| Testing Costs | 25.00 |
| Rework Costs | 15.00 |
| Ordering Costs | 0.20 |
| Engineering Costs | 19.80 |
| | 200.00 |

Labour is paid on piece rate basis. Therefore, ABC considers direct manufacturing labour cost as variable cost.
The following additional information is available for 'AB 100'

(i) Testing and inspection time per unit is 2 hours.
(ii) 10 per cent of 'AB 100' manufactured are reworked
(iii) It currently takes 1 Hour to manufacture each unit of 'AB 100'
(iv) ABC place two orders per month for each component. A different supplier supplies each component.

ABC has identified activity cost pools and cost drivers for each activity. The cost per unit of the cost driver for each activity cost pool is as follows:

| **Manufacturing Activity** | **Description of Activity** | **Cost driver** | **Cost per unit of cost driver** |
|---|---|---|---|
| 1. Machining costs | Machining components | Machine hours of | Rs 200 |
| 2. Testing costs | Testing components and finished products. (Each unit of 'AB 100' is tested individually) | Testing hours | Rs 125 |
| 3. Rework costs | Correcting and fixing errors and defects | Units of 'AB 100' reworked | Rs 1,500 per unit |
| 4. Ordering costs | Ordering of components | Number of orders | Rs 125 per order |
| 5. Engineering costs | Designing and managing of products and processes | Engineering hours | Rs 1980 per engineering hour |

Over long-run horizon, each of the overhead costs described above vary with chosen cost drivers. In response to competitive pressure ABC must reduce the price of its product to Rs 600 and to reduce the cost by at least Rs 400 per unit. ABC does not anticipate increase in sales due to price reduction. However, if it does not reduce price it will not be able to maintain the current sales level.

Cost reduction on the existing model is almost impossible. Therefore, ABC has decided to replace 'AB 100' by a new model 'AB 200', which is a modified versions of 'AB 100'. The expected effect of design modifications are as follows:

(i) The member of components will be reduced to 50.
(ii) Direct material costs to be lower by Rs 200 per unit.
(iii) Direct manufacturing labour costs to be lower by Rs 20 per unit.
(iv) Machining time required to be lower by 20 per cent.
(v) Testing time required to be lower by 20 per cent.
(vi) Rework to decline to 5 per cent.
(vii) Machining capacity and engineering hours capacity to remain the same.

ABC currently out sources the rework on defective units.

**Required:**

(i) Compare the manufacturing cost per unit of 'AB 100' and 'AB 200'.
(ii) Determine the immediate effect of design change and pricing decision on the operating to apply to AB 200'.

Ignore income tax. Assume that the cost per unit of each cost driver for 'AB 100 continues to apply to 'AB 200'.

**Q12. (C6)** MNP suits is a ready-to-wear suit manufacturer. It has four customers: two wholesale-channel customers and two retail-channel customers. MNP suits has developed the following activity-based costing system:

| Activity | Cost driver | Rate in 2008 |
|---|---|---|
| Order processing | Number of purchase orders | Rs 1,225 per order |
| Sales visits | Number of customer visits | Rs 7,150 per visit |
| Delivery-regular | Number of regular deliveries | Rs 1,500 per delivery |
| Delivery-rushed | Number of rushed deliveries | Rs 4,250 per delivery |

List selling price per suit is Rs. 1000 and average cost per suit is Rs. 550. The CEO of MNP suits wants to evaluate the profitability of each of the four customers in 2013 to explore opportunities for increasing profitability of his company is 2014. The following data are available for 2013:

| Item | Wholesale customers | | Retail customers | |
|---|---|---|---|---|
| | W | H | R | T |
| Total number of orders | 44 | 62 | 212 | 250 |
| Total number of sales visits | 8 | 12 | 22 | 20 |
| Regular deliveries | 41 | 48 | 166 | 190 |
| Rush deliveries | 3 | 14 | 46 | 60 |
| Average number of suits per order | 400 | 200 | 30 | 25 |
| Average selling price per suit | Rs. 700 | Rs. 800 | Rs. 850 | Rs. 900 |

***Required:***

(i) Calculate the customer-level operating income in 2013.

(ii) What do you recommend to CEO of MNP suits to do to increase the company's operating income in 2014?

(iii) Assume MNP Suits' distribution channel costs are Rs. 17,50,000 for its wholesale customers and Rs. 10,50,000 for the retail customers. Also, assume that its corporate sustaining costs are Rs. 12,50,000. Prepare income statement of MNP suits for 2013.

**Q13.** **(C7)** ABCD Co. Ltd. produces and sells four products, A, B, C and D. These products are similar and usually produced in production runs of 10 units and sold in a batch of 5 units.

**The production details of these products are as follows:**

| Product | A | B | C | D |
|---|---|---|---|---|
| Production (Units) | 100 | 110 | 120 | 150 |
| Cost per unit: | | | | |
| Direct material (Rs) | 30 | 40 | 35 | 45 |
| Direct labour (Rs) | 25 | 30 | 30 | 40 |
| Machine hour (per unit) | 5 | 4 | 3 | 4 |

**The production overheads during the period are as follows:**

| Particulars | | Rs. |
|---|---|---|
| Factory works expenses | 22,500 | |
| Stores receiving costs | 8,100 | |
| Machine set up costs | 12,200 | |
| Cost relating to quality control | 4,600 | |
| Material handling and dispatch | 9,600 | Rs. 57,000 |

**The cost drivers for these overheads are detailed below:**

| Cost | Cost Drivers |
|---|---|
| Factory works expenses | Machine hours |
| Stores receiving costs | Requisitions raised |
| Machine set up costs | No. of production runs |
| Cost relating to quality control | No. production runs |
| Material handling and dispatch | No. of orders Executed |

The number of requisitions raised on the stores was 25 for each product and number of orders executed was 96, each order was in a batch of 5 units.

***Required:***

(i) Calculate total cost of each product assuming the absorption of overhead on machine hour basis;

(ii) Calculate total cost of each product assuming the absorption of overhead by using activity based costing; and

(iii) Show the differences between (i)and (ii) and comment.

**Q14.** **(C8)** ABC Limited manufactures two radio models, the Nova which has been produced for five years and sells for Rs 900, and the Royal, a new model introduced in early 2013, which sells for Rs 1,140. Based on the following income statement for the year 2013-2014, a decision has been made to concentrate ABC Limited's marketing resources on the Royal model and to begin to phase out the Nova model.

**Income Statement Of ABC Limited For The Year Ending March 31, 2014**

| Particulars | Royal Model Rs | Nova Model | Total |
|---|---|---|---|
| Sales | 45,60,000 | 1,98,00,000 | 2,43,60,000 |
| Cost of Goods sold | 31,92,000 | 1,25,40,000 | 1,57,32,000 |
| Gross margin | 13,68,000 | 72,60,000 | 86,28,000 |
| Selling and Administrative Expenses | 9,78,000 | 58,30,000 | 68,08,000 |
| Net Income | 3,90,000 | 14,30,000 | 18,20,000 |
| Unit Produced and sold | 4,000 | 22,000 | |
| Net Income per unit sold | 97.50 | 65 | |

**The standard unit costs for the Royal and Nova models are as follows:**

| **Particulars** | **Royal Model Rs.** | **Nova Model Rs.** |
|---|---|---|
| Direct Materials | 584 | 208 |
| Direct Labour | | |
| Royal (3.5 hrs × Rs. 12) | 42 | |
| Nova (1.5 hrs × Rs. 12) | | 18 |
| Machine usage | | |
| Royal (4 hrs × Rs. 18) | 72 | |
| Nova (8 hrs × Rs. 18) | | 144 |
| Manufacturing overheads (applied on the basis of machine hours at a pre-determined rate of Rs 25 per hour) | 100 | 200 |
| Standard Cost | 798 | 570 |

ABC Ltd's Controller is advocating the use of activity-based costing and activity-based cost mangagement and has gathered the following information about the company's manufacturing overheads cost for the year ending March 31,2014.

| **Activity Centre (Cost driver)** | **Traceable** | **Number of Events** | | |
|---|---|---|---|---|
| | **Costs Rs.** | **Royal** | **Nova** | **Total** |
| Soldering (Number of solder joints) | 9,42,000 | 3,85,000 | 11,85,000 | 15,70,000 |
| Shipments (Number of shipments) | 8,60,000 | 3,800 | 16,200 | 20,000 |
| Quality control (Number of Shipments) | 12,40,000 | 21,300 | 56,200 | 77,500 |
| Purchase orders (Number of orders) | 9,50,400 | 1,09,980 | 80,100 | 1,90,080 |
| Machine Power (Machine hours) | 57,600 | 16,000 | 1,76,000 | 1,92,000 |
| Machine setups (Number of setups) | 7,50,000 | 14,000 | 16,000 | 30,000 |
| Total Traceable costs | 48,00,000 | | | |

***Required:***

(i) Prepare a Statement showing allocation of manufacturing overheads using the principles of activity-based costing.

(ii) Prepare a Statement showing product cost profitability using activity-based costing.

(iii) Should ABC ltd. continue to emphasize the Royal model and phase out the Nova Model? Discuss.

**Q15. (C9)** ABC Bank is examining the profitability of its Premier Account, a combined Savings and Current Account. Depositors receive a 7% annual interest on their average deposit. ABC Bank earns an interest rate spread of 3% (the difference between the rate at which it lends money and rate it pays to depositors) by lending money for home lone purpose at 10%

The Premier Account allows depositors unlimited use of services such as deposits, withdrawals, cheque facility, and foreign currency drafts. Depositors with Premier Account balances of Rs. 50,000 or more receive unlimited free use of services. Depositors with minimum balance of less than Rs. 50,000 pay Rs. 1,000-a-month service free for their Premier Account.

| | **Activity-Based Cost per Transaction** | **Account Usage** | | |
|---|---|---|---|---|
| | | **Customer X** | **Customer Y** | **Customer Z** |
| Deposits/withdrawal with teller | Rs. 125 | 40 | 50 | 5 |
| Deposits/withdrawal with Automatic teller machine (ATM) | Rs. 40 | 10 | 20 | 16 |
| Deposits/withdrawal on pre-arranged Monthly basis | Rs. 25 | 0 | 12 | 60 |
| Bank Cheques written | Rs. 400 | 9 | 3 | 2 |
| Foreign Currency drafts | Rs. 600 | 4 | 1 | 6 |
| Inquiries abouts Account balance | Rs. 75 | 10 | 18 | 9 |
| Average Premier Account balance For 2007-08 | | Rs. 55,000 | Rs. 40,000 | Rs. 12,50,000 |



Assume Customer X and Z always maintains a balance above Rs. 50,000, whereas Cutomer Y always has a balance below Rs. 50,000.

***Required:***

(i) Computer the profitability of the customers X, Y and Z Premier Account at ABC Bank.

(ii) What evidence is there of cross-subsidisation among the three Premier Accounts? Why might ABC Bank worry about this Cross-subsidisation, if the Premier Account product offering is profitable as a whole?

(iii) What changes would you recommend for ABC Bank's Premier Account?

**Q16.** **(C11)** A manufacturing organization has four different customers A, B, C and D. A single product is sold to them at different prices because of trade discount offered. Data is given for cost per unit of business activity. You are required to prepare customer profitability statement.

**Information On Four Customers**

| Customers | A | B | C | D |
|---|---|---|---|---|
| No. of units sold | 600 | 800 | 1,000 | 700 |
| Selling price | Rs. 25 | Rs. 25 | Rs. 25 | Rs. 25 |
| Trade Discount | Nil | 8% | 16% | 12% |
| No. of Sales Visits | 2 | 4 | 6 | 3 |
| No. of Purchase Orders | 30 | 20 | 40 | 20 |
| No. of Deliveries | 10 | 15 | 25 | 14 |
| Kilometers per Journey | 20 | 30 | 10 | 50 |
| No. of rush Deliveries | ..... | ..... | 1 | 2 |

| Activity | Cost each Activity |
|---|---|
| Sales visit | Rs. 210 per visit |
| Order placing | Rs. 60 per Order |
| Product handling | Rs. 10 per item |
| Normal delivery cost | Rs. 2 per kilometer |
| Rushed Delivery cost | Rs. 200 per delivery |

**Q17.** **(C12)** ABC Ltd. plans to use Activity Based Costing to determine it product costs. It presently, uses a single Plant wise Factory Overhead Rate for allocating Factory overhead to products, based on Direct Labour Hours. The total Factory Overhead Cost is as follows:

| Department | |
|---|---|
| Factory Overhead | |
| Product Support | Rs.12,25,000 |
| Production (Factory Overhead only) Rs. | 1,75,000 |
| Total Cost | Rs. 14,00,000 |

The Company determined that it preformed four major activities in the Production Support Department. These activities, along with their Budgeted Costs, are as follows:

| Production Support Activities | Budgeted Cost (Rs) |
|---|---|
| Set up | 4,28,750 |
| Production Control | 2,45,000 |
| Quality Control | 1,83,750 |
| Materials Management | 3,67,500 |
| Total | 12,25,000 |

**ABC Ltd. estimated the following Activity Base Usage Quantities and Units produced for each of its three products:**

| Products | No. of Units | Direct Labour Hours | Set ups | Production Orders | Inspections | Material |
|---|---|---|---|---|---|---|
| Product K | 10,000 | 25,000 | 80 | 80 | 35 | 320 |
| Product L | 2,000 | 10,000 | 40 | 40 | 40 | 400 |
| Product M | 50,000 | 1,40,000 | 5 | 5 | 0 | 30 |
| Total Cost | 62,000 | 1,75,000 | 125 | 125 | 75 | 750 |

***Required:***

(i) Determine the Factory Overhead Cost per Unit for products K, L and M under the single Plant wise Factory Overhead Rate Method. Use Direct Labour Hours as the Activity Base.

(ii) Determine the Factory Overhead Cost per Unit for products K, L and M under Activity Based Costing.

(iii) Which Method provides more accurate Product Costing? Why?

**Q18. (C13)** LM Company Limited manufactures three products – 'N', 'O' and 'P'. The company furnishes the following particulars for the year ending 31st March:

| | N | O | P |
|---|---|---|---|
| Output and Sales (units) | 15,000 | 12,000 | 5,000 |
| Selling Price per unit (Rs.) | 180 | 130 | 95 |
| Direct Material per unit (Rs.) | 60 | 40 | 35 |
| Direct Labour per unit (Rs.) (@ Rs. 20 per hr) | 80 | 60 | 40 |
| No. of purchase orders placed | 200 | 150 | 40 |
| No. of stores deliveries | 250 | 160 | 110 |
| No. of inspections | 260 | 150 | 140 |

The above three products are similar and usually produced in production runs of 50 units. The manufacturing overheads are currently absorbed by using a blanket overhead rate on the basis of direct labour hours for analyzing the whole factory. Now the company plans to use activity based costing system for the profitability of its products. The activity analysis and total overheads for the year of LM company ltd. are as under:

| Activity Area | Total Overheads (Rs) | Cost Driver |
|---|---|---|
| Material handling | 92,040 | No. of stores deliveries |
| Set-up | 1,22,240 | No. of production runs |
| Quality Control | 1,23,200 | No. of inspections |
| Material purchase ordering | 89,700 | No. of orders placed |
| Factory Control | 1,82,320 | Direct labour hours worked |

**You are required to:**

(a) Calculate the total cost and profit of each product by using direct labour hour rate method for absorption of manufacturing overheads.

(b) Calculate the total cost and profit of each product by using activity based costing system for absorption of manufacturing overheads

**Q19. (C14)** DEF Bank operated for years under the assumption that profitability can be increased by increasing Rupee volumes. But that has not been the case. Cost analysis has revealed the following:

| Activity | Activity Cost (Rs) | Activity Driver | Activity Capacity |
|---|---|---|---|
| Providing ATM service | 1,00,000 | No. of transactions | 2,00,000 |
| Computer processing | 10,00,000 | No. of transactions | 25,00,000 |
| Issuing | 8,00,000 | No. of statements | 5,00,000 |
| Issuing Statements | 3,60,000 | Telephone minutes | 6,00,000 |
| Customer inquiries | | | |

**The following annual information on three products was also made available:**

| | Checking Accounts | Personal Loans | Goid Visa |
|---|---|---|---|
| Units of product | 30,000 | 5,000 | 10,000 |
| ATM transactions | 1,80,000 | 0 | 20,000 |
| Computer transactions | 20,00,000 | 2,00,000 | 3,00,000 |
| Number of Statements | 3,00,000 | 50,000 | 1,50,000 |
| Telephone minutes | 3,50,000 | 90,000 | 1,60,000 |

**Required:**

(i) Calculate rates for each activity.

(ii) Using the rates computed in requirement (i), calculate the cost of each product.

**[MTP-MAR-18/1(D)]**

**Q20. (C15)**PQR Ltd. manufactures four products, namely A, B, C and D using the same plant and process. The following information relates to production period October:

| Product | A | B | C | D |
|---|---|---|---|---|
| Output in units | 1440 | 1200 | 960 | 1008 |
| Cost per unit: | | | | |
| Direct Materials | Rs. 42 | Rs. 45 | Rs. 40 | Rs. 48 |
| Direct Labour | Rs. 10 | Rs. 9 | Rs. 7 | Rs. 8 |
| Machine hours per unit | 4 | 3 | 2 | 1 |

The four products are similar and are usually produced in production runs of 48 units per batch and are sold in batches of 24 units. Currently, the production overheads are absorbed using machine hour rate. The production overheads incurred by the company for the period October are as follows:

| | Rs. |
|---|---|
| Machine department costs (rent, depreciation and supervision) | 1,26,000 |
| Set-up Costs | 40,000 |
| Store receiving costs | 30,000 |
| Inspection | 20,000 |
| Material handling and dispatch | 5,184 |

During the period October the following cost drivers are to be used for allocation of overheads cost:

| Cost | Cost Driver |
|---|---|
| Set-up Costs | Number of production runs (batches) |
| Stores receiving | Requisition raised |
| Inspection | Number of production runs (batches) |
| Material handling and dispatch | Orders executed |

**It is also determined that:**

(i) Machine department costs should be apportioned among set-up, stores receiving and inspection activities in proportion of 4 : 3 : 2.
(ii) The number of requisitions raised on stores are 50 for each product. The total number of material handling and dispatch orders executed during the period are 192 and each order being for a batch size of 24 units of product.

***Required:***

(i) Calculate the total cost of each product, if all overheads costs are absorbed on machine-hour rate basis.
(ii) Calculate the total cost of each product using activity-based costing.
(iii) Comment briefly on as to how an activity-based costing might benefit PQR Ltd.

**Q21.** A company manufactures three products namely A,B and C in a factory. The following cost data for the month of March, 20X8 are as under:

| **Activity** | **A** | **B** | **C** |
|---|---|---|---|
| Unit produced | 10,000 | 15,000 | 20,000 |
| Direct labour hour per unit | 3 | 4.5 | 4 |
| Machine hour per unit | 6 | 4 | 5 |
| Set-up of machines | 20 | 25 | 30 |
| Number of orders | 15 | 12 | 10 |
| Machine operating cost (Rs.) | | | 34,50,000 |
| Machine set-up cost (Rs.) | | | 4,36,000 |
| Order processing cost (Rs.) | | | 2,56,000 |

**Required:**

(i) IDENTIEY Cost pool, Cost drivers,
(ii) CALCULATE cost driver rate.
(iii) CALCULAT overheads rate per unit using activity-based costing method.

**Q22.** Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

| **Cost pool** | **Budgeted overheads (Rs.)** | **Cost driver** | **Budgeted volume** |
|---|---|---|---|
| Material procurement | 18,42,000 | No. of orders | 1,200 |
| Material handing | 8,50,000 | No. of Movement | 1,240 |
| Maintenance | 24,56,000 | Maintenance hours | 17,550 |
| Set-up | 9,12,000 | No. of set-ups | 1,450 |
| Quality control | 4,42,000 | No. of inspection | 1,820 |

The company has produced a batch of 7,600 units, its material cost was Rs. 24,62,000 and wages Rs. 4,68,500. Usage activities of the said batch are as follows:

| | |
|---|---|
| Material | 56 |
| Material handling | 84 |
| Maintenance hours | 1,420 hours |
| Set-ups | 60 |
| No. of inspections | 18 |

**Required:**

(i) CALCULATE cost driver rates.
(ii) CALCULATE the total and unit cost for the batch.

**Q23.** MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

| Activity | Cost Driver | Capacity | Cost(Rs.) |
|---|---|---|---|
| Power | Kilowatt hours | 50,000 kilowatt hours | 40,00,000 |
| Quality Inspections | Number of Inspections | 10,000 Inspections | 60,00,000 |

The company makes three products M, S and T. For the year ended March 31, 20X7, the following consumption of cost drivers was reported:

| Product | Kilowatt hours | Quality Inspections |
|---|---|---|
| M | 10,000 | 3,500 |
| S | 20,000 | 2,500 |
| T | 15,000 | 3,000 |

**Required:**

(i) Prepare a statement showing cost allocation to each product form each activity.
(ii) Calculate the cost of unused capacity for each activity.
(iii) State the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

**Q24.** M/s. HMB Limited is producing a product in 10 batches each of 15000 units in a year and incurring following overheads their on:

| | Amount(Rs.) |
|---|---|
| Material procurement | 22,50,000 |
| Maintenance | 17,30,000 |
| Set-up | 6,84,500 |
| Quality control | 5,14,800 |

The prime costs for the year amounted to Rs. 3,01,39,000.
The company is using currently the method of absorbing overheads on the basis of prime cost.
Now it wants to shift to activity based costing. Information relevant to Activity drivers for a year are as under:

| Activity Driver | Activity volume |
|---|---|
| No. of purchase orders | 1500 |
| Maintenance hours | 9080 |
| No. of set-ups | 2250 |
| No. of inspections | 2710 |

The company has produced a batch of 15000 units and has incurred Rs. 26,38,700 and Rs.3,75,200 on materials and wages respectively.
The usage of activities of the said batch are as follows:

| | |
|---|---|
| Material orders | 48 hours |
| Maintenance hours | 810 hours |
| No. of sets -ups | 40 |
| No. of inspections | 25 |

You are required to :

(i) Find out cost of product per unit on absorption costing basis for the said batch.
(ii) determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity based costing. **[INTER/N18/3(B)]**

**Q25.** SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the months of September 2019, using the absorption costing method has been prepared:

| Particulars | Product X (using machine A) | Product Y (using machine B) | Product Z (using machine C) |
|---|---|---|---|
| Production units | 45,000 | 52,500 | 30,000 |
| Material cost per unit (Rs.) | 350 | 460 | 410 |
| Wages per unit @ Rs. 80 per hour | 240 | 400 | 560 |
| Overhead cost per unit (Rs.) | 240 | 400 | 560 |
| Total cost per unit (Rs.) | 830 | 1,260 | 1,530 |
| Selling price (Rs.) | 1,037.50 | 1,575 | 1,912.50 |

The following additional information is available relating to overhead cost drivers.

| Cost Driver | Product X | Product Y | Product Z | Total |
|---|---|---|---|---|
| No. of machine set-ups | 40 | 160 | 400 | 600 |
| No. of purchase orders | 400 | 800 | 1,200 | 2,400 |
| No. of customers | 1,000 | 2,200 | 4,800 | 8,000 |

Actual production and budgeted production for the month is same. Workers are paid at standard rate. Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material ordering.

**Required:**

(i) COMPUTE overhead cost per unit using activity based costing method.

(ii) DETERMINE the selling price of each product based on activity-based costing with the same profit mark-up on cost. **[R-N19/4]**

**Q26.** Woolmark 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 @ Rs. 20 | 4 | 12 | 8 |
| Direct Material per unit (Rs.) | 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 Rs. 6 per hour.

The company proposes to use activity based costing system and the activity analysis as under:

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

The total production overheads are analysed as under :

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

**Required:**

(i) Calculate the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) Calculate the cost per unit of each product using activity based costing principles.

**[MTP-OCT18/5(B)]**

**Q27.** 'Humara-Apna' bank offers three products, viz, deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.

The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget:

| Activity | Present Cost (Rs.) | Estimation for the budget period |
|---|---|---|
| ATM Services: | | |
| (a) Machine Maintenance | 4,00,000 | All fixed, no change. |
| (b) Rents | 2,00,000 | Full fixed, no change. |
| (c) Currency | 1,00,000 | Expected to double during budget period. |
| Replenishment Cost | 7,00,000 | (This activity is driven by no. of ATM transactions) |
| Computer Processing | 5,00,000 | Half this amount is fixed and no change<br>The variable portion is expected to increase to three time the current level.<br>(This activity is driven by the number of computer transactions) |
| Issuing Statements | 18,00,000 | Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase.<br>(This activity is driven by the number of statements) |
| Compute Inquiries | 2,00,000 | Estimated to increase by 80% during the budget period.<br>(This activity is driven by telephone minutes) |

The activity drivers and their budgeted quantifies are given below:

| Activity Drivers | Deposits | Loans | Credit Cards |
|---|---|---|---|
| No. of ATM Transactions | 1,50,000 | --- | 50,000 |
| No. of Computer Processing Transactions | 15,00,000 | 2,00,000 | 3,00,000 |
| No. of Statements to be issued | 3,50,000 | 50,000 | 1,00,000 |
| Telephone Minutes | 3,60,000 | 1,80,000 | 1,80,000 |

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

**Required**

(i) CALCULATE the budgeted rate for each activity.

(ii) PREPARE the budgeted cost statement activity wise.

(iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

**[MTP-APR-19/3(B)]**

**Q28.** Linex Limited manufactures thee 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 overhead incurred by the company during the first quarter are as under :

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

The date related to the three products during the period are as under :

| | P | Q | R |
|---|---|---|---|
| Units produced and sold | 15,000 | 12,000 | 18,000 |
| Machine hours worked | 30,000 hrs. | 48,000 hrs. | 54,000 hrs. |
| Assembly hours worked (direct labour hours) | 15,000 hrs. | - | 27,000 hrs. |
| 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 overheads costs allocated to each product type using activity based costing. **[MTP/MAR.19/3(B)]**

**Q29.** Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 20X7-X8 for each product line:

| | Soft drinks | Fresh produce | Packaged food |
|---|---|---|---|
| Revenues | Rs. 39,67,500 | Rs. 1,05,03,000 | Rs. 60,49,500 |
| Cost of goods sold | Rs. 30,00,000 | Rs. 75,00,000 | Rs. 45,00,000 |
| Cost of bottles returned | Rs. 60,000 | Rs. 0 | Rs 0 |
| Number of purchases orders placed | 360 | 840 | 360 |
| Number of deliveries received | 300 | 2,190 | 660 |
| Hours of shelf-stocking time | 540 | 5,400 | 2,700 |
| Items sold | 1,26,000 | 11,04,000 | 3,06,000 |

Family store also provides the following information for the year 20X7-X8:

| Activity | Description of activity | Total Cost | Cost-allocation base |
|---|---|---|---|
| Bottles returns | Returning of empty bottles | Rs. 60,000 | Direct tracing to soft drink line |
| Ordering | Placing of orders for purchases | Rs. 7,80,000 | 1,560 purchase orders |
| Delivery | Physical delivery and receipt of goods | Rs. 12,60,000 | 3,150 deliveries |
| Shelf stocking | Stocking of goods on store shelves and on-going restocking | Rs. 8,64,000 | 8,640 hours of shelf-stocking time |
| Customer Support | Assistance provided to customers including check out | Rs. 15,36,000 | 15,36,000 items sold |

**Required:**

(i) Family store currently allocates support case (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.

(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity based costing system, CALCULATE the operating income and operating income as a % revenues for each product line. **[R-N18/4]**

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# Home work