

# JOB AND BATCH COSTING (TOPPERS INSTITUTE)

## CHAPTER OVERVIEW

|  |   |
|--|---|
| <p>(1)</p> <p><b>Job Costing</b></p> <p>1. Meaning<br/>2. Situations<br/>3. Ascertainment of Job Costs - Material, Labour and OH<br/>4. Advantages and Disadvantages</p> | <p>(2)</p> <p><b>Batch Costing</b></p> <p>1. Meaning<br/>2. Situations<br/>3. Ascertainment of Batch Costs<br/>4. Economic Batch Quantity (EBQ)<br/>5. Job Costing vs Batch Costing</p> |
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**7.1 Job Costing**

**7.1.1 Meaning of Job Costing**

**1. Job:** A Job refers to any specific assignment, contract or work order wherein work is executed as per customer's specific requirements. The output of the job generally consists of one unit or a manageable number of units. Ascertainment of cost of each Job is called **Job Costing**.

**2. Examples:** Job Costing is applied in - Printing Press, Furniture, Hardware, Ship-Building, Heavy Machinery, Interior Decoration, Repairs and other similar work.

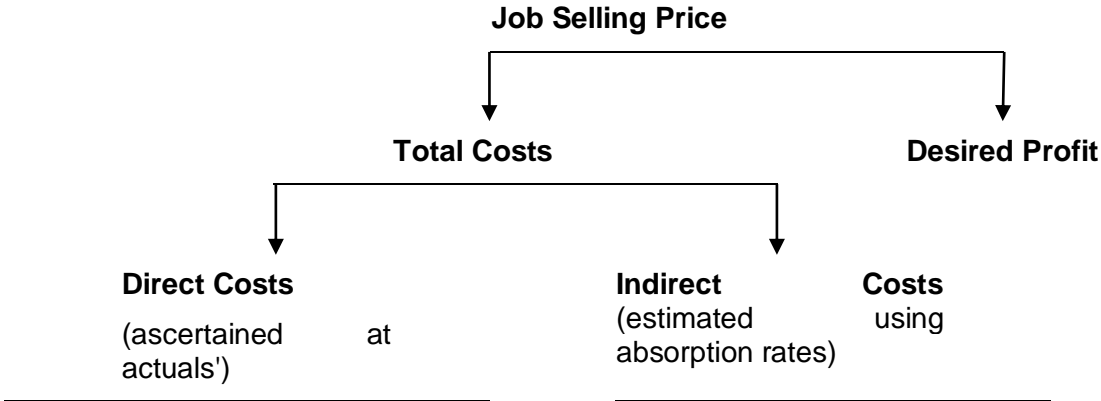
**7.1.2 Situations when Job Costing is used**

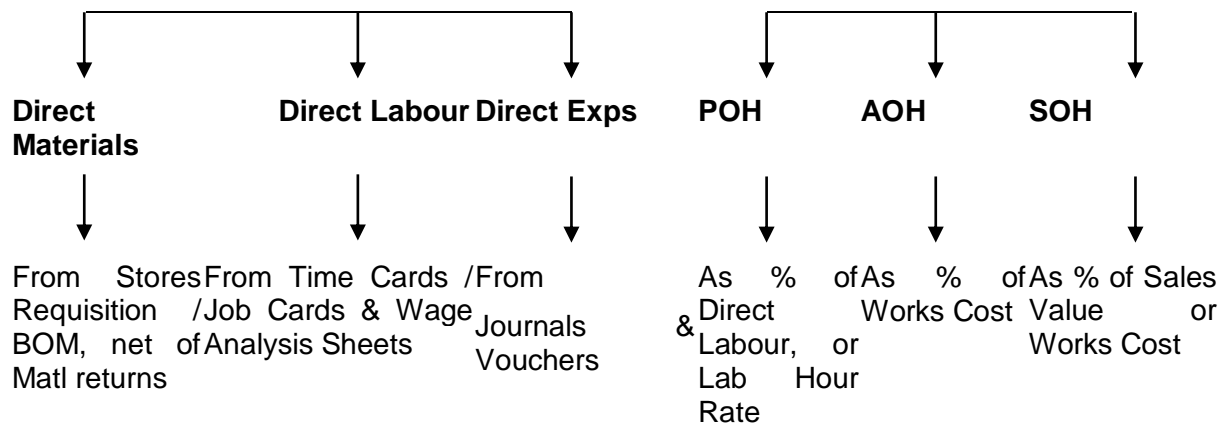
Job Costing is used in the following situations -

1. When jobs are executed for different customers according to their specifications
2. When no two orders are alike in all respects and each order/job needs special treatment.
3. Where WIP differs from period to period on the basis of the number of jobs in hand at different stages of completion.

**7.1.3 Job Cost Ascertainment**

Job Costs are classified and ascertained as under –





### 7.1.4 Advantages and Disadvantages of Job Costing

|                      |  |
|----------------------|--|
| <b>Advantages</b>    | <ol style="list-style-type: none"> <li>1. Helps in Cost Ascertainment, and ensures Profit in determining Selling Price as Cost + Profit.</li> <li>2. Aids Production Planning and Control.</li> </ol>  |
|                      | <ol style="list-style-type: none"> <li>3. Easy to implement Budgetary Control and Standard Costing.</li> <li>4. Provides details of Direct and Indirect Costs by type (Material, Labour, Expenses, etc.)</li> <li>5. Easy to handle spoilage, defectives, etc.</li> </ol>  |
| <b>Disadvantages</b> | <ol style="list-style-type: none"> <li>1. Time consuming, costly and laborious clerical process.</li> <li>2. Higher possibilities of errors in Job Cost Estimates.</li> <li>3. Not suitable for long term work, or in inflationary situations.</li> <li>4. Not suitable for inclusion in Accounting System, since Actual Direct Costs and Estimated Indirect Costs are used, leading to absorption differences.</li> </ol> |

## 7.2 Batch Costing

### 7.2.1 Meaning of Batch Costing

1. **Batch:** Where the output of the job consists of homogeneous (similar) units, a lot (or) collection of similar units may be used as a cost unit for ascertaining cost. Such lot or collection of units is called as a Batch.
2. **Batch Costing:** It is a form of Job Costing, wherein cost is ascertained for a collection / lot of units called a batch. Separate Cost Sheets are maintained for each batch of products by assigning a batch number.

$$\text{Cost per unit} = \frac{\text{Total Costs for the Batch}}{\text{Number of items produced in the Batch}}$$

3. **Examples:** Batch Costing is applied in - (a) Pharmaceutical or medicine industries, (b) Radio / TV / Computer manufacturing industries, etc.

### 7.2.2 Situations when Batch Costing is used

Batch Costing may be used in the following circumstances -

1. When the output of a job consists of a number of units and it is not economical to ascertain cost of every unit of output independently, e.g. printing of Visiting Cards.
2. When customer's annual requirement is to be supplied in uniform quantities over the year.

3. When certain features like size, colour, taste, quality etc. are required uniformly over a collection of units, e.g. garments of the same size, pharmaceuticals, etc.
4. When an internal manufacturing order is made out for production of components / sub-parts, e.g. component parts of automobiles, radio sets, watches, etc.

### 7.2.3 Batch Cost Ascertainment

Batch Costing is an extension of Job Costing. Hence cost is ascertained in the same manner as for jobs. Typically, cost of each batch is ascertained as under -

1. **Materials:** Material Requisitions are priced in the cost department. Material Cost is thus allocated to the relevant batch for which they are issued.
2. **Labour:** Time Sheets or Job tickets are prepared to determine the amount of time spent on each batch. Direct Wages are charged to batch by multiplying the time spent at the appropriate wage rate.
3. **OH:** OH are absorbed on appropriate basis, e.g. Percentage of Direct Labour, Labour Hour Rate, etc.

### 7.2.4 Economic Batch Quantity

1. **Meaning:** Economic Batch Quantity (EBQ) represents the optimum size for batch production, at which the total of Set- Up Costs per annum, and Inventory Carrying Costs per annum, are **minimum**.

2. **Costs:** The determination of EBQ involves two types of costs. These are -

(a) **Set-up Cost (or Preparation Cost):** The processing of a particular batch gives rise to clerical and machine set up costs followed by machine disassembly costs on completion of the batch. These costs are incurred in connection with each batch processed, and are independent of the size of the batch.

(b) **Carrying Cost (or Holding Cost):** The larger the batch size, the greater will be number of units in inventory. Hence the costs associated with holding/carrying the inventory like space-occupancy, interest, etc. will also be higher. These are Carrying Costs.

3. **EBQ:** If Batch Size increases, there is an increase in the carrying cost but the set up cost per unit of product is reduced, this situation is reversed when the batch size decreases. Thus there is one particular batch size for which the total of set up and carrying costs are minimum. This size is known as Economic or Optimum Batch Quantity.

4. **Formula:** EBQ can be determined with the help of the following formula -

$$EBQ = \sqrt{\frac{2AS}{C}}, \text{ where}$$

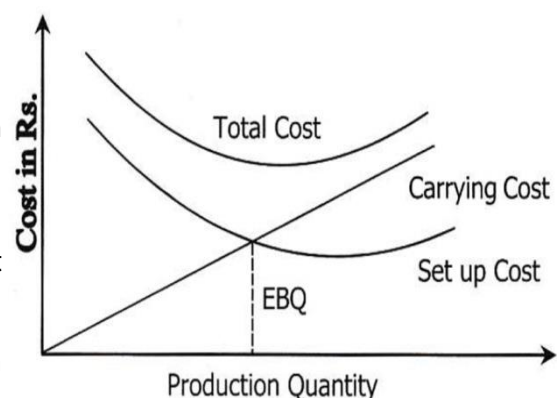
A = Annual Demand for Finished Product (in units).

S = Set-Up Cost per batch.

C = Carrying Cost per unit of Finished Product per annum.

If Rate of Interest (I) and Unit Cost of Production (C) is given,

$$\text{then } EBQ = \sqrt{\frac{2AS}{IC}}$$



## 7.2.5 Job Costing vs Batch Costing

| Particulars                  | Job Costing   | Batch Costing   |
|------------------------------|---|---|
| 1. <b>Meaning</b>            | Job refers to any specific assignment, contract or work order wherein work is executed as per customer's specific requirements. | Batch refers to a collection / lot of similar units under a Job.  |
| 2. <b>Cost Ascertainment</b> | Cost is ascertained for the job, which may consist of one unit or service.  | Cost is ascertained for the batch as a whole and then expressed by dividing total cost by Batch Quantity. |

## ILLUSTRATIONS

### 1. Job Costing

#### 1. Valuation of Closing WIP based on Absorption Rates

RTP

A Firm uses Job Costing System and recovers OH based on Direct Labour. Three jobs were worked on during a month and their details are as follows

| Particulars                  | Job 1      | Job 2      | Job 3      |
|------------------------------|------------|------------|------------|
| Opening Work in Progress     | Rs. 8,500  | Nil        | Rs. 46,000 |
| Material Costs for the month | Rs. 17,150 | Rs. 29,025 | Nil        |
| Labour Costs for the month   | Rs. 12,500 | Rs. 23,000 | Rs. 4,500  |

OH for the period were exactly as budgeted Rs. 1,40,000. Jobs 1 and 2 are incomplete at the end of the month. You are required to calculate the value of Closing WIP.

#### **Solution: 1. Computation of OH Recovery Rate**

• Total Labour Cost for the month = Rs. 12,500 + Rs. 23,000 + Rs. 4,500 = Rs. 40,000

• So, OH Absorption Rate =  $\frac{\text{Rs. } 1,40,000}{\text{Rs. } 40,000} = 350\%$  of Direct Labour Cost

#### **2. Valuation of Closing Work-in-Progress (only for Job 1 and 2, which are incomplete at the month end)**

|   | Job 1             | Job 2               | Total               |
|---|-------------------|---------------------|---------------------|
| Opening Work in Progress Value            | Rs. 8,500         | Nil                 | Rs. 8,500           |
| Material Costs for the month              | Rs. 17,150        | Rs. 29,025          | Rs. 46,175          |
| Labour Costs for the month                | Rs. 12,500        | Rs. 23,000          | Rs. 35,500          |
| OH absorbed at 350% of Direct Labour Cost | Rs. 43,750        | Rs. 80,500          | Rs. 1,24,250        |
| <b>Total</b>                              | <b>Rs. 81,900</b> | <b>Rs. 1,32,525</b> | <b>Rs. 2,14,425</b> |

2. Department-wise OH Estimation - Total Cost Estimation

RTP

XYZ Ltd manufactures mechanical fittings which pass through three departments - Foundry, Machine Shop and Assembling. The details of Wages and Production OH for the three Departments are as under -

| Particulars         | Foundry    | Machine Shop | Assembling | Total        |
|---------------------|------------|--------------|------------|--------------|
| Direct Wages        | Rs. 10,000 | Rs. 50,000   | Rs. 10,000 | Rs. 70,000   |
| Production Overhead | Rs. 5,000  | Rs. 90,000   | Rs. 10,000 | Rs. 1,05,000 |

The Factory Cost for manufacturing "K" fitting was estimated as under -

| Particulars   | Rs. per unit |
|---|--------------|
| Materials   | 16           |
| Labour: Foundry Rs. 2, Machine Shop Rs. 4, Assembling Rs. 2         | 8            |
| Works OH at 150% of Direct Wages (Rs. 70,000 * Rs. 1,05,000 = 150%) | 12           |
| Factory Cost  | 36           |

Identify and correct the conceptual error in the calculation of Factory Cost as shown above.

**Solution:** In the question, Overheads and Direct Wages are given separately for each department. However, a Blanket Overhead Rate has been taken into consideration, while computing OH Costs. The use of Blanket Overhead Rate may not give an accurate measurement of Costs.

To arrive at a more realistic measure of Cost, Department-wise Overhead Rates are appropriate. These rates are calculated,

i.e.  $\frac{\text{Overheads}}{\text{Direct Wages}}$ , and the Factory Cost of the product is computed as below -

| Particulars                    | Computation  | Rs. p.u.     |
|--------------------------------|--|--------------|
| Direct Materials               | Given  | 16.00        |
| Direct Labour: Foundry         | Given  | 2.00         |
| Machine Shop                   | Given  | 4.00         |
| Assembling                     | Given  | 2.00         |
| <b>Prime Cost</b>              |  | <b>24.00</b> |
| <b>Add:</b> Overheads: Foundry | $\frac{\text{Rs.5,000}}{\text{Rs.10,000}} = 50\%$ on Labour Cost of Rs. 2.00   | 1.00         |
| Machine Shop                   | $\frac{\text{Rs.90,000}}{\text{Rs.50,000}} = 180\%$ on Labour Cost of Rs. 4.00 | 7.20         |

|                   |   |              |
|-------------------|---|--------------|
| Assembling        | $\frac{\text{Rs.10,000}}{\text{Rs.10,000}} = 100\%$ on Labour Cost of<br>Rs. 2.00 | 2.00         |
| <b>Total Cost</b> |   | <b>34.20</b> |

### 3. Estimation of Job Costs

RTP

From the records of a manufacturing Company, the following budgeted details are available.

| Particulars              |               |              | Rs.    |
|--------------------------|---------------|--------------|--------|
| Direct Materials         | Machine Shop  | 12,000 hours | 63,000 |
| Direct Wages             | Assembly Shop | 10,000 hours | 48,000 |
| Works Overheads          | Machine Shop  | 12,000 hours | 88,200 |
|                          | Assembly Shop | 10,000 hours | 51,800 |
| Administrative Overheads |               |              | 90,000 |
| Selling Overheads        |               |              | 81,000 |
| Distribution Overheads   |               |              | 62,100 |

The Company follows Absorption Costing method. You are required to prepare -

- Schedule of OH Rates from the data available stating the basis of OH Recovery Rates used under the given circumstances.
- A cost estimate for the following job based on the overhead rates so computed.

(a) Direct Materials 25 kg at Rs. 16.80 per kg, and 15 kg at Rs. 20.00 per kg

(b) Direct Labour Machine Shop 30 hours, Assembly Shop 42 hours

**Solution:**

| Particulars            | Budget Rs.      | Recovery Rates  | New Job Rs.                       |
|------------------------|-----------------|---|-----------------------------------|
| Direct Materials       | 1,99,000        | $(25 \text{ kg} \times \text{Rs. } 16.8) + (15 \text{ kg} \times \text{Rs. } 20)$   | 720.00                            |
| Direct Wages: M/c Shop | 63,000          | $\frac{\text{Rs.63,000}}{12,000 \text{ hours}} = \text{Rs. } 5.25 \text{ per hour}$ | 30 hrs $\times$ Rs. 5.25 = 157.50 |
| Assembly Shop          | 48,000          | $\frac{\text{Rs.48,000}}{10,000 \text{ hours}} = \text{Rs. } 4.80 \text{ per hour}$ | 42 hrs $\times$ Rs. 4.80 = 201.60 |
| <b>Prime Cost</b>      | <b>3,10,000</b> |   | <b>1,079.10</b>                   |
| + Works OH: M/c Shop   | 88,200          | $\frac{\text{Rs.88,200}}{12,000 \text{ hours}} = \text{Rs. } 7.35 \text{ per hour}$ | 30 hrs $\times$ Rs. 7.35 = 220.50 |

|                      |                 |   |                               |
|----------------------|-----------------|---|-------------------------------|
| Assembly Shop        | 51,800          | $\frac{\text{Rs.}51,800}{10,000 \text{ hours}} = \text{Rs. } 5.18 \text{ per hour}$ | 42 hrs x Rs. 5.18 = 217.56    |
| <b>Factory Cost</b>  | <b>4,50,000</b> |   | <b>1,517.16</b>               |
| + AOH                | 90,000          | $\frac{\text{Rs.}90,000}{\text{Rs.}4,50,000} = 20\% \text{ on Works Cost}$          | 20% x Rs. 1,517.16 = 303.43   |
| <b>Sub Total</b>     | <b>5,40,000</b> |   | <b>1,820.59</b>               |
| + S&D OH             | 1,43,100        | $\frac{\text{Rs.}1,43,100}{\text{Rs.}4,50,000} = 31.8\% \text{ on Works Cost}$      | 31.8% x Rs. 1,517.16 = 482.46 |
| <b>Cost of Sales</b> | <b>6,83,100</b> |   | <b>2,303.05</b>               |

#### 4. Estimation of Job Costs and Preparation of Quotation - Department-wise OH Estimation RTP

A Furniture making business manufactures quality furniture to customers' order. It has three Production Departments (A, B and C) which have OH Absorption Rates (per Direct Labour Hour) of Rs. 12.86, Rs. 12.40 and Rs. 14.03 respectively.

Two pieces of furniture are to be manufactured for customers. Direct Costs are as follows -

| Particulars      |  | Job 1    | Job 2    |
|------------------|--|----------|----------|
| Direct Materials |  | Rs. 154  | Rs. 108  |
| Direct Labour:   | Department A Labour Rate Rs. 7.60 per hour | 20 hours | 16 hours |
|                  | Department B Labour Rate Rs. 7.00 per hour | 12 hours | 10 hours |
|                  | Department C Labour Rate Rs. 6.80 per hour | 10 hours | 14 hours |

The Firm quotes prices to customers that reflect a required profit of 25% on Selling Price. Calculate the Total Cost and Selling Price of each job.

#### **Solution:** Job Cost Sheet

| Particulars      |              | Job 1                        | Job 2                        |
|------------------|--------------|------------------------------|------------------------------|
| Direct Materials |              | 154.00                       | 108.00                       |
| Direct Labour:   | Department A | 20 hours x Rs. 7.60 = 152.00 | 16 hours x Rs. 7.60 = 121.60 |
|                  | Department B | 12 hours x Rs. 7.00 = 84.00  | 10 hours x Rs. 7.00 = 70.00  |
|                  | Department C | 10 hours x Rs. 6.80 =        | 14 hours x Rs. 6.80 =        |

|  |                                  |                                  |
|--|----------------------------------|----------------------------------|
|  | 68.00                            | 95.20                            |
| <b>Prime Cost</b>  | <b>458.00</b>                    | <b>394.80</b>                    |
| <b>Add:</b> Overheads: Department A  | 20 hours × Rs. 12.86 =<br>257.20 | 16 hours × Rs. 12.86 =<br>205.76 |
| Department B   | 12 hours × Rs. 12.40 =<br>148.80 | 10 hours × Rs. 12.40 =<br>124.00 |
| Department C   | 10 hours × Rs. 14.03 =<br>140.03 | 14 hours × Rs. 14.03 =<br>196.42 |
| <b>Total Cost</b>  | <b>1,004.03</b>                  | <b>920.98</b>                    |
| <b>Add:</b> Profit (25% i.e. 1/4 <sup>th</sup> on Price = 1/3 <sup>rd</sup> on Cost) | 334.68                           | 306.99                           |
| <b>Quoted Selling Price</b>  | <b>1,338.71</b>                  | <b>1,227.97</b>                  |

#### 5. Preparation of Job Cost Sheet

N 89

A Factory, which uses a Job Costing System, provides the following cost data for the year ended 31<sup>st</sup> March.

Direct Material: Rs. 9,00,000, Direct Wages: Rs. 7,50,000, Profit Rs. 6,09,000, SOH: Rs. 5,25,000, AOH: Rs. 4,20,000, POH: Rs. 4,50,000.

You are required to -

(a) Prepare a Cost Sheet indicating the various components of cost and profit.

(b) For the next year, the factory has received an order for a number of jobs. It is estimated that Direct Materials would be Rs. 12 Lakhs and Direct Labour would cost Rs. 7.5 Lakhs. What would be the price for these jobs if the Factory intends to earn the same rate of profit on sales, assuming that the S&D OH has gone up by 15%? (Note: Absorb FOH on Direct Wages and AOH and S&D OH on Works Cost)

**Solution:**

#### Job Cost Sheet

| Particulars         | Last year | Relationship  | Next year |
|---------------------|-----------|---|-----------|
| Direct Materials    | 9,00,000  | Actuals   | 12,00,000 |
| Direct Wages        | 7,50,000  | Actuals   | 7,50,000  |
| <b>Prime Cost</b>   | 16,50,000 | Actuals   | 19,50,000 |
| <b>Add</b> POH :    | 4,50,000  | Absorbed at $\frac{\text{Rs. } 4,50,000}{\text{Rs. } 7,50,000} = 60\%$ on Wages | 4,50,000  |
| <b>Factory Cost</b> | 21,00,000 |   | 24,00,000 |

|                             |                  |  |                         |
|-----------------------------|------------------|--|-------------------------|
| <b>Add AOH</b><br>:         | 4,20,000         | Absorbed at $\frac{\text{Rs.4,20,000}}{\text{Rs.21,00,000}} = 20\%$ on Factory Cost            | 4,80,000                |
| <b>Sub Total</b>            | 25,20,000        |  | 28,80,000               |
| <b>Add S&amp; D OH</b><br>: | 5,25,000         | Taken at $\frac{\text{Rs.5,25,000}}{\text{Rs.21,00,000}} = 25\%$ on Factory Cost + 15% thereon | 6,00,000+15% = 6,90,000 |
| <b>Cost Sales</b> of        | 30,45,000        |  | 35,70,000               |
| <b>Add Profit</b><br>:      | 6,09,000         | $\frac{\text{Rs.6,09,000}}{\text{Rs.30,45,000}} = 20\%$ on Cost of Sales                       | 7,14,000                |
| <b>Sales</b>                | <b>36,54,000</b> |  | <b>42,84,000</b>        |

### 6. Job Costing &WIP

N85

In a factory following the Job Costing Method, an abstract from WIP on 30<sup>th</sup> September was prepared as under -

| Job No. | Materials | Direct Labour Hours | Labour Cost | Factory Overheads applied |
|---------|-----------|---------------------|-------------|---------------------------|
| 115     | Rs. 1,325 | 400 hours           | Rs. 800     | Rs. 640                   |
| 118     | Rs. 810   | 250 hours           | Rs. 500     | Rs. 400                   |
| 120     | Rs. 765   | 300 hours           | Rs. 475     | Rs. 380                   |
| Total   | Rs. 2,900 |                     | Rs. 1,775   | Rs. 1,420                 |

Materials used in October were as follows -

| Materials Requisition No. | 54      | 55      | 56      | 57      | 58      | 59      |
|---------------------------|---------|---------|---------|---------|---------|---------|
| Job No.                   | 118     | 118     | 118     | 120     | 121     | 124     |
| Cost                      | Rs. 300 | Rs. 425 | Rs. 515 | Rs. 665 | Rs. 910 | Rs. 720 |

A summary of labour hours deployed during October is as under -

| Job No. | No. of hours Shop A | No. of hours Shop B |
|---------|---------------------|---------------------|
| 115     | 25                  | 25                  |
| 118     | 90                  | 30                  |
| 120     | 75                  | 10                  |
| 121     | 65                  | -                   |
| 124     | 20                  | 10                  |

|                      |     |     |
|----------------------|-----|-----|
| Total                | 275 | 75  |
| Indirect Labour      |     |     |
| Waiting for Material | 20  | 10  |
| Machine Breakdown    | 10  | 5   |
| Idle Time            | 5   | 6   |
| Overtime Premium     | 6   | 5   |
| Total                | 316 | 101 |

A Shop Credit Slip was issued in October, that material issued under Requisition No 54 was returned back to stores as being not suitable. A Material Transfer Note issued in October indicated that material issued under Requisition No. 55 for Job 118 was directed to Job 124.

The hourly rate in Shop A per labour hour is Rs. 3 per hour and at Shop B Rs. 2 per hour. The Factory Overhead is applied at the same rate as in September. Jobs 115, 118 and 120 were completed in October.

Compute the Factory Cost of the completed jobs. It is the Company practice to put 10% on the Factory Cost to cover AOH and SOH and invoice the job to the customer on a total cost plus 20% basis. What would be the Invoice Price of these three jobs?

**Solution:** **1. Factory Cost Statement of Completed Jobs**

| Month        | Job No. | Materials    | Labour                                | FOH (80% of Lab. Cost) | Factory Cost |
|--------------|---------|--------------|---------------------------------------|------------------------|--------------|
| September    | 115     | 1,325        | 800                                   | 640                    | 2,765        |
| October      | 115     | -            | $(25 \times 3) + (25 \times 2) = 125$ | 100                    | 225          |
| <b>Total</b> |         | <b>1,325</b> | <b>925</b>                            | <b>740</b>             | <b>2,990</b> |
| September    | 118     | 810          | 500                                   | 400                    | 1,710        |
| October      | 118     | 515          | $(90 \times 3) + (30 \times 2) = 330$ | 264                    | 1,109        |
| <b>Total</b> |         | <b>1,325</b> | <b>830</b>                            | <b>664</b>             | <b>2,819</b> |
| September    | 120     | 765          | 475                                   | 380                    | 1,620        |
| October      | 120     | 665          | $(75 \times 3) + (10 \times 2) = 245$ | 196                    | 1,106        |
| <b>Total</b> |         | <b>1,430</b> | <b>720</b>                            | <b>576</b>             | <b>2,726</b> |

**2. Invoice Price of Completed Jobs**

|                |            |            |            |
|----------------|------------|------------|------------|
| <b>Job No.</b> | <b>115</b> | <b>118</b> | <b>120</b> |
|----------------|------------|------------|------------|

|  |                 |                 |                 |
|--|-----------------|-----------------|-----------------|
| Factory Cost                                       | 2,990.00        | 2,819.00        | 2,726.00        |
| Administration & Selling OH at 10% of Factory Cost | 299.00          | 281.90          | 272.60          |
| <b>Total Cost</b>                                  | <b>3,289.00</b> | <b>3,100.90</b> | <b>2,998.60</b> |
| <b>Add:</b> Profit at 20% on Cost                  | 657.80          | 620.18          | 599.72          |
| <b>Invoice Price</b>                               | <b>3,946.80</b> | <b>3,721.08</b> | <b>3,598.32</b> |

## 2. Batch Costing

### 7. EBQ and related computations

Super Specialities Ltd has to supply 2,40,000 units of a component "Wizzo" annually for its valued customer Goenka. The Company has been producing 20,000 units per month by having 12 runs per annum. Its new Finance Manager Arun says that the production should be brought down to 5,000 units per batch and 48 batches should be run per annum. You are required to advise the Company on the following issues given that the Set up Cost per batch is Rs. 75 per batch and Carrying Cost per unit is Rs. 1 per annum.

1. What is the Economic Batch Size?
2. Should the Company continue producing 20,000 units per batch or should it adopt Arun's suggestion?
3. For least cost, how many batches should be run in a year?
4. What will be the total associated cost, i.e. Set Up Costs and Carrying Costs per annum, if EBQ is adopted?

#### Solution:

A = Annual Demand for Finished Product = 2,40,000 units.

S = Set-Up Cost per batch = Rs. 75

1.  $EBQ = \sqrt{\frac{2AS}{C}}$ , where C = Carrying Cost per unit of Finished Product per annum = Re. 1.00

On substitution, **EBQ = 6,000 units.**

### 2. Comparison of Associated Costs at different Batch Output Levels

| Particulars                     | EBQ                                      | Existing Policy                            | Arun's suggestion                        |
|---------------------------------|--|--|--|
| (a) Batch Quantity              | 6,000 units                              | 20,000 units                               | 5,000 units                              |
| (b) Number of Batches p.a.      | $2,40,000 \div 6,000 = 40$               | $2,40,000 \div 20,000 = 12$                | $2,40,000 \div 5,000 = 48$               |
| (c) Set-up Costs p.a. at Rs. 75 | $40 \times Rs. 75 = Rs. 3,000$           | $12 \times Rs. 75 = Rs. 900$               | $48 \times Rs. 75 = Rs. 3,600$           |
| (d) Average Inventory           | $\frac{1}{2} \times 6,000 = 3,000$ units | $\frac{1}{2} \times 20,000 = 10,000$ units | $\frac{1}{2} \times 5,000 = 2,500$ units |
| (e) Carrying Costs p.a. at      | $3,000 \text{ uts} \times Rs. 1 = Rs.$   | $10,000 \text{ uts} \times Rs. 1 = Rs.$    | $2,500 \text{ uts} \times Rs. 1 =$       |

|                                    |                  |                   |                  |
|------------------------------------|------------------|-------------------|------------------|
| Rs. 1                              | 3,000            | 10,000            | Rs. 2,500        |
| (f) Associated Costs<br>p.a.=(c+e) | <b>Rs. 6,000</b> | <b>Rs. 10,900</b> | <b>Rs. 6,100</b> |

**Observation:** Any deviation from EBQ leads to increase in Associated Costs. Hence, the Company should prefer to operate at 6,000 units per batch.

**Note:** At EBQ using the above formula, Set-up Costs p.a. = Carrying Costs p.a. = **Vi** of Associated Costs p.a.

3. Number of Batches p.a. =  $\frac{\text{Annual Requirement (A)}}{\text{Production per Batch (Q)}} = \frac{2,40,000}{6,000} = \mathbf{40 \text{ batches per annum}}$ , (for least cost)

## 8. EBQ and Job Costing

What to do Ltd has just received an enquiry from M/s Aditya Brothers for the supply of a sub-part Googly. Annual supply would be 3,60,000 pieces for the next 15 years. The Company ascertains the following information for decision-making.

- Cost of Material for each component: Rs. 6
- Direct Labour: 6 minutes per unit. Labourers are paid at Rs. 50 per hour.

However, for machinery set-up time, labourers are paid only Rs. 40 per hour, which is absorbed as Factory OH.

Machine set-up time: 2 and a half hours, Simple Machine Hour Rate: Rs. 100 per hour.

Average Cost of Stock holding = Rs. 700 per annum for every 100 units.

The Company has approached you for the following consultations.

1. What should be the economic batch size? Why should this size be used for production?
2. What is the Selling Price, if OH is accounted for at Rs. 4 per unit and one-third margin on cost is desired?
3. What would be the forecast annual profit after estimated share of Head Office Expenses is Rs. 12 lakhs?

### Solution:

A = Annual Demand for Finished Product = 3,60,000 pieces.

S = Set-Up Cost per batch = Rs. 350 per run. (See Note below)

1. **EBQ** =  $\sqrt{\frac{2AS}{C}}$ , where C = Carrying Cost per unit of Finished Product p.a. = Rs. 700 - ₹ 100 = Rs. 7 p.u. p.a..

On substitution, **EBQ = 6,000 pieces.**

**Note:** (Machinery Cost= 2½ hrs × Rs. 100 = 250) + (Labour Cost = 2½ hrs × Rs. 40 = 100) = **Rs. 350.**

### 2. Job Cost Sheet

| Particulars  | Rs. |
|--|-----|
| Direct Materials (given)                                 | 6   |
| Direct Labour [6 minutes at Rs. 50 per hour] = 6/60 × 50 | 5   |

|   |           |
|---|-----------|
| Prime Cost  | 11        |
| <b>Add: Overheads (given)</b>                               | 4         |
| Total Cost  | 15        |
| <b>Add: 1/3<sup>rd</sup> Margin (15 × 1/3<sup>rd</sup>)</b> | 5         |
| <b>Selling Price per unit</b>                               | <b>20</b> |

**Less:** Annual Gross Profit on 3,60,000 pieces = 3,60,000 × Rs. 5 = Rs. 18 Lakhs  
Head Office Expenses = Rs. 12 Lakhs  
Net Profit = Rs. 6 Lakhs

### 9. Batch Cost Sheet - Cost and Profit per batch

RTP, M 87

Taurus Ltd undertakes to supply 1,000 assemblies per month for the months of January, February and March. Every month, a batch order is opened against which Materials and Labour Cost is booked at actuals. Labourers are paid at Rs. 2 per hour. Overheads are levied at a rate per labour hour. The unit Selling Price is fixed at Rs. 15. From the following data, present the profit per unit of each batch order and the overall position of the order for 3,000 units.

| Month    | Batch Output | Material Cost | Labour Cost | Total OH for the month | Total Labour Hours for the month |
|----------|--------------|---------------|-------------|------------------------|----------------------------------|
| January  | 1,250 units  | Rs. 6,250     | Rs. 2,500   | Rs. 12,000             | 4,000                            |
| February | 1,500 units  | Rs. 9,000     | Rs. 3,000   | Rs. 9,000              | 4,500                            |
| March    | 1,000 units  | Rs. 5,000     | Rs. 2,000   | Rs. 15,000             | 5,000                            |

### Solution: 1. Computation of OH for the Batch

| Month | Total OH    | Total Direct Labour Hrs | So, OH Rate     | Direct Lab. for the batch =<br>Direct Wages ÷ Wage Rate | OH for the job  |
|-------|-------------|-------------------------|-----------------|---|-----------------|
| (1)   | (2) (given) | (3) (given)             | (4) = (2) ÷ (3) | (5) = Wages ÷ Rs. 2                                     | (6) = (5) × (4) |
| Jan   | Rs. 12,000  | 4,000                   | Rs. 3 per hour  | = 1,250 hours   | Rs. 3,750       |
| Feb   | Rs. 9,000   | 4,500                   | Rs. 2 per hour  | = 1,500 hours   | Rs. 3,000       |
| Mar   | Rs. 15,000  | 5,000                   | Rs. 3 per hour  | = 1,000 hours   | Rs. 3,000       |

### 2. Batch Cost Sheet

| Particulars | Jan | Feb | March | Total |
|-------------|-----|-----|-------|-------|
|-------------|-----|-----|-------|-------|

| Quantity                              | 1,250 units  | 1,500 units  | 1,000 units  | 3,750 units   |
|---------------------------------------|--------------|--------------|--------------|---------------|
| Direct Materials (given)              | 6,250        | 9,000        | 5,000        | 20,250        |
| Direct Labour (given)                 | 2,500        | 3,000        | 2,000        | 7,500         |
| Overhead (as per WN above)            | 3,750        | 3,000        | 3,000        | 9,750         |
| Total Cost (sub-total)                | 12,500       | 15,000       | 10,000       | 37,500        |
| <b>Add: Profit (balancing figure)</b> | <b>6,250</b> | <b>7,500</b> | <b>5,000</b> | <b>18,750</b> |
| Sales at Rs. 15 p.u. (Qty × Rs. 15)   | 18,750       | 22,500       | 15,000       | 56,250        |
| Cost per unit (Total Cost -r Qty)     | 10           | 10           | 10           | 10            |
| Profit per unit (balancing figure)    | 5            | 5            | 5            | 5             |
| Selling Price per unit (given)        | 15           | 15           | 15           | 15            |

Overall Profit position for 3,000 units = 3,000 × Rs. 5 (average Profit p.u.) = Rs. **15,000**.

10. Different batch sizes - Cost per unit computation N92

Component P is made entirely in cost centre 100. Material Cost is 6 paise per component. The Component takes 10 minutes to produce. The Machine Operator is paid 72 paise per hour and the Machine Hour Rate is Rs. 1.50. The setting up of the machine to produce the Component P takes 2 hours 20 minutes.

On the basis of this information, prepare a Cost-Sheet showing the production and setting up both total and per component, assuming that a batch of: (a) 10 components, (b) 100 components, & (c) 1,000 components is produced.

**Solution:**     **1. Computation of Operators' Wages and Overheads**

| Components per batch                     | 10 units  | 100 units   | 1,000 units   |
|--|---|---|---|
| Time taken in minutes at 10 minutes p.u. | 100 min   | 1,000 min   | 10,000 min  |
| Operators' Wages at Rs. 0.72 per hour    | $\frac{100}{60} \times 0.72 = \text{Rs. } 1.20$ | $\frac{1000}{60} \times 0.72 = \text{Rs. } 12.00$ | $\frac{10000}{60} \times 0.72 = \text{Rs. } 120.00$ |
| Overhead Expenses at Rs. 1.50 per hour   | $\frac{100}{60} \times 1.50 = \text{Rs. } 2.50$ | $\frac{1000}{60} \times 1.50 = \text{Rs. } 25.00$ | $\frac{10000}{60} \times 1.50 = \text{Rs. } 250.00$ |

**2. Computation of Batch Costs**

| Batch Size                           | 10 units |       | 100 units |        | 1,000 units |         |
|--------------------------------------|----------|-------|-----------|--------|-------------|---------|
|                                      | Total    | p.u.  | Total     | p.u.   | Total       | p.u.    |
| <b>1. Set-up Cost:</b>               |          |       |           |        |             |         |
| M/c Operators wages (2 hrs 20 min at | 1.68     | 0.168 | 1.68      | 0.0168 | 1.68        | 0.00168 |

|  |             |              |              |               |               |                |
|--|-------------|--------------|--------------|---------------|---------------|----------------|
| Rs. 0.72 p.h)                            |             |              |              |               |               |                |
| Overheads (2 hrs 20 min at Rs. 1.50 p.h) | 3.50        | 0.350        | 3.50         | 0.0350        | 3.50          | 0.00350        |
| <b>2. Production Cost:</b>               |             |              |              |               |               |                |
| Material Cost at 0.06 p.u.               | 0.60        | 0.060        | 6.00         | 0.0600        | 60.00         | 0.06000        |
| Machine Operators Wages (WN 1)           | 1.20        | 0.120        | 12.00        | 0.1200        | 120.00        | 0.12000        |
| Overheads (WN 1)                         | 2.50        | 0.250        | 25.00        | 0.2500        | 250.00        | 0.25000        |
| <b>3. Total Costs</b>                    | <b>9.48</b> | <b>0.948</b> | <b>48.18</b> | <b>0.4818</b> | <b>435.18</b> | <b>0.43518</b> |

### 11. Computation of Batch Costs and Costs per unit

RTP

A Company manufactures widgets to order and has the following budgeted OH and normal activity levels -

| Department | Budgeted Overhead | Budgeted Activity Levels |
|------------|-------------------|--------------------------|
| Welding    | Rs. 6,000         | 1,500 Labour Hours       |
| Assembly   | Rs. 10,000        | 1,000 Labour Hours       |

Selling and Administration OH are 20% of Factory Cost. An order for 250 widgets type X—128 and made as Batch S—937, had the following costs - (1) Materials - Rs. 12,000, (2) Labour - 100 hours in Welding Shop at Rs. 10 per hour, 200 hours in Assembly Shop at Rs. 8 per hour, (3) Rs. 500 was paid for hire of special scan equipment for testing the widgets. From the given data, calculate the cost per unit for Batch S—937.

#### Solution: 1. Computation of OH Absorption Rates

Welding Department:  $\frac{\text{Rs. } 6,000}{1,500} = \text{Rs. } 4$  per Labour Hour. Assembly Department:  $\frac{\text{Rs. } 10,000}{1,000} = \text{Rs. } 10$  per Labour Hour.

#### 2. Batch Cost Sheet

| Particulars  | Rs.           |
|--|---------------|
| Direct Material Given  | 12,000        |
| Direct Wages 100 hours in Welding Shop at Rs. 10 per hour          | 1,000         |
| 200 hours in Assembly Shop at Rs. 8 per hour                       | 1,600         |
| Direct Expenses Hire of Special Scan Equipment                     | 500           |
| <b>Prime Cost</b>  | <b>15,100</b> |
| <b>Add:</b> Overheads: 100 hours in Welding Shop at Rs. 4 per hour | 400           |
| 200 hours in Assembly Shop at Rs. 10 per hour                      | 2,000         |
| <b>Factory Cost</b>  | <b>17,500</b> |

|   |               |
|---|---------------|
| <b>Add:</b> SOH absorbed at 20% on Factory Cost of Rs. 17,500 | 3,500         |
| <b>Total Cost</b>   | <b>21,000</b> |

$$\text{Cost per unit} = \frac{\text{Rs.21,000}}{250} = \text{Rs. 84.00}$$

### Important Theory Questions

| Question  | Refer |
|---|-------|
| 1. What is Job Costing? M 01<br>What is meant by Job Costing? Give examples of (any 4) industries where it is used.<br>N 16   | 7.1.1 |
| 2. What are the situations when Job Costing is used?  | 7.1.2 |
| 3. How are costs of a job ascertained?  | 7.1.3 |
| 4. List the advantages and disadvantages of Job Costing.  | 7.1.4 |
| 5. What is meant by Batch Costing? M 86. M 87, M 01   | 7.2.1 |
| 6. List the circumstances under which Batch Costing may be adopted. M 87, M 01  | 7.2.2 |
| 7. Write short notes on ascertainment of cost under Batch Costing.  | 7.2.3 |
| 8. What do you understand by Economic Batch Quantity? How is it determined? M 00, M 01, M 07<br>Z Ltd produces a product in batches. Z Ltd wants to know the number of batches of the product to be produced, where the cost incurred on Batch Setup and Carrying Cost of Production is at the optimum level. Advise. RTP | 7.2.4 |
| 9. Distinguish between Job Costing and Batch Costing. N 04, M 06, M 08  | 7.2.5 |

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