5

Standard Costing

LEARNING OBJECTIVES
After studying this unit you will be able to understand:

• The meaning of standard costing and its definition
• How a standard costing system operates
• How to calculate material, labour, overhead, sales variances and reconcile actual profit with budgeted profit
• Distinguish between standard variable costing and standard absorption costing
• How to prepare a set of accounts for standard costing system.

5.1 Classification and Type of Variances

Cost variance is the difference between standard cost and the actual cost incurred.

Variance analysis is the analysis of the cost variances into its component parts with appropriate justification of such variances, so that we can approach for corrective measures.

5.1.1 Classification of Variances: Variances can be established under material, labour & overheads. There are three distinct groups of variances that arise in standard costing which are

• **Variance of Efficiency**: Variances due to the effective or ineffective use of materials quantities, labour hours, once actual quantities are compared with the predetermined standards.

• **Variance of Price Rates**: Variances arising due to change in unit material prices, standard labour hour rates and standard allowances for indirect costs.

• **Variance Due to Volume**: Variance due to the effect of difference between actual activity and the level of activity assumed when the standard was set.

5.1.2 Why Standard Costing: Standard Costing main purpose is to

• Investigate the reasons
• Identify the problems
• Take corrective action.

Variance are broadly of two types, controllable and uncontrollable. Controllable variances are
those which can be controlled by the departmental heads whereas uncontrollable variances are those which are beyond control.

For example, price variance is normally regarded as uncontrollable if the price increase is due to market fluctuations. It becomes controllable if the production controller has failed to place orders in time and urgent purchase was made at extra cost. In the former case, no responsibility is attached to any one whereas the departmental head has responsibility for the loss in the latter case. Since all price variances are uncontrollable and are of significant nature and are persistent, the standard may need revision.

The possible reasons for each type of variances and the suggested course of action are given below. This list is only illustrative and not exhaustive.

<table>
<thead>
<tr>
<th>Type of Variance</th>
<th>Reasons of Variance</th>
<th>Suggestive Course of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Price</td>
<td>• Change in Basic Price&lt;br&gt;• Fail to purchase the anticipated standard quantities at appropriate price</td>
<td>• Departmental head should take necessary action to purchase at right point of time&lt;br&gt;• Cash discount or interest rate for payment of purchase should be consider at the time of such payment&lt;br&gt;• Price check on the purchase of standard quality materials</td>
</tr>
<tr>
<td>Material Usage</td>
<td>• Use of sub-standard material&lt;br&gt;• Ineffective use of materials&lt;br&gt;• Pilferage&lt;br&gt;• Non standardised mix</td>
<td>• Regular Inspection of quality of materials&lt;br&gt;• Proper training of operators&lt;br&gt;• Ensure best utilisation of resources</td>
</tr>
<tr>
<td><strong>Labour</strong></td>
<td></td>
<td></td>
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<tr>
<td>Labour Efficiency</td>
<td>• Change in design and quality standard&lt;br&gt;• Poor working conditions&lt;br&gt;• Improper scheduling</td>
<td>• Proper planning&lt;br&gt;• Proper training&lt;br&gt;• Healthy working environment&lt;br&gt;• Timelines for achieving set targets</td>
</tr>
</tbody>
</table>
### Type of Variance
<table>
<thead>
<tr>
<th>Labour Rate</th>
<th>Reasons of Variance</th>
<th>Suggestive Course of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Improper placement of labour</td>
<td>• Time scheduling for work performance</td>
</tr>
<tr>
<td></td>
<td>• Increments / high labour wages</td>
<td>• Proper job allocation according to capabilities of workers</td>
</tr>
<tr>
<td></td>
<td>• Overtime</td>
<td></td>
</tr>
</tbody>
</table>

### Overheads

<table>
<thead>
<tr>
<th>Manufacturing</th>
<th>Reasons of Variance</th>
<th>Suggestive Course of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Improper planning</td>
<td>• Efficient planning for better capacity utilization</td>
</tr>
<tr>
<td></td>
<td>• Under or over absorption of fixed overheads</td>
<td>• Check on expenditure</td>
</tr>
<tr>
<td></td>
<td>• Reduction of sales</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Breakdowns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Power failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Labour trouble</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Selling and Distribution</th>
<th>Reasons of Variance</th>
<th>Suggestive Course of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Increase in delivery cost</td>
<td>• Sales quotas</td>
</tr>
<tr>
<td></td>
<td>• Increase in stock holding period</td>
<td>• Sale targets</td>
</tr>
<tr>
<td></td>
<td>• Overtime</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administrative</th>
<th>Reasons of Variance</th>
<th>Suggestive Course of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Over expenditure</td>
<td>• Comparison of budgets with actuals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Introduction of operating costing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Introduction of cost ratios</td>
</tr>
</tbody>
</table>

### 5.2 Computation of Variances

Let us now proceed to study with illustrations and the method of computation of major variances. In all the problems illustrated in the following pages, ‘F’ means favourable variance and ‘A’ means adverse variance.

**5.2.1 Direct Material Variances**: Direct material total variance (also known as material cost variance) for actual output can basically be divided into two types, namely (a) price variance and (b) usage variance. The method of calculating these variances is as under:
### Direct Material Variances

#### Direct Material Total Variance

\[
\text{[Standard Cost}^\text{'} - \text{Actual Cost]}
\]
(The difference between the Standard Direct Material Cost of the actual production volume and the Actual Cost of Direct Material)

\[
[(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})]
\]

---

#### Direct Material Price Variance

\[
\text{[Standard Cost of Actual Quantity} - \text{Actual Cost]}
\]
(The difference between the Standard Price and Actual Price for the Actual Quantity)

\[
[(\text{SP} - \text{AP}) \times \text{AQ}] \\
\text{Or} \\
[(\text{SP} \times \text{AQ}) - (\text{AP} \times \text{AQ})]
\]

---

#### Direct Material Usage Variance

\[
\text{[Standard Cost of Standard Quantity for Actual Production} - \text{Standard Cost of Actual Quantity]}
\]
(The difference between the Standard Quantity specified for actual production and the Actual Quantity used, at Standard Purchase Price)

\[
[(\text{SQ} - \text{AQ}) \times \text{SP}] \\
\text{Or} \\
[(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{SP})]
\]

---

#### Direct Material Mix Variance

\[
\text{[Standard Cost of Actual Quantity in Standard Proportion} - \text{Standard Cost of Actual Quantity]}
\]
(The difference between the Actual Quantity in standard proportion and Actual Quantity in actual proportion, at Standard Purchase Price)

\[
[(\text{RAQ} - \text{AQ}) \times \text{SP}] \\
\text{Or} \\
[(\text{RAQ} \times \text{SP}) - (\text{AQ} \times \text{SP})]
\]

**Alternative Formula**

\[
\text{Total Actual Quantity (units) \times \{Average Standard Price per unit of Standard Mix - Average Standard Price per unit of Actual Mix\}}
\]

---

#### Direct Material Yield Variance

\[
\text{[Standard Cost of Standard Quantity for Actual Production} - \text{Standard Cost of Actual Quantity in Standard Proportion]}
\]
(The difference between the Standard Quantity specified for actual production and Actual Quantity in standard proportion, at Standard Purchase Price)

\[
[(\text{SQ} - \text{RAQ}) \times \text{SP}] \\
\text{Or} \\
[(\text{SQ} \times \text{SP}) - (\text{RAQ} \times \text{SP})]
\]

**Alternative Formula**

\[
\text{Average Standard Price per unit of Standard Mix} \times \{\text{Total Standard Quantity (units)} \text{ Less Total Actual Quantity (units)}\}
\]
Note:

- SQ = Standard Quantity = Expected Consumption for Actual Output
- AQ = Actual Quantity of Material Consumed
- RAQ = Revised Actual Quantity = Actual Quantity Rewritten in Standard Proportion
- SP = Standard Price per Unit
- AP = Actual Price per Unit
- (*) = Standard Cost refers to ‘Standard Cost of Standard Quantity for Actual Output’
- (**) = Direct Material Total Variance (also known as material cost variance)

### Material Purchase Price Variance

\[
\text{Material Purchase Price Variance} = \left( \text{Standard Cost of Actual Quantity} - \text{Actual Cost} \right)
\]

(The difference between the Standard Price and Actual Price for the actual quantity of material purchased)

\[
\left[ (SP - AP) \times PQ \right]
\]

Or

\[
\left[ (SP \times PQ) - (AP \times PQ) \right]
\]

Note:

- PQ = Purchase Quantity
- SP = Standard Price
- AP = Actual Price

**Illustration 1**

The standard quantity of material required is 4 kgs. per unit of actual output. The relevant figures are as under:

<table>
<thead>
<tr>
<th>Material</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard mix %</td>
<td>30%</td>
<td>40%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Price per kg. (₹)</td>
<td>1.25</td>
<td>1.50</td>
<td>3.50</td>
<td>3.00</td>
</tr>
<tr>
<td>Actual qty. used (Kg.)</td>
<td>1,180</td>
<td>1,580</td>
<td>830</td>
<td>440</td>
</tr>
<tr>
<td>Actual price per kg. (₹)</td>
<td>1.30</td>
<td>1.80</td>
<td>3.40</td>
<td>3.00</td>
</tr>
<tr>
<td>Actual output: 1,000 units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculate price variance, mix variance, sub-usage variance and total material cost variance.
## Solution

### Basic Calculations:

Statement showing computation of Standard Cost/Actual Cost/Revised Actual Quantity

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Cost of 1,000 Units</th>
<th>Actual Cost of 1,000 Units</th>
<th>Revised Actual Quantity [RAQ] (Kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[SQ] (Kg.)</td>
<td>[SP] (₹)</td>
<td>[SQ × SP] (₹)</td>
</tr>
<tr>
<td>A</td>
<td>1,200</td>
<td>1.25</td>
<td>1,500</td>
</tr>
<tr>
<td>B</td>
<td>1,600</td>
<td>1.50</td>
<td>2,400</td>
</tr>
<tr>
<td>C</td>
<td>800</td>
<td>3.50</td>
<td>2,800</td>
</tr>
<tr>
<td>D</td>
<td>400</td>
<td>3.00</td>
<td>1,200</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>7,900</td>
<td>4,030</td>
</tr>
</tbody>
</table>

**Note:**
- **SQ** = Standard Quantity = Expected Consumption for Actual Output
- **AQ** = Actual Quantity of Material Consumed
- **RAQ** = Revised Actual Quantity = Actual Quantity Rewritten in Standard Proportion
- **SP** = Standard Price per unit
- **AP** = Actual Price per unit

### Computation of Variances:

Statement showing Variances (₹)

<table>
<thead>
<tr>
<th>Material A</th>
<th>Material B</th>
<th>Material C</th>
<th>Material D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Cost Variance = SQ × SP – AQ × AP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Price Variance = AQ × (SP – AP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Usage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Variance  
= SP \times (SQ – AQ)  
= 1,180)  
= 30 (F)  
= 105 (A)  
= 120 (A)

Material Mix Variance  
= SP \times (RAQ – AQ)  
= 1.25 \times (1,209 – 1,180)  
= 1.50 \times (1,612 – 1,580)  
= 3.50 \times (806 – 830)  
= 3.00 \times (403 – 440)  
= 36.25 (F)  
= 48 (F)  
= 84 (A)  
= 111 (A)  
= 110.75 (A)

Material Yield Variance  
= SP \times (SQ – RAQ)  
= 1.25 \times (1,200 – 1,209)  
= 1.50 \times (1,600 – 1,612)  
= 3.50 \times (800 – 806)  
= 3.00 \times (400 – 403)  
= 11.25 (A)  
= 18 (A)  
= 21 (A)  
= 9 (A)  
= 59.25 (A)

Illustration 2
The standard set for a chemical mixture of a firm is as under:

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Mix %</th>
<th>Standard Price Per Kg. (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

The standard loss in production is 10 %. During a period, the actual consumption and price paid for a good output of 182 kg. are as under:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity in Kg.</th>
<th>Actual Price Per Kg (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90</td>
<td>18</td>
</tr>
<tr>
<td>B</td>
<td>110</td>
<td>34</td>
</tr>
</tbody>
</table>

Calculate the variances.

Solution

Basic Calculations:
Take the good output of 182 Kg. The standard quantity of material required for 182 Kg. of output is

\[
\frac{182}{90} \times 100 = 202.22 \text{ Kg.}
\]
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Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Cost</th>
<th>Actual Cost</th>
<th>Revised Actual Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Rate</td>
<td>Amount</td>
</tr>
<tr>
<td>A (40% of 202.22 Kg.)</td>
<td>[SQ] Kg.</td>
<td>[SP] ₹</td>
<td>[SQ × SP] ₹</td>
</tr>
<tr>
<td>80.89</td>
<td>20</td>
<td>1,617.80</td>
<td>90</td>
</tr>
<tr>
<td>B (60% of 202.22 Kg.)</td>
<td>121.33</td>
<td>30</td>
<td>3,639.90</td>
</tr>
<tr>
<td>202.22</td>
<td>5,257.70</td>
<td>200</td>
<td>5,360</td>
</tr>
</tbody>
</table>

Note:

SQ  =  Standard Quantity = Expected Consumption for Actual Output
AQ  =  Actual Quantity of Material Consumed
RAQ =  Revised Actual Quantity = Actual Quantity Rewritten in Standard Proportion
SP  =  Standard Price Per Unit
AP  =  Actual Price Per Unit

Computation of Variances:

Material Price Variance  = AQ × (SP – AP)
A  =  90 Kg. × (₹ 20 – ₹ 18) = ₹ 180 (F)
B  =  110 Kg. × (₹ 30 – ₹ 34) = ₹ 440 (A)
Total  = ₹ 180 (F) + ₹ 440 (A) = ₹ 260 (A)

Material Usage Variance = SP × (SQ – AQ)
A  =  ₹ 20 × (80.89 Kg. – ₹ 90 Kg.) = ₹182.20 (A)
B  =  ₹ 30 × (121.33 Kg. – 110 Kg.) = ₹ 339.90 (F)
Total  = ₹ 182.20 (A) + ₹ 339.90 (F) = ₹ 157.70 (F)

Material Mix Variance  = SP × (RAQ – AQ)
A  =  ₹ 20 × (80 Kg – 90 Kg) = ₹200 (A)
B  =  ₹ 30 × (120 Kg – 110 Kg.) = ₹ 300 (F)
Total  = ₹ 200 (A) + ₹ 300 (F) = ₹ 100 (F)
Material Yield Variance = SP × (SQ – RAQ)

A = ₹ 20 × (80.89 Kg. – ₹ 80 Kg) = ₹ 17.80 (F)
B = ₹ 30 × (121.33 Kg. – 120 Kg.) = ₹ 39.90 (F)
Total = ₹ 17.80 (F) + ₹ 39.90 (F)
= ₹ 57.70 (F)

Material Cost Variance = SQ × SP – AQ × AP

A = ₹ 80.89 Kg. × ₹ 20 – 90 Kg. × ₹ 18 = ₹ 2.20 (A)
B = ₹ 121.33 Kg. × 30 Kg. – 110 Kg. × ₹ 34 = ₹ 100.10 (A)
Total = ₹ 2.20 (A) + ₹ 100.10 (A)
= ₹ 102.30 (A)

5.2.2. Direct Labour Variances: The two basic variances that can be calculated in respect of direct labour total variance (also known as labour cost variance) are (a) rate variance and (b) efficiency variance. The formula's for calculating labour variances are as under:
### Direct Labour Variances

#### Direct Labour Total Variance

\[ \text{[Standard Cost}^2 - \text{Actual Cost]} \]

(The difference between the Standard Direct Labour Cost and the Actual Direct Labour Cost incurred for the production achieved)

\[ [(\text{SH} \times \text{SR}) - (\text{AH}^* \times \text{AR})] \]

#### Direct Labour Rate Variance

\[ \text{[Standard Cost of Actual Time} - \text{Actual Cost]} \]

(The difference between the Standard Rate per hour and Actual Rate per hour for the Actual Hours paid)

\[ [(\text{SR} - \text{AR}) \times \text{AH}^*] \]

Or

\[ [(\text{SR} \times \text{AH}^*) - (\text{AR} \times \text{AH}^*)] \]

#### Direct Labour Idle Time Variance

\[ \text{[Standard Rate per Hour} \times \text{Actual Idle Hours]} \]

(The difference between the Actual Hours paid and Actual Hours worked at Standard Rate)

\[ [(\text{AH}^* - \text{AH}^#) \times \text{SR}] \]

Or

\[ [(\text{AH}^* \times \text{SR}) - (\text{AH}^# \times \text{SR})] \]

#### Direct Labour Efficiency Variance

\[ \text{[Standard Cost of Standard Time for Actual Production} - \text{Standard Cost of Actual Time]} \]

(The difference between the Standard Hours specified for actual production and Actual Hours worked at Standard Rate)

\[ [(\text{SH} - \text{AH}^#) \times \text{SR}] \]

Or

\[ [(\text{SH} \times \text{SR}) - (\text{AH}^# \times \text{SR})] \]

#### Direct Labour Mix Variance

Or Gang Variance

\[ \text{[Standard Cost of Actual Time Worked in Standard Proportion} - \text{Standard Cost of Actual Time Worked]} \]

(The difference between the Actual Hours worked in standard proportion and Actual Hours worked in actual proportion, at Standard Rate)

\[ [(\text{RAH} - \text{AH}^#) \times \text{SR}] \]

Or

\[ [(\text{RAH} \times \text{SR}) - (\text{AH}^# \times \text{SR})] \]

#### Direct Labour Yield Variance

Or Sub-Efficiency Variance

\[ \text{[Standard Cost of Standard Time for Actual Production} - \text{Standard Cost of Actual Time Worked} \text{ in Standard Proportion]} \]

(The difference between the Standard Hours specified for actual production and Actual Hours worked in standard proportion, at Standard Rate)

\[ (\text{SH} - \text{RAH}) \times \text{SR} \]

Or

\[ (\text{SH} \times \text{SR}) - (\text{RAH} \times \text{SR}) \]
Alternate Formula

\[
\text{[Total Actual Time Worked (hours) \times \{Average Standard Rate per hour of Standard Gang Less Average Standard Rate per hour of Actual Gang\}]}
\]

@ on the basis of hours worked

Alternate Formula

\[
\text{[Average Standard Rate per hour of Standard Gang \times \{Total Standard Time (hours) Less Total Actual Time Worked (hours)\}]
\]

Note:

- **SH** = Standard Hours = Expected time (Time allowed) for Actual Output
- **AH* = Actual Hours paid for**
- **AH# = Actual Hours worked**
- **RAH = Revised Actual Hours = Actual Hours (worked) rewritten in Standard Proportion**
- **SR = Standard Rate per Labour Hour**
- **AR = Actual Rate per Labour Hour Paid**
- (2) = Standard Cost refers to ‘Standard Cost of Standard Time for Actual Output’
- (1) = Direct Labour Total Variance (also known as labour cost variance)

*In the absence of idle time*

\[
\text{Actual Hours Worked = Actual Hours Paid}
\]

Idle Time is a period for which a workstation is available for production but is not used due to e.g. shortage of tooling, material or operators. During Idle Time, Direct Labour Wages are being paid but no output is being produced. The cost of this can be identified separately in an Idle Time Variance, so that it is not ‘hidden’ in an adverse Labour Efficiency Variance.

Some organizations face Idle Time on regular basis. In this situation the Standard Labour Rate may include an allowance for the cost of the expected idle time. Only the impact of any unexpected or abnormal Idle Time would be included in the Idle Time Variance.

**Illustration 3**

Given the following data, compute the variances.

<table>
<thead>
<tr>
<th></th>
<th>Skilled</th>
<th>Semi-Skilled</th>
<th>Unskilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of workers in standard gang</td>
<td>16</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Standard rate per hour (₹)</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Actual number of workers in the gang</td>
<td>14</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Actual rate of pay per hour (₹)</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

In a 40- hour week, the gang as a whole produced 900 standard hours.
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Solution

Basic Calculations:

In a 40 hour week, the standard gang should have produced 1,000 std. hours as shown below

<table>
<thead>
<tr>
<th>Gang</th>
<th>No. of workers x 40 hrs.</th>
<th>Std. Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled</td>
<td>16 No. of workers x 40 hrs.</td>
<td>640</td>
</tr>
<tr>
<td>Semi-Skilled</td>
<td>6 No. of workers x 40 hrs.</td>
<td>240</td>
</tr>
<tr>
<td>Unskilled</td>
<td>3 No. of workers x 40 hrs.</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000</td>
</tr>
</tbody>
</table>

However, the actual output is 900 standard hours. Hence to find out the total labour cost variance, the standard cost (or cost charged to production) is to be computed with reference to 900 standard hours. This is done in the following statement:

Statement showing the Standard Cost, Actual Cost and Standard Cost of Actual Time for Actual Output, i.e. 900

<table>
<thead>
<tr>
<th>Gang</th>
<th>Standard Cost</th>
<th>Actual Cost</th>
<th>Std Cost of Actual Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours</td>
<td>Rate</td>
<td>Amt</td>
</tr>
<tr>
<td>Skilled</td>
<td>576</td>
<td>3</td>
<td>1728</td>
</tr>
<tr>
<td>Semi-Skilled</td>
<td>216</td>
<td>2</td>
<td>432</td>
</tr>
<tr>
<td>Unskilled</td>
<td>108</td>
<td>1</td>
<td>108</td>
</tr>
<tr>
<td>Total</td>
<td>900</td>
<td>2.52</td>
<td>2268</td>
</tr>
</tbody>
</table>

Computation of Variances:

Cost Variance = Std. Labour Cost – Actual Labour Cost
= ₹ 2,268 – ₹ 3,480 = ₹ 1,212 (A)

Rate Variance = Actual Time x (Std. Rate – Actual Rate)
= (Standard Cost of Actual Time – Actual Cost)
= ₹ 2,480 – ₹ 3,480 = ₹ 1,000 (A)

Efficiency variance = Std. Rate x (Std. Time – Actual Time)
= Standard Cost – Std. Cost of Actual Time
= ₹ 2,268 – ₹ 2,480 = ₹ 212 (A)

Gang Variance = Total Actual Time x (Std. Rate of Std. Gang– Std. Rate of Actual Gang)
= 1,000 x (₹ 2.52 – ₹ 2.48) = ₹ 40 (F)

Sub-Efficiency Variance = Std. Rate of Std. Gang x (Total Std. Time – Total Actual Time)
= ₹ 2.52 x (900 Hours – 1,000 Hours) = ₹ 252 (A)
Illustration 4

A firm gives you the following data:

- **Standard time per unit**: 2.5 hours
- **Actual hours (paid)**: 2,000 hours
- **Standard rate of pay**: ₹ 2 per hour

25 % of the actual hours (paid) have been lost as idle time.

- **Actual output**: 1,000 units
- **Actual wages (paid)**: ₹ 4,500

Calculate the idle time variance.

**Solution**

**Basic Calculations:**

- **Standard Cost**: (1,000 units × 2.5 hours × ₹ 2) = ₹ 5,000
- **Actual wages paid**: ₹ 4,500
- **Actual wage rate per hour** (₹ 4,500 / 2,000 hours) = ₹ 2.25
- **Std. wage rate per hour**: ₹ 2.00
- **Abnormal idle time (25% of 2,000 hours)**: 500 hrs

**Computation of Variances:**

- **Rate Variance** = Actual Time × (Std. Rate – Actual Rate)
  = 2,000 Hours × (₹ 2 – ₹ 2.25) = ₹ 500 (A)
- **Efficiency Variance** = Std. Rate × (Std. Time – Actual time*)
  = ₹ 2 x (2,500 hrs. – 1,500 hrs.) = ₹ 2,000 (F)
- **Idle time Variance** = Idle Time × Std. Rate
  = 500 hrs. × ₹ 2 = ₹ 1,000 (A)
- **Total Variance** = Std. Labour Cost – Actual Labour Cost
  = ₹ 5,000 – ₹ 4,500 = ₹ 500 (F)

*Actual time less idle time (Actual time worked).

**5.2.3 Overhead Variances:** Overhead variances arise due to the difference between actual overheads and absorbed overheads.

The actual overheads can be known only at the end of the accounting period, when the expense accounts are finalised. The absorbed overheads are the overheads charged to each unit of production on the basis of a pre-determined overhead rate. This pre-determined rate is
also known as standard overhead recovery rate, standard overhead absorption rate or standard burden rate. To calculate the standard overhead recovery rate, we have to first make an estimate of the likely overhead expenses for each department for the next year. The estimate of budget of the overheads is to be divided into fixed and variable elements. An estimate of the level of normal capacity utilisation is then made either in terms of production or machine hours or direct labour hours.

The estimated overheads are divided by the estimated capacity level to calculate the predetermined overhead absorption rate as shown below:

\[
\text{Standard Fixed Overhead Rate} = \frac{\text{Budgeted Fixed Overheads}}{\text{Normal Volume}}
\]

\[
\text{Standard Variable Overhead Rate} = \frac{\text{Budgeted Variable Overheads}}{\text{Normal Volume}}
\]

Overhead variances can be classified in the following two major categories:

a) **Fixed Overhead Variances**

b) **Variable Overhead Variances**

(a) **Fixed Overhead Variances**:

Fixed overhead total variance (also known as fixed overhead cost variance) as may be broadly classified into:

**Expenditure Variance**: It represents the difference between the fixed overheads as per budget and the actual fixed overheads incurred.

**Volume Variance**: This variance represents the unabsorbed portion of the fixed costs because of underutilization of capacity. In case a firm exceeds capacity, this variance is favourable in nature. This can be divided into capacity variance and efficiency variance.
Fixed Production Overhead Variances

Fixed Overhead Total Variance
(Absorbed Fixed Overheads) Less (Actual Fixed Overheads)

Fixed Overhead Expenditure Variance
(Budgeted Fixed Overheads) Less (Actual Fixed Overheads)

Fixed Overhead Volume Variance
(Absorbed Fixed Overheads) Less (Budgeted Fixed Overheads)

Fixed Overhead Capacity Variance
(Budgeted Fixed Overheads for Actual Hours) Less (Budgeted Fixed Overheads)

Fixed Overhead Efficiency Variance
(Absorbed Fixed Overheads) Less (Budgeted Fixed Overheads for Actual Hours)

Or

Fixed Overhead Capacity Variance
(Budgeted Fixed Overheads for Actual Hours) Less (Possible Fixed Overheads)

Fixed Overhead Calendar Variance
(Possible Fixed Overheads) Less (Budgeted Fixed Overheads)

Fixed Overhead Efficiency Variance
(Absorbed Fixed Overhead) Less (Budgeted Fixed Overheads for Actual Hours)

# Actual Hours (Worked)
5.16 Advanced Management Accounting

Note:

**Standard Fixed Overheads for Production (Absorbed)**

\[ \text{Standard Fixed Overhead Rate per Unit} \times \text{Actual Production in Units} = \text{Standard Fixed Overhead Rate per Hour} \times \text{Standard Hours for Actual Production} \]

**Budgeted Fixed Overheads**

\[ \text{It represents the amount of fixed overhead which should be spent according to the budget or standard during the period} \]

\[ \text{Standard Fixed Overhead Rate per Unit} \times \text{Budgeted Production in Units} = \text{Standard Fixed Overhead Rate per Hour} \times \text{Budgeted Hours} \]

**Actual Fixed Overheads Incurred**

**Budgeted Fixed Overheads for Actual Hours**

\[ \text{Standard Fixed Overhead Rate per Hour} \times \text{Actual Hours} \]

**Possible Fixed Overheads**

\[ \text{Expected Fixed Overhead for Actual Days Worked} \]

\[ \frac{\text{Budgeted Fixed Overhead}}{\text{Budgeted Days}} \times \text{Actual Days} \]

\[ \text{Fixed Overhead Total Variance also known as ‘Fixed Overhead Cost Variance’} \]

---

### Fixed Overhead Efficiency Variance

\[ (\text{Absorbed Fixed Overheads}) - (\text{Budgeted Fixed Overheads for Actual Hours}) \]

\[ \text{Or} \]

\[ (\text{Standard Fixed Overhead Rate per Hour} \times \text{Standard Hours for Actual Output}) - (\text{Standard Fixed Overhead Rate per Hour} \times \text{Actual Hours}) \]

\[ \text{Or} \]

\[ \text{Standard Fixed Overhead Rate per Hour} \times (\text{Standard Hours for Actual Output} - \text{Actual Hours}) \]

### Fixed Overhead Capacity Variance

\[ (\text{Budgeted Fixed Overheads for Actual Hours}) - (\text{Budgeted Fixed Overheads}) \]

\[ \text{Or} \]

\[ (\text{Standard Fixed Overhead Rate per Hour} \times \text{Actual Hours}) - (\text{Standard Fixed Overhead Rate per Hour} \times \text{Budgeted Hours}) \]

\[ \text{Or} \]

\[ \text{Standard Fixed Overhead Rate per Hour} \times (\text{Actual Hours} - \text{Budgeted Hours}) \]

### Fixed Overhead Volume Variance-I

\[ (\text{Absorbed Fixed Overheads}) - (\text{Budgeted Fixed Overheads}) \]
Overhead Variances can also be affected by idle time. It is usually assumed that Overheads are incurred when labour is working, not when it is idle. Accordingly, *hours worked* has been considered for the calculation of Variable and Fixed Overheads Variances.

**Illustration 5**
You are given the following data:

<table>
<thead>
<tr>
<th></th>
<th><strong>Budgeted</strong></th>
<th><strong>Actual</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed overhead for July</td>
<td>₹10,000</td>
<td>₹10,200</td>
</tr>
<tr>
<td>Units of production in July</td>
<td>5,000</td>
<td>5,200</td>
</tr>
<tr>
<td>Standard time for one unit</td>
<td>4 hours</td>
<td></td>
</tr>
<tr>
<td>Actual hours worked</td>
<td></td>
<td>20,100 hours</td>
</tr>
</tbody>
</table>

Calculate all variances relating to fixed overheads
5.18 Advanced Management Accounting

Solution

Basic Calculations:
1. Absorbed Fixed Overheads = Standard Rate per Hour \(\times\) Standard Hours for Actual Output
   
   \[\text{Absorbed Fixed Overheads} = ₹ 0.50 \times \text{4 Hours} \times \text{5,200 Units}\]
   
   \[= ₹ 10,400\]

   OR

   \[= \text{Standard Rate per unit} \times \text{Actual Output}\]

   \[= ₹ 2 \times 5,200 \text{ Units}\]

   \[= ₹ 10,400\]

\[\# \text{Standard Rate per Hour} = ₹ 10,000 \text{ (Budgeted Fixed Overheads)} /\]

\[\quad [5,000 \text{ units (Budgeted Output)} \times 4 \text{ hours (Budgeted Hours)}]\]

\[= ₹ 0.50\]

\[\@ \text{Standard Rate per Unit} = ₹ 10,000 \text{ (Budgeted Fixed Overheads)} / 5,000 \text{ units}\]

\[\quad \text{(Budgeted Output)}\]

\[= ₹ 2\]

2. Budgeted Fixed Overheads = ₹ 10,000

3. Actual Fixed Overheads = ₹ 10,200

4. Budgeted Fixed Overheads for Actual Hours
   
   \[= ₹ 0.50 \times 20,100 \text{ Hrs}\]

   \[= ₹ 10,050\]

Computation of Variances:

Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads

\[= ₹ 10,400 – ₹ 10,200\]

\[= ₹ 200 \text{ (F)}\]

Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

\[= ₹ 10,000 – ₹ 10,200\]

\[= ₹ 200 \text{ (A)}\]

Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

\[= ₹ 10,400 – ₹ 10,000 = ₹ 400 \text{ (F)}\]
Fixed Overhead Capacity Variance = Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Overheads
= ₹ 10,050 – ₹ 10,000
= ₹ 50 (F)

Fixed Overhead Efficiency Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours
= ₹ 10,400 – ₹ 10,050
= ₹ 350 (F)

Calendar Variance: Calendar Variance arises due to the fact that the estimated fixed overheads are the same for each month or period irrespective of the actual number of working days. It is that portion of the volume variance which is due to the difference between the number of working days in the budget period and the number of actual working days in the period to which the budget is applied. The number of working days in the budget period are arrived at simply by dividing the number of annual days by twelve.

Illustration 6
Assuming the expenses to be fixed, calculate from the following data:
(a) Efficiency variance, (b) Volume variance, (c) Calendar variance and (d) Expense variance

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of working days per month</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Man hours per day</td>
<td>8,000</td>
<td>8,400</td>
</tr>
<tr>
<td>Output per man hour in units</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Standard overhead rate per man hour</td>
<td>₹ 2</td>
<td></td>
</tr>
<tr>
<td>Actual fixed expenses per month</td>
<td></td>
<td>₹ 3,25,000</td>
</tr>
</tbody>
</table>

Solution

Basic Calculations:
1. Actual Output: 8,400 Hours × 22 Days × 1.2 Units per Hour = 2,21,760 Units
2. Standard Output per Man Hour: 1
3. Standard Hours Produced or Std. Hrs. for Actual Production: 2,21,760 Units × 1 Hr. = 2,21,760 Hrs.
4. Budgeted Hrs.: 8,000 Hours × 20 Days = 1,60,000 Hours
5. Possible Hours: 8,000 Hours × 22 Days = 1,76,000 Hours
6. Actual Hours Worked: 8,400 Hours × 22 Days = 1,84,800 Hours
7. Overheads as per Budget: 8,000 Hours × 20 Days × ₹ 2 per Hour = ₹ 3,20,000
5.20 Advanced Management Accounting

Computation of Variances:

**Efficiency variance**

\[
\text{Efficiency variance} = \text{Std. Fixed Overhead Rate per Hour} \times (\text{Std. Hrs. for Actual Production} - \text{Actual Hrs.})
\]

\[
= ₹ 2 \times (2,21,760 \text{ Hours} - 1,84,800 \text{ Hours}) = ₹ 73,920 \text{ (F)}
\]

**Capacity variance**

\[
\text{Capacity variance} = \text{Standard Fixed Overhead Rate per Hour} \times (\text{Actual Hours} - \text{Possible Hours})
\]

\[
= ₹ 2 \times (1,84,800 \text{ Hours} - 1,76,000 \text{ hours}) = ₹ 17,600 \text{ (F)}
\]

**Calendar variance**

\[
\text{Calendar variance} = \text{Standard Fixed Overhead Rate per Hour} \times (\text{Possible Hours} - \text{Budgeted Hours})
\]

\[
= ₹ 2 \times (1,76,000 \text{ Hours} - 1,60,000 \text{ Hours}) = ₹ 32,000 \text{ (F)}
\]

**Volume variance**

\[
\text{Volume variance} = \text{Standard Fixed Overhead Rate per Hour} \times (\text{Standard Hours for Actual Output} - \text{Budgeted Hours})
\]

\[
= ₹ 2 \times (2,21,760 \text{ Hours} - 1,60,000 \text{ Hours}) = ₹ 1,23,520 \text{ (F)}
\]

**Expenses variance**

\[
\text{Expenses variance} = \text{Budgeted Expenses} - \text{Actual Expenses}
\]

\[
= ₹ 3,20,000 - ₹ 3,25,000 = ₹ 5,000 \text{ (A)}
\]

**Total variance**

\[
\text{Total variance} = \text{Absorbed Overheads} - \text{Actual Overheads}
\]

\[
= ₹ 2,21,760 \times ₹ 2 - ₹ 3,25,000 = ₹ 4,43,520 - ₹ 3,25,000 = ₹ 1,18,520 \text{ (F)}
\]

(b) Variable Overhead Variances:

These variances arise due to the difference between the standard variable overheads for actual output and the actual variable overheads. The variable overhead total variance (also known as variable overhead cost variance) can be analysed further as:-

**Variable Overhead Expenditure Variance:** It is that part of variable overhead variance which arises due to the difference between the budgeted variable overhead and the actual variable overhead incurred.

**Variable Overhead Efficiency Variance:** It is that part of variable overhead variance which arises due to the difference between standard hours required for actual output and the actual hours worked. It can be computed by multiplying the difference of standard and actual hours by the standard variable overhead rate per hour. If standard hours exceed the actual hours worked, the variance will be favourable and vice versa.
Variable Production Overhead Variances

Variable Overhead Total Variance®
(Standard Variable Overheads for Production – Actual Variable Overheads)

Variable Overhead Expenditure (Spending) Variance
(Budgeted Variable Overheads for Actual Hours*)
Less (Actual Variable Overheads)

Variable Overhead Efficiency Variance
(Standard Variable Overheads for Production)
Less (Budgeted Variable Overheads for Actual Hours*)

Note:

Standard Variable Overheads for Production/Charged to Production
= Standard/Budgeted Variable Overhead Rate per Unit × Actual Production (Units)
= Standard Variable Overhead Rate per Hour × Standard Hours for Actual Production

Actual Overheads Incurred
Budgeted Variable Overheads for Actual Hours
= Standard Variable Overhead Rate per Hour × Actual Hours
(*)
= Variable Overhead Total Variance also known as ‘Variable Overhead Cost Variance’

Variable Overhead Expenditure Variance
(Budgeted Variable Overheads for Actual Hours) – (Actual Variable Overheads)
Or
(Standard Rate per Hour × Actual Hours) – (Actual Rate per Hour × Actual Hours)
Or
Actual Hours × (Standard Rate per Hour – Actual Rate per Hour)

Variable Overhead Efficiency Variance
(Standard Variable Overheads for Production) – (Budgeted Overheads for Actual Hours)
Or
(Standard Variable Overhead Rate per Hour × Standard Hours for Actual Output) – (Standard Variable Overhead Rate per Hour × Actual Hours)
Or
Standard Variable Overhead Rate per Hour × (Standard Hours for Actual Output – Actual hours)
Illustration 7

XYZ Company has established the following standards for variable factory overhead.

**Standard hours per unit:** 6

**Variable overhead per hour:** ₹ 2

The actual data for the month are as follows:

- **Actual variable overheads incurred:** ₹ 2,00,000
- **Actual output (units):** 20,000
- **Actual hours worked:** 1,12,000

Calculate variable overhead variances viz

**Solution**

**Basic Calculations:**

1. **Standard Variable Overheads for Production**
   \[
   = \text{Standard Rate per Hour} \times \text{Standard Hours for Actual Output}
   \]
   \[
   = ₹ 2 \times [6 \text{ Hours} \times 20,000 \text{ Units}]
   \]
   \[
   = ₹ 2,40,000
   \]

2. **Actual Variable Overheads**
   \[
   = ₹ 2,00,000
   \]

3. **Budgeted Variable Overheads for Actual Hours**
   \[
   = \text{Standard Rate per Hour} \times \text{Actual Hours}
   \]
   \[
   = ₹ 2 \times 1,12,000 \text{ hours}
   \]
   \[
   = ₹ 2,24,000
   \]

**Computation of Variances:**

- **Variable Overhead Cost Variance**
  \[
  = \text{Standard Variable Overheads for Production} - \text{Actual Variable Overheads}
  \]
  \[
  = ₹ 2,40,000 - ₹ 2,00,000
  \]
  \[
  = ₹ 40,000 \text{ (F)}
  \]

- **Variable Overhead Expenditure Variance**
  \[
  = \text{Budgeted Variable Overheads for Actual Hours} - \text{Actual Variable Overheads}
  \]
  \[
  = ₹ 2,24,000 - ₹ 2,00,000
  \]
  \[
  = ₹ 24,000 \text{ (F)}
  \]

- **Variable Overhead Efficiency Variance**
  \[
  = \text{Standard Variable Overheads for Production} - \text{Budgeted Variable Overheads for Actual Hours}
  \]
  \[
  = ₹ 2,40,000 - ₹ 2,24,000
  \]
  \[
  = ₹ 16,000 \text{ (F)}
  \]
**Illustration 8**

The overhead expense budget for a cost centre is as under:

<table>
<thead>
<tr>
<th></th>
<th>Budget per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect material</td>
<td>₹ 0.40</td>
</tr>
<tr>
<td>Indirect labour</td>
<td>₹ 0.60</td>
</tr>
<tr>
<td>Maintenance</td>
<td>₹ 0.40</td>
</tr>
<tr>
<td>Power</td>
<td>₹ 0.30</td>
</tr>
<tr>
<td>Sundries</td>
<td>₹ 0.30</td>
</tr>
<tr>
<td><strong>Total variable expenses</strong></td>
<td>₹ 2.00</td>
</tr>
<tr>
<td><strong>Fixed overhead budgeted</strong></td>
<td>₹ 240</td>
</tr>
</tbody>
</table>

Budgeted output = 9,600 units or 120 standard hours.

At the end of a period the actual rates given by the accounts department are as under:

<table>
<thead>
<tr>
<th></th>
<th>Actual per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>₹ 0.32</td>
</tr>
<tr>
<td>Maintenance</td>
<td>₹ 0.45</td>
</tr>
<tr>
<td>Indirect labour</td>
<td>₹ 0.60</td>
</tr>
<tr>
<td>Indirect material</td>
<td>₹ 0.50</td>
</tr>
<tr>
<td>Sundry expenses</td>
<td>₹ 0.29</td>
</tr>
<tr>
<td><strong>Total variable expenses</strong></td>
<td>₹ 2.16</td>
</tr>
<tr>
<td><strong>Fixed expenses</strong></td>
<td>₹ 250</td>
</tr>
</tbody>
</table>

The actual output is 12,160 units for which the actual hours worked are 156. The fixed expenses amounted to ₹ 250. Compute the variances.

**Solution**

**Basic Calculations:**

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Overhead Expenses Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Budget: 120 Std. Hours</td>
</tr>
<tr>
<td></td>
<td>Rate per hour ₹</td>
</tr>
<tr>
<td>Indirect material</td>
<td>0.40</td>
</tr>
<tr>
<td>Indirect labour</td>
<td>0.60</td>
</tr>
<tr>
<td>Maintenance</td>
<td>0.40</td>
</tr>
<tr>
<td>Power</td>
<td>0.30</td>
</tr>
<tr>
<td>Sundries</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>Total Variable Overheads</strong></td>
<td>2.00</td>
</tr>
<tr>
<td>Fixed overheads</td>
<td>2.00</td>
</tr>
<tr>
<td><strong>Total overheads</strong></td>
<td>2.00</td>
</tr>
</tbody>
</table>

Actual output = 12,160 units.

Hence standard hours produced or std. hours for actual production

\[
\frac{120 \text{ std. hours}}{9,600 \text{ units}} \times 12,160 \text{ actual output} = 152 \text{ hours}
\]
**Computation of Variances: Fixed Overheads**

**Working Notes:**
1. Absorbed Fixed Overhead = Standard Rate per Hour × Standard Hours for Actual Output
   \[
   \text{Absorbed Fixed Overhead} = \frac{120 \text{ Hours}}{9,600 \text{ Units}} \times 12,160 \text{ Units}
   \]
   \[
   = 2 \times 152 \text{ Hours} = ₹ 304
   \]
2. Budgeted Fixed Overhead = ₹ 240
3. Actual Fixed Overhead = ₹ 250
4. Budgeted Fixed Overheads for Actual Hours = Standard Rate per Hour × Actual Hours
   \[
   = 2 \times 156 \text{ Hours} = ₹ 312
   \]

**Computation of Variances:**
- **Fixed Overhead Cost Variance**
  \[
  \text{Fixed Overhead Cost Variance} = \text{Absorbed Fixed Overheads} - \text{Actual Fixed Overheads}
  \]
  \[
  = ₹ 304 - ₹ 250 = ₹ 54 \text{ (F)}
  \]
- **Fixed Overhead Expenditure Variance**
  \[
  \text{Fixed Overhead Expenditure Variance} = \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads}
  \]
  \[
  = ₹ 240 - ₹ 250 = ₹ 10 \text{ (A)}
  \]
- **Fixed Overhead Volume Variance**
  \[
  \text{Fixed Overhead Volume Variance} = \text{Absorbed Fixed Overheads} - \text{Budgeted Fixed Overheads}
  \]
  \[
  = ₹ 304 - ₹ 240 = ₹ 64 \text{ (F)}
  \]
- **Fixed Overhead Capacity Variance**
  \[
  \text{Fixed Overhead Capacity Variance} = \text{Budgeted Fixed Overheads for Actual Hours} - \text{Budgeted Fixed Overheads}
  \]
  \[
  = ₹ 312 - ₹ 240 = ₹ 72 \text{ (F)}
  \]
- **Fixed Overhead Efficiency Variance**
  \[
  \text{Fixed Overhead Efficiency Variance} = \text{Absorbed Fixed Overheads} - \text{Budgeted Fixed Overheads for Actual Hours}
  \]
  \[
  = ₹ 304 - ₹ 312 = ₹ 8 \text{ (A)}
  \]

**Computation of Variances: Variable Overhead**

**Working Notes:**
1. Standard Variable Overheads for Production = Standard Rate per Hour × Standard Hours for Actual Output
   \[
   \text{Standard Variable Overheads for Production} = 2 \times \frac{120 \text{ Hours}}{9,600 \text{ Units}} \times 12,160 \text{ Units}
   \]
   \[
   = 2 \times 152 \text{ Hours} = ₹ 304
   \]
2. Actual Variable Overheads = ₹ 337
3. Budgeted Variable Overheads for actual hours = Standard Rate per Hour × Actual Hours
   \[
   = 2 \times 156 \text{ Hrs.} = ₹ 312
   \]
### Computation of Variances:

<table>
<thead>
<tr>
<th>Variable Overhead Cost</th>
<th>Standard Variable Overheads for Production – Actual Variable Overheads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>= $304 – $337 = $33 (A)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable Overhead Expenditure Variance</th>
<th>Budgeted Variable Overheads for Actual Hours – Actual Variable Overheads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>= $312 – $337 = $25 (A)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable Overhead Efficiency Variance</th>
<th>Standard Variable Overheads for Production – Budgeted Variable Overheads for Actual Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>= $304 – $312 = $8 (A)</td>
</tr>
</tbody>
</table>

Now Students should try to attempt Illustration No.15, 17 and 18

### 5.2.4 Sales Variances

The sales variances can be computed in two ways. They are:

(a) Sales Turnover or Value Method.

(b) Profit or Sales Margin Method.

**a) Sales Turnover or Sales Value Method:** In the sales turnover method, the variances are computed on the basis of sales value. This method will give the sales manager an idea of the effect of various factors affecting sales such as prices, quantity and sales mix on the overall sales value.

**Sales Value Variance:** It is the difference between the Actual Sales and Budgeted Sales. The variance can be bifurcated into sales price variance and sales volume variance.

**Sales Price Variance:** It is difference between the Actual Sales and Standard Sales.

**Sales Volume Variances:** It is difference between the Standard Sales and Budgeted Sales.

As in the case of materials, the sales volume variance can be bifurcated into

— Sales Mix Variance and

— Sales Quantity Variance.

The former shows the difference in sales value due to the fact that the actual sales mix is different from what was expected as the budgeted mix. The latter shows the effect of total quantity being larger or smaller than what was budgeted.

For calculating the sales mix and quantity variances, we have to calculate the *average budgeted price per unit of budgeted mix* and the *average budgeted price per unit of actual mix*.

The sales mix variance can then be calculated as below:

\[
\text{Total Actual Sales Quantity} \times \left( \text{Average Budgeted Price per Unit of Actual Mix} - \text{Average Budgeted Price per Unit of Budgeted Mix} \right)
\]

The sales quantity variance can then be calculated as below:
### Advanced Management Accounting

**Average Budgeted Price per unit of Budgeted Mix x (Total Actual Qty. – Total Budgeted Qty.)**

#### Sales Variances (Turnover or Value)

<table>
<thead>
<tr>
<th>Sales Variance</th>
<th>(Actual Sales) Less (Budgeted Sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[(AP \times AQ) - (BP \times BQ)]</td>
</tr>
</tbody>
</table>

**Sales Price Variance**

<table>
<thead>
<tr>
<th>(Actual Sales)</th>
<th>Less</th>
<th>(Standard Sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[(AP \times AQ) - (BP \times AQ)]</td>
<td></td>
</tr>
<tr>
<td>Or</td>
<td>[AQ \times (AP - BP)]</td>
<td></td>
</tr>
</tbody>
</table>

**Sales Volume Variance**

<table>
<thead>
<tr>
<th>(Standard Sales)</th>
<th>Less</th>
<th>(Budgeted Sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(BP \times AQ) - (BP \times BQ)]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or</td>
<td>[BP \times (AQ - BQ)]</td>
<td></td>
</tr>
</tbody>
</table>

**Sales Mix Variance**

<table>
<thead>
<tr>
<th>(Standard Sales)</th>
<th>Less</th>
<th>(Revised Standard Sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(BP \times AQ) - (BP \times RAQ)]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or</td>
<td>[BP \times (AQ - RAQ)]</td>
<td></td>
</tr>
</tbody>
</table>

**Sales Quantity Variance**

<table>
<thead>
<tr>
<th>(Revised Standard Sales)</th>
<th>Less</th>
<th>(Budgeted Sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(BP \times RAQ) - (BP \times BQ)]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or</td>
<td>[BP \times (RAQ - BQ)]</td>
<td></td>
</tr>
</tbody>
</table>

**Alternative Formula**

- **Total Actual Quantity (units) × \{Average Budgeted Price per unit of Actual Mix Less Average Budgeted Price per unit of Budgeted Mix\}

**Market Size Variance**

| (Budgeted Market Share % × (Actual Industry Sales Quantity in units – Budgeted Industry Sales Quantity in units)) × (Average Budgeted Price per unit) |

**Market Share Variance**

| ((Actual Market Share % – Budgeted Market Share %) × (Actual Industry Sales Quantity in units) × (Average Budgeted Price per unit)) |
### Market Size Variance

\[
\text{Budgeted Market Share} \times (\text{Actual Industry Sales Quantity in units} - \text{Budgeted Industry Sales Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

Or

\[
(\text{Budgeted Market Share} \times \text{Actual Industry Sales Quantity in units} - \text{Budgeted Market Share} \times \text{Budgeted Industry Sales Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

Or

\[
(\text{Required Sales Quantity in units} - \text{Total Budgeted Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

### Market Share Variance

\[
(\text{Actual Market Share} - \text{Budgeted Market Share}) \times (\text{Actual Industry Sales Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

Or

\[
(\text{Actual Market Share} \times \text{Actual Industry Sales Quantity in units} - \text{Budgeted Market Share} \times \text{Actual Industry Sales Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

Or

\[
(\text{Total Actual Quantity in units} - \text{Required Sales Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

### Market Size Variance + Market Share Variance

\[
(\text{Required Sales Quantity in units} - \text{Total Budgeted Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

\[
\text{Add}
(\text{Total Actual Quantity in units} - \text{Required Sales Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

\[
\text{Equals to}
(\text{Total Actual Quantity in units} - \text{Total Budgeted Quantity in units}) \times (\text{Average Budgeted Price per unit})
\]

### Sales Quantity Variance

#### Note:
- BQ = Budgeted Sales Quantity
- AQ = Actual Sales Quantity
- RAQ = Revised Actual Sales Quantity
  = Actual Quantity Sold Rewritten in Budgeted Proportion
- BP = Budgeted Selling Price per Unit
- AP = Actual Selling Price per Unit
Illustration 9

Compute the sales turnover variances from the following figures:

<table>
<thead>
<tr>
<th>Product</th>
<th>Budget</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity (Units)</td>
<td>Price (₹)</td>
</tr>
<tr>
<td>A</td>
<td>2,000</td>
<td>2.50</td>
</tr>
<tr>
<td>B</td>
<td>1,500</td>
<td>5.00</td>
</tr>
<tr>
<td>C</td>
<td>1,000</td>
<td>7.50</td>
</tr>
<tr>
<td>D</td>
<td>500</td>
<td>10.00</td>
</tr>
</tbody>
</table>

Solution

Basic Calculations:

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted Price</th>
<th>Actual Price</th>
<th>Budgeted Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.50</td>
<td>3.00</td>
<td>2,000</td>
</tr>
<tr>
<td>B</td>
<td>5.00</td>
<td>4.50</td>
<td>1,500</td>
</tr>
<tr>
<td>C</td>
<td>7.50</td>
<td>7.00</td>
<td>1,000</td>
</tr>
<tr>
<td>D</td>
<td>10.00</td>
<td>10.50</td>
<td>500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted Sales</th>
<th>Standard Sales</th>
<th>Actual Sales</th>
<th>Revised Actual Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5,000</td>
<td>6,000</td>
<td>7,200</td>
<td>2,160</td>
</tr>
<tr>
<td>B</td>
<td>7,500</td>
<td>9,000</td>
<td>6,300</td>
<td>1,620</td>
</tr>
<tr>
<td>C</td>
<td>12,000</td>
<td>9,000</td>
<td>8,400</td>
<td>1,080</td>
</tr>
<tr>
<td>D</td>
<td>5,000</td>
<td>4,000</td>
<td>4,200</td>
<td>540</td>
</tr>
</tbody>
</table>

Note:

BQ  =  Budgeted Sales Quantity
AQ  =  Actual Sales Quantity
RAQ =  Revised Actual Sales Quantity
      =  Actual Quantity Sold Rewritten in Budgeted Proportion
BP  =  Budgeted Selling Price per Unit
AP  =  Actual Selling Price per Unit

Computation of Variances:

<table>
<thead>
<tr>
<th>Product</th>
<th>Sales Variance (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$2,200 (F)</td>
</tr>
<tr>
<td>B</td>
<td>$1,200 (A)</td>
</tr>
<tr>
<td>C</td>
<td>$900 (F)</td>
</tr>
<tr>
<td>D</td>
<td>$800 (A)</td>
</tr>
</tbody>
</table>

Total Variance = $1,100 (F)
Sales Price Variance = AQ × (AP – BP)

Sales Volume Variance = BP × (AQ – BQ)

Sales Mix Variance = BP × (AQ – RAQ)

Sales Quantity Variance = BP × (RAQ – BQ)

(b) Sales Margin Method: The purpose of measuring the variances under this method is to identify the effect of changes in sale quantities and selling prices on the profits of the company. The quantity and mix variances should be analysed in conjunction with each other because the sales manager is responsible for both of these variances. Where a company is engaged in the manufacture and sale of multiple products, the variances between budgeted sales and actual sales may arise due to the following reasons:

— Changes in unit price and cost.
— Changes in physical volume of each product sold. This is quantity variance.
— Changes in the physical volume of the more profitable or less profitable products.

There are five distinct variables that can cause actual performance to differ from budgeted performance. They are:

— Direct substitution of products.
— Actual quantity of the constituents of sales being different from the budgeted quantity.
— Actual total quantity being different from the budgeted total quantity.
— Difference between actual and budgeted unit cost.
— Difference between actual and budgeted unit sale price.

The sales management should consider particularly the interaction of more than one variable in making decisions. For example, decrease in selling price coupled with a favourable product quantity variance may help to assess the price elasticity of demand.

The formulae for the calculation of Sales Margin Variances are as under:

Total Sales Margin Variance: It is the difference between the Actual Margin and the Budgeted Margin.

Sales Margin Price Variance: This variance arises because of the difference between the budgeted price of the quantity actually sold and the actual price thereof.
5.30 Advanced Management Accounting

Sales Margin Price Variance equals to Actual Quantity × (Actual Margin per Unit – Budgeted Margin per Unit).

Sales Margin Volume Variance:
This variance arises because of the difference between the actual and budgeted quantities of each product both evaluated at budgeted margin.

Sales Margin Volume Variance equals to Budgeted Margin per Unit × (Actual Units – Budgeted Units)
This can be further sub-divided into the following two variances:

**Sales Margin Quantity Variance:** This variance arises because of the difference between the actual total quantity and the budgeted total quantity and is ascertained by multiplying this difference by average budgeted margin per unit of budgeted mix.

**Sales Margin Mix Variance:** This variance arises because of the change in the quantities of actual sales mix from budgeted sale mix and can be computed as below:

Sales Margin Mix Variance equals to Total Actual Quantity × (Average Budgeted Margin per Unit of Actual Mix – Average Budgeted Margin per Unit of Budgeted Mix).

**Sales Variances (Margin)**

**Sales Margin Variance**

\[
\text{(Actual Margin) Less (Budgeted Margin)} = (AQ \times AM) - (BQ \times BM)
\]

**Sales Margin Price Variance**

\[
\text{(Actual Margin) Less (Standard Margin)} = (AM \times AQ) - (BM \times AQ)
\]

Or
\[
AQ \times (AM - BM)
\]

**Sales Margin Volume Variance**

\[
\text{(Standard Margin) Less (Budgeted Margin)} = (BM \times AQ) - (BM \times BQ)
\]

Or
\[
BM \times (AQ - BQ)
\]

**Sales Margin Mix Variance**

\[
\text{(Standard Margin) Less (Revised Standard Margin)} = (AQ \times BM) - (RAQ \times BM)
\]

Or
\[
BM \times (AQ - RAQ)
\]

**Sales Margin Quantity Variance**

\[
\text{(Revised Standard Margin) Less (Budgeted Margin)} = (RAQ \times BM) - (BQ \times BM)
\]

Or
\[
BM \times (RAQ - BQ)
\]
**Alternative Formula**

\[ \text{Total Actual Qty (units)} \times \{ \text{Average Budgeted Margin per unit of Actual Mix Less Average Budgeted Margin per unit of Budgeted Mix} \} \]

---

**Alternative Formula**

\[ \text{Average Budgeted Margin per unit of Budgeted Mix} \times \{ \text{Total Actual Qty (units) Less Total Budgeted Qty (units)} \} \]

---

**Market Size Variance**

\[ \text{Budgeted Market Share \%} \times (\text{Actual Industry Sales Quantity in units} – \text{Budgeted Industry Sales Quantity in units}) \times (\text{Average Budgeted Margin per unit}) \]

**Market Share Variance**

\[ (\text{Actual Market Share \%} – \text{Budgeted Market Share \%}) \times (\text{Actual Industry Sales Quantity in units}) \times (\text{Average Budgeted Margin per unit}) \]

---

**Note:**

- **BQ** = Budgeted Sales Quantity
- **AQ** = Actual Sales Quantity
- **RAQ** = Revised Actual Sales Quantity
  - = Actual Quantity Sold Rewritten in Budgeted Proportion
- **BM** = Budgeted Margin
  - = Budgeted price per Unit – Standard Cost per Unit
- **AM** = Actual Margin
  - = Actual Sales Price per Unit – Standard Cost per Unit

---

**Market Size Variance**

(Budgeted Market Share \% \times (Actual Industry Sales Quantity in units – Budgeted Industry Sales Quantity in units) \times (Average Budgeted Margin per unit))

Or

(Budgeted Market Share \% \times Actual Industry Sales Quantity in units – Budgeted Market Share \% \times Budgeted Industry Sales Quantity in units) \times (Average Budgeted Margin per unit)

Or

(Required Sales Quantity in units –Total Budgeted Quantity in units) \times (Average Budgeted Margin per unit)

**Market Share Variance**

(Actual Market Share \% – Budgeted Market Share \%) \times (Actual Industry Sales Quantity in units) \times (Average Budgeted Margin per unit)

Or

(Actual Market Share \% \times Actual Industry Sales Quantity in units – Budgeted Market Share \% \times Actual Industry Sales Quantity in units) \times (Average Budgeted Margin per unit)

Or

(Total Actual Quantity in units– Required Sales Quantity in units) \times (Average Budgeted Margin per unit)
Market Size Variance + Market Share Variance

(Required Sales Quantity \( \text{in units} \) – Total Budgeted Quantity \( \text{in units} \) \( \times \) (Average Budgeted Margin per unit)

\[
\text{Add} \quad (\text{Total Actual Quantity } \text{in units} – \text{Required Sales Quantity } \text{in units}) \times (\text{Average Budgeted Margin per unit})
\]

Equals to

(Required Sales Quantity \( \text{in units} \) – Total Budgeted Quantity \( \text{in units} \) \( \times \) (Average Budgeted Margin per unit)

Sales Margin Quantity Variance

Illustration 10

Compute the sales margin variances from the following data:

<table>
<thead>
<tr>
<th>Products</th>
<th>Budgeted Quantity (units)</th>
<th>Actual Quantity (units)</th>
<th>Budgeted Sale Price (( \text{₹} ))</th>
<th>Actual Sale Price (( \text{₹} ))</th>
<th>Standard Cost per Unit (( \text{₹} ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,200</td>
<td>2,000</td>
<td>5.00</td>
<td>4.50</td>
<td>3.00</td>
</tr>
<tr>
<td>B</td>
<td>800</td>
<td>1,000</td>
<td>2.50</td>
<td>2.00</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Solution

Basic Calculations:

The margin for each product may be calculated as under:

<table>
<thead>
<tr>
<th>Products</th>
<th>Budgeted Price (( \text{₹} ))</th>
<th>Actual Price (( \text{₹} ))</th>
<th>Std. Cost (( \text{₹} ))</th>
<th>Budgeted Margin (( \text{₹} ))</th>
<th>Actual Margin (( \text{₹} ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.00</td>
<td>4.50</td>
<td>3.00</td>
<td>2.00</td>
<td>1.50</td>
</tr>
<tr>
<td>B</td>
<td>2.50</td>
<td>2.00</td>
<td>1.50</td>
<td>1.00</td>
<td>0.50</td>
</tr>
</tbody>
</table>

For computing the various sales margin variances the following calculations be made:

<table>
<thead>
<tr>
<th>Products</th>
<th>Marginal Budget</th>
<th>Marginal Actual</th>
<th>Quantity Budget</th>
<th>Quantity Actual</th>
<th>Budgeted Margin</th>
<th>Standard Margin</th>
<th>Actual Margin</th>
<th>Revised Actual Quantity [RAQ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.00</td>
<td>1.50</td>
<td>1,200</td>
<td>2,000</td>
<td>2,400</td>
<td>4,000</td>
<td>3,000</td>
<td>1,800</td>
</tr>
<tr>
<td>B</td>
<td>1.00</td>
<td>0.50</td>
<td>800</td>
<td>1,000</td>
<td>800</td>
<td>1,000</td>
<td>500</td>
<td>1,200</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>2,000</td>
<td>3,000</td>
<td>3,200</td>
<td>5,000</td>
<td>3,500</td>
<td>3,000</td>
</tr>
</tbody>
</table>
Note:
BQ = Budgeted Sales Quantity
AQ = Actual Sales Quantity
RAQ = Actual Quantity Sold Rewritten in Budgeted Proportion
BM = Budgeted Margin
AM = Actual Margin

Computation of Variances:
Sales Margin Variance = Actual Margin – Budgeted Margin
= AQ × AM – BQ × BM
For Product A
= ₹ 3,000 – ₹ 2,400
= ₹ 600 (F)
For Product B
= ₹ 500 – ₹ 800
= ₹ 300 (A)
Total (A + B)
= ₹ 600 (F) + ₹ 300 (A)
= ₹ 300 (F)

Sales Margin Price Variance = Actual Margin – Standard Margin
= AQ × AM – AQ × BM
Or
AQ × (AM – BM)
For Product A
= ₹ 3,000 – ₹ 4,000
= ₹ 1,000 (A)
For Product B
= ₹ 500 – ₹ 1,000
= ₹ 500 (A)
Total (A + B)
= ₹ 1,000 (A) + ₹ 500 (A)
= ₹ 1,500 (A)

Sales Margin Volume Variance = Standard Margin – Budgeted Margin
= AQ× BM – BQ × BM
Or
BM × (AQ – BQ)
For Product A
= ₹ 4,000 – ₹ 2,400
= ₹ 1,600 (F)
For Product B
\[\text{Sales Margin Mix Variance} = 1,000 - 800 = 200 (F)\]
Total (A + B)
\[\text{Sales Margin Mix Variance} = 1,600 (F) + 200 (F) = 1,800 (F)\]
Sales Margin Mix Variance
\[\text{Sales Margin Mix Variance} = \text{Standard Margin} - \text{Revised Standard Margin} = AQ \times BM - RAQ \times BM\]
\[\text{Or} \quad BM \times (AQ - RAQ)\]
For Product A
\[\text{For Product A} = 2 \times (2,000 \text{ Units} - 1,800 \text{ Units}) = 400 (F)\]
For Product B
\[\text{For Product B} = 1 \times (1,000 \text{ Units} - 1,200 \text{ Units}) = 200 (A)\]
Total (A + B)
\[\text{Total (A + B)} = 400 (F) + 200 (A) = 200 (F)\]
Sales Margin Quantity Variance
\[\text{Sales Margin Quantity Variance} = \text{Revised Standard Margin} - \text{Budgeted Margin} = RAQ \times BM - BQ \times BM\]
\[\text{Or} \quad BM \times (RAQ - BQ)\]
Product A
\[\text{Product A} = 2 \times (1,800 \text{ Units} - 1,200 \text{ Units}) = 1,200 (F)\]
Product B
\[\text{Product B} = 1 \times (1,200 \text{ Units} - 800 \text{ Units}) = 400 (F)\]
Total (A + B)
\[\text{Total (A + B)} = 1,200 (F) + 400 (F) = 1,600 (F)\]

Illustration 11
Super computers manufactures and sells three related PC models:
1. PC — Sold mostly to college students
2. Portable PC— Smaller version of PC positioned as home computer
3. Super PC — Sold mostly to business executives
Budgeted and actual data for 2012 is as follows:

**Budgeted for 2012**

<table>
<thead>
<tr>
<th>Products/PC Models</th>
<th>Selling price per unit (₹)</th>
<th>Variable cost per unit (₹)</th>
<th>Contribution margin per unit (₹)</th>
<th>Sales volume in units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>24,000</td>
<td>14,000</td>
<td>10,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Portable PC</td>
<td>16,000</td>
<td>10,000</td>
<td>6,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Super PC</td>
<td>1,00,000</td>
<td>60,000</td>
<td>40,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
<td>10,000</td>
</tr>
</tbody>
</table>

**Actual for 2012**

<table>
<thead>
<tr>
<th>Products/PC Models</th>
<th>Selling price per unit (₹)</th>
<th>Variable cost per unit (₹)</th>
<th>Contribution margin per unit (₹)</th>
<th>Sales volume in units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>22,000</td>
<td>10,000</td>
<td>12,000</td>
<td>8,250</td>
</tr>
<tr>
<td>Portable PC</td>
<td>13,000</td>
<td>8,000</td>
<td>5,000</td>
<td>1,650</td>
</tr>
<tr>
<td>Super PC</td>
<td>70,000</td>
<td>50,000</td>
<td>20,000</td>
<td>1,100</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
<td>11,000</td>
</tr>
</tbody>
</table>

Super computers derived its total unit sales budget for 2012 from the internal management estimate of a 20% market share and an industry sales forecast by computer manufacturers association of 50,000 units. At the end of the year the association reported actual industry sales of 68,750 units.

**Required:**

(i) Compute the individual product and total sales volume variance.

(ii) Compute total sales quantity variance.

(iii) Compute the market size and market share variances.

**Solution**

**Basic Calculations:**

1. Statement of budgeted average contribution margin per unit for the year 2012

<table>
<thead>
<tr>
<th>Products/Different PC Models</th>
<th>Budgeted Contribution Margin per Unit (₹)</th>
<th>Budgeted Sales Volume (Units)</th>
<th>Total Budgeted Contribution Margin (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>10,000</td>
<td>7,000</td>
<td>70,00,00,000</td>
</tr>
<tr>
<td>Portable PC</td>
<td>6,000</td>
<td>1,000</td>
<td>60,00,000</td>
</tr>
<tr>
<td>Super PC</td>
<td>40,000</td>
<td>2,000</td>
<td>80,00,00,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10,000</td>
<td>1560,00,000</td>
</tr>
</tbody>
</table>
Budgeted Average Contribution Margin per Unit = ₹15,60,00,000
10,000 Units
= ₹ 15,600

2. Actual Market Share Percentage
\[
\text{Actual Sales of 3 Models} \times 100
\]
\[
\text{Actual Industry Sales}
\]
= \[
\frac{11,000 \text{ Units}}{68,750 \text{ Units}} \times 100
\]
= 16%

3. Actual Sales Mix Percentage of Product
\[
\frac{\text{Actual Sale of Product}}{\text{Total Actual Sale of 3 Models}} \times 100
\]
PC
\[
= \frac{8,250 \text{ Units}}{11,000 \text{ Units}} \times 100 = 75%
\]
Portable PC
\[
= \frac{1,650 \text{ Units}}{11,000 \text{ Units}} \times 100 = 15%
\]
Super PC
\[
= \frac{1,100 \text{ Units}}{11,000 \text{ Units}} \times 100 = 10%
\]

Computation of Variances:
(i) Computation of Individual Product and Total Sales Volume Variance
\[
\text{Sales Volume Variance} = \left( \frac{\text{Actual Industry Sales in Units} - \text{Budgeted Industry Sales in Units}}{\text{Sales in Units}} \right) \times \text{Budgeted Contribution Margin per Unit}
\]
Individual Product Sales Volume Variance:
PC:
\[
= (8,250 \text{ Units} - 7,000 \text{ Units}) \times ₹ 10,000 = ₹ 1,25,00,000 \quad (F)
\]
Portable PC:
\[
= (1,650 \text{ Units} - 1,000 \text{ Units}) \times ₹ 6,000 = ₹ 39,00,000 \quad (F)
\]
Super PC:
\[
= (1,100 \text{ Units} - 2,000 \text{ Units}) \times ₹ 40,000 = ₹ 3,60,00,000 \quad (A)
\]
Total Sales Volume Variance = ₹ 1,96,00,000 \quad (A)

(ii) Computation of Total Sales Quantity Variance
\[
\text{Total Sales Quantity Variance} = \left( \frac{\text{Total Actual Sales Units} - \text{Total Budgeted Sales Units}}{\text{Sales Units}} \right) \times \text{Budgeted Average Contribution Margin per Unit}
\]
\[(11,000 \text{ Units} - 10,000 \text{ Units}) \times ₹15,600 = ₹1,56,00,000 (F)\]

(iii) **Computation of the Market Size and Market Share Variances**

*Market size variance:*

\[
= \text{Budgeted Market Share Percentage} \times \left( \frac{\text{Actual Industry Sales in Units} - \text{Budgeted Industry Sales in Units}}{\text{Sales in Units}} \right) \times \text{Budgeted Average Contribution Margin per Unit}
\]

\[
= 0.20 \times (68,750 \text{ Units} - 50,000 \text{ Units}) \times ₹15,600
\]

\[
= ₹5,85,00,000 (F)
\]

*Market Share Variance:*

\[
= \left( \frac{\text{Actual market Share Percentage} - \text{Budgeted Market Share Percentage}}{\text{Share Percentage}} \right) \times \left( \frac{\text{Actual Industry Sale Volume in Units} \times \text{Budgeted Average Contribution Margin per Unit}}{\text{Share Percentage}} \right)
\]

\[
= (0.16 - 0.20) \times 68,750 \text{ Units} \times ₹15,600
\]

\[
= ₹4,29,00,000 (A)
\]

*Note: Sales variances can also be calculated by using sales value approach.*

### 5.3 Reporting of Variances

Computation of variances and their reporting is not the final step towards the control of various elements of cost. It in fact demands an analysis of variances from the side of the executives, to ascertain the correct reasons for their occurrence. After knowing the exact reasons, it becomes their responsibility to take necessary steps so as to stop the re-occurrence of adverse variances in future. To enhance the utility of such a reporting system it is necessary that such a system of reporting should not only be prompt but should also facilitate the concerned managerial level to take necessary steps. Variance reports should be prepared after keeping in view its ultimate use and its periodicity. Such reports should highlight the essential cost deviations and possibilities for their improvements. In fact the variance reports should give due regard to the following points:-

(i) The concerned executives should be informed about what the cost performance should have been.

(ii) How close the actual cost performance is with reference to standard cost performance.

(iii) The analysis and causes of variances.

(iv) Reporting should be based on the principle of management by exception.

(v) The magnitude of variances should also be stated.

**Preparation of Original Budget, Standard Product Cost Sheet and the Reconciliation of Budgeted Profit and Actual Profit:** Generally, under variance analysis we compute various
variances from the actual and the standard/budgeted data. Sometimes all or a few variances and actual data are made available and from that we are required to prepare standard product cost sheet, original budget and to reconcile the budgeted profit with the actual profit. Some important concept are given below:

Reconciliations (Budgeted / Standard Profit / Actual Profit)

<table>
<thead>
<tr>
<th>Reconciliation Statement-I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted Profit to Actual Profit</td>
</tr>
<tr>
<td><strong>Budgeted Profit</strong></td>
</tr>
<tr>
<td>(Budgeted Quantity × Budgeted Margin)</td>
</tr>
<tr>
<td><strong>Effect of Variances</strong></td>
</tr>
<tr>
<td><strong>Material Cost Variance</strong></td>
</tr>
<tr>
<td>Material Price Variance</td>
</tr>
<tr>
<td>Material Usage Variance</td>
</tr>
<tr>
<td>Material Mix Variance</td>
</tr>
<tr>
<td>Material Yield Variance</td>
</tr>
<tr>
<td><strong>Labour Cost Variance</strong></td>
</tr>
<tr>
<td>Labour Rate Variance</td>
</tr>
<tr>
<td>Labour Idle Time Variance</td>
</tr>
<tr>
<td>Labour Efficiency Variance</td>
</tr>
<tr>
<td>Labour Mix Variance</td>
</tr>
<tr>
<td>Labour Sub-Efficiency Variance</td>
</tr>
<tr>
<td><strong>Variable Overhead Cost Variances</strong></td>
</tr>
<tr>
<td>Variable Overhead Expenditure Variance</td>
</tr>
<tr>
<td>Variable Overhead Efficiency Variance</td>
</tr>
<tr>
<td><strong>Fixed Overhead Cost Variances</strong></td>
</tr>
<tr>
<td>Fixed Overhead Expenditure Variance</td>
</tr>
<tr>
<td>Fixed Overhead Volume Variance</td>
</tr>
<tr>
<td>Fixed Overhead Capacity Variance</td>
</tr>
<tr>
<td>Fixed Overhead Efficiency Variance</td>
</tr>
<tr>
<td><strong>Sales Margin Variance</strong></td>
</tr>
<tr>
<td>Sales Margin Price Variance</td>
</tr>
<tr>
<td>Sales Margin Volume Variance</td>
</tr>
<tr>
<td>Sales Margin Mix Variance</td>
</tr>
<tr>
<td>Sales Margin Quantity Variance</td>
</tr>
<tr>
<td><strong>Actual Profit</strong></td>
</tr>
</tbody>
</table>
Reconciliation Statement-II
Budgeted Profit to Actual Profit

**Budgeted Profit**
(Budgeted Quantity × Budgeted Margin)

**Effect of Variances**

**Material Cost Variance**
- Material Price Variance
- Material Usage Variance
  - Material Mix Variance
  - Material Yield Variance

**Labour Cost Variance**
- Labour Rate Variance
- Labour Idle Time Variance
- Labour Efficiency Variance
  - Labour Mix Variance
  - Labour Sub-Efficiency Variance

**Variable Overhead Cost Variances**
- Variable Overhead Expenditure Variance
- Variable Overhead Efficiency Variance

**Fixed Overhead Cost Variances**
- Fixed Overhead Expenditure Variance
- Fixed Overhead Volume Variance
  - Fixed Overhead Capacity Variance
  - Fixed Overhead Efficiency Variance

**Sales Contribution Variances**
- Sales Contribution Price Variance
- Sales Contribution Volume Variance
  - Sales Contribution Mix Variance
  - Sales Contribution Quantity Variance

**Actual Profit**

---

(1) Relation between Sales Margin Volume Variance & Sales Contribution Volume Variance

Sales Margin Volume Variance = Budgeted Margin Per Unit × (Actual Quantity - Budgeted Quantity)

Or
### 5.40 Advanced Management Accounting

#### Sales Margin Volume Variance

\[
\text{Sales Margin Volume Variance} = \left[ \text{Standard (or Budgeted) Contribution Per Unit} - \text{Standard Fixed Overheads Per Unit} \right] \times (\text{Actual Quantity} - \text{Budgeted Quantity})
\]

Or

\[
\text{Sales Margin Volume Variance} = \text{Sales Contribution Volume Variance} - \text{Fixed Overhead Volume Variance}
\]

#### Fixed Overhead Volume Variance

Fixed Overhead Volume Variance does not arise in a Marginal Costing system. Why?

In an Absorption Costing system, it stands for the value of the under-or-over absorbed Fixed Overhead due to a change in production volume (Budgeted Vs Actual). When Marginal Costing is in use, there is no Overhead Volume Variance, because Marginal Costing does not absorb Fixed Overhead. Fixed Overhead Expenditure Variance is the only variance for Fixed Overhead in a Marginal Costing system. It is calculated as in an Absorption Costing system. Sales Margin Volume Variance in Marginal Costing System also known as Sales Volume Contribution Variance. This variance calculates the Standard Contribution gained or lost as a result of an increase or decrease in sales volume.

#### Sales Contribution Variance Formulas

<table>
<thead>
<tr>
<th>Type</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Contribution Volume</td>
<td>[ \text{Standard Contribution Per Unit} \times (\text{Actual Quantity} - \text{Budgeted Quantity}) ]</td>
</tr>
<tr>
<td>Sales Contribution Mix</td>
<td>[ \text{Standard Contribution Per Unit} \times (\text{Actual Quantity} - \text{Revised Actual Quantity}) ]</td>
</tr>
<tr>
<td>Sales Contribution Quantity</td>
<td>[ \text{Standard Contribution Per Unit} \times (\text{Revised Actual Quantity} - \text{Budgeted Quantity}) ]</td>
</tr>
</tbody>
</table>

#### Relation between Sales Price Variance & Sales Contribution Price Variance

Sales Price Variance is equal to Sales Contribution Price Variance. (This is because, for the actual quantity sold, standard cost remaining constant, change in selling price will have equal impact on turnover and contribution)

#### Relation between Sales Volume Variance & Sales Contribution Volume Variance

Sales Contribution Volume = Sales Volume Variance \times \text{Budgeted PV Ratio}
### Reconciliation Statement-III
Standard Profit to Actual Profit

**Standard Profit**
(Actual Quantity × Budgeted Margin)

**Effect of Variances**

<table>
<thead>
<tr>
<th>Variances</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material Cost Variance</strong></td>
<td></td>
</tr>
<tr>
<td>Material Price Variance</td>
<td></td>
</tr>
<tr>
<td>Material Usage Variance</td>
<td></td>
</tr>
<tr>
<td>Material Mix Variance</td>
<td></td>
</tr>
<tr>
<td>Material Yield Variance</td>
<td></td>
</tr>
<tr>
<td><strong>Labour Cost Variance</strong></td>
<td></td>
</tr>
<tr>
<td>Labour Rate Variance</td>
<td></td>
</tr>
<tr>
<td>Labour Idle Time Variance</td>
<td></td>
</tr>
<tr>
<td>Labour Efficiency Variance</td>
<td></td>
</tr>
<tr>
<td>Labour Mix Variance</td>
<td></td>
</tr>
<tr>
<td>Labour Sub-Efficiency Variance</td>
<td></td>
</tr>
<tr>
<td><strong>Variable Overhead Cost Variances</strong></td>
<td></td>
</tr>
<tr>
<td>Variable Overhead Expenditure Variance</td>
<td></td>
</tr>
<tr>
<td>Variable Overhead Efficiency Variance</td>
<td></td>
</tr>
<tr>
<td><strong>Fixed Overhead Cost Variances</strong></td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead Expenditure Variance</td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead Volume Variance</td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead Capacity Variance</td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead Efficiency Variance</td>
<td></td>
</tr>
<tr>
<td><strong>Sales Margin Variance</strong></td>
<td></td>
</tr>
<tr>
<td>Sales Margin Price Variance</td>
<td></td>
</tr>
<tr>
<td>Sales Margin Volume Variance</td>
<td></td>
</tr>
<tr>
<td>Sales Margin Mix Variance</td>
<td>NA</td>
</tr>
<tr>
<td>Sales Margin Quantity Variance</td>
<td>NA  NA</td>
</tr>
<tr>
<td><strong>Actual Profit</strong></td>
<td></td>
</tr>
</tbody>
</table>

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Illustration 12

New Jumbo Enterprises manufactures one product, and the entire product is sold as soon as it is produced. There are no opening or closing stocks and work in progress is negligible. The company operates a standard costing system and analysis of variances is made every month. The standard cost card for the product is as follows:

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material 0.5 kgs at ₹ 4 per kg.</td>
<td>2.00</td>
</tr>
<tr>
<td>Direct Wages 2 hrs. at ₹ 2 per hour</td>
<td>4.00</td>
</tr>
<tr>
<td>Variable overheads 2 hrs at ₹ 0.30 per hour</td>
<td>0.60</td>
</tr>
<tr>
<td>Fixed overheads 2 hours at ₹ 3.70 per hour</td>
<td>7.40</td>
</tr>
<tr>
<td>Standard cost 14.00</td>
<td></td>
</tr>
<tr>
<td>Standard profit 6.00</td>
<td></td>
</tr>
<tr>
<td>Standard selling price 20.00</td>
<td></td>
</tr>
</tbody>
</table>

Budgeted output for April 2012 was 5,100 units.

Actual results for April 2012 were as follows:

Production of 4,850 units was sold for ₹ 95,600.

Materials consumed in production amounted to 2,300 kgs. At a total cost of ₹ 9,800.

Labour hours paid for amounted to 8,500 hours at a cost of ₹ 16,800.

Actual operating hours amounted to 8,000 hours.

Variable overheads amounted to ₹ 2,600.

Fixed overheads amounted to ₹ 42,300.

You are required to

(a) Calculate Material, Labour, Variable Overhead, Fixed Overhead, Sales Value & Sales Margin Variances.

(b) Prepare an operating statement for the month ended 30th April 2012.

(c) Prepare an reconciliation Statement between ‘Budgeted Profit & Actual Profit’ under ‘Absorption Costing Method’

(d) Prepare an reconciliation Statement between ‘Budgeted Profit & Actual Profit’ under ‘Marginal Costing Method’

(e) Prepare an reconciliation Statement between ‘Standard Profit & Actual Profit’ under ‘Absorption Costing Method’
Solution
(a) Calculation of Variances:

1. **Material Variances**

<table>
<thead>
<tr>
<th></th>
<th>[SP \times SP]</th>
<th>[AQ \times AP]\</th>
<th>[AQ \times SP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4.850 \times 0.50) Kg. \times 4</td>
<td>2,300 Kg. \times 4.26</td>
<td>2,300 Kg. \times 4</td>
<td></td>
</tr>
<tr>
<td>= ₹ 9,700</td>
<td>= ₹ 9,800</td>
<td>= ₹ 9,200</td>
<td></td>
</tr>
</tbody>
</table>

* ₹ 9,800 / 2,300Kg.

Note:
- SQ = Standard Quantity = Expected Consumption for Actual Output
- AQ = Actual Quantity of Material Consumed
- SP = Standard Price per Unit
- AP = Actual Price per Unit

Material Cost Variance = Standard Cost – Actual Cost
= SQ \times SP – AQ \times AP
= ₹ 9,700 – ₹ 9,800
= ₹ 100 (A)

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost
= AQ \times SP – AQ \times AP
= ₹ 9,200 – ₹ 9,800
= ₹ 600 (A)

Material Usage Variance = Standard Cost of Standard Quantity for Actual Output –
= Standard Cost of Actual Quantity
= SQ \times SP – AQ \times SP
= ₹ 9,700 – ₹ 9,200
= ₹ 500 (F)

2. **Labour Variances**

<table>
<thead>
<tr>
<th></th>
<th>[SH \times SR]\</th>
<th>[AH \times AR]\</th>
<th>[AH \times SR]\</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4,850 \times 2) hrs. \times 2</td>
<td>8,500 hrs. \times 1.976</td>
<td>8,500 hrs. \times 2</td>
<td></td>
</tr>
<tr>
<td>= ₹ 19,400</td>
<td>= ₹ 16,800</td>
<td>= ₹ 17,000</td>
<td></td>
</tr>
</tbody>
</table>

* ₹ 16,800/8,500 hrs.

Note:
- SH = Standard Hours = Expected Time Allowed for Actual Output
- AH = Actual Hours paid for
- SR = Standard Rate per Labour Hour
- AR = Actual Rate per Labour Hour Paid
Labour Cost Variance
\[ \text{Labour Cost Variance} = \text{Standard Wages} - \text{Actual Wages} \]
\[ = \text{SH} \times \text{SR} - \text{AH} \times \text{AR} \]
\[ = \text{\₹ 19,400} - \text{\₹ 16,800} = \text{\₹ 2,600 (F)} \]

Labour Rate Variance
\[ \text{Labour Rate Variance} = \text{Standard Cost of Actual Time} - \text{Actual Cost} \]
\[ = \text{SR} \times \text{AH} - \text{AR} \times \text{AH} \]
\[ = \text{\₹ 17,000} - \text{\₹ 16,800} = \text{\₹ 200 (F)} \]

Labour Efficiency Variance
\[ \text{Labour Efficiency Variance} = \text{Standard Cost of Standard Time for Actual Output} - \text{Standard Cost of Actual time} \]
\[ = \text{SH} \times \text{SR} - \text{AH}^# \times \text{SR} \]
\[ = \text{\₹ 19,400} - \text{\₹ 16,000} = \text{\₹ 3,400 (F)} \]

\( \text{AH}^# \) refers to actual hours worked

Labour Idle Time Variance
\[ \text{Labour Idle Time Variance} = \text{Actual Idle Hrs.} \times \text{Standard Rate per Hour} \]
\[ = 500 \text{ Hrs.} \times \text{\₹ 2} = \text{\₹ 1,000} \]

3. **Fixed Overhead Variance**

<table>
<thead>
<tr>
<th>Absorbed Fixed Overheads</th>
<th>Budgeted Fixed Overheads</th>
<th>Actual Fixed Overheads</th>
<th>Budgeted Overheads for Actual Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ \text{\₹ 7.40} \times 4,850 ] Units</td>
<td>5,100 Units \times \text{\₹ 7.40}</td>
<td>4,850 Units \times \text{\₹ 8.722}^*</td>
<td>3.70 \times 8,000 Hrs</td>
</tr>
<tr>
<td>= \text{\₹ 35,890}</td>
<td>= \text{\₹ 37,740}</td>
<td>= \text{\₹ 42,300}</td>
<td>= \text{\₹ 29,600}</td>
</tr>
</tbody>
</table>

\*\( \text{\₹ 42,300 / 4,850 Units} \)

**Note:**
- \( \text{SR}^\circ \) = Standard Fixed Overhead Rate per Unit
- \( \text{AO} \) = Actual Output
- \( \text{BO} \) = Budgeted Output
- \( \text{AR} \) = Actual Fixed Overhead Rate per Unit
- \( \text{SR}^# \) = Standard Fixed Overhead Rate per Hour
- \( \text{AH} \) = Actual Hours

Fixed Overhead Cost Variance
\[ \text{Fixed Overhead Cost Variance} = \text{Absorbed Fixed Overheads} - \text{Actual Fixed Overheads} \]
\[ = \text{\₹ 35,890} - \text{\₹ 42,300} = \text{\₹ 6,410 (A)} \]

Fixed Overhead Expenditure Variance
\[ \text{Fixed Overhead Expenditure Variance} = \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads} \]
\[ = \text{\₹ 37,740} - \text{\₹ 42,300} = \text{\₹ 4,560 (A)} \]
Fixed Overhead Capacity Variance = Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Overheads
= ₹ 29,600 – ₹ 37,740 = ₹ 8,140 (A)

Fixed Overhead Efficiency Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual hours
= ₹ 35,890 – ₹ 29,600 = ₹ 6,290 (F)

Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads
= ₹ 35,890 – ₹ 37,740 = ₹ 1,850 (A)

4. Variable Overhead Variance

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>₹ 0.60 × 4,850 Units</td>
<td>4,850 Units × ₹ 0.536</td>
<td>₹ 0.30 × 8,000 Hours</td>
</tr>
<tr>
<td>= ₹ 2,910</td>
<td>= ₹ 2,600</td>
<td>= ₹ 2,400</td>
</tr>
</tbody>
</table>

*₹ 2,600/4,850 Units

Note:

SR® = Standard Variable Overhead Rate per Unit
AO = Actual Output
AR = Actual Variable Overhead Rate per Unit
SR# = Standard Variable Overhead Rate per Hour
AH = Actual Hours

Variable Overhead Cost Variance = Standard Variable Overheads – Actual Variable Overheads
= ₹ 2,910 – ₹ 2,600 = ₹ 310 (F)

Variable Overhead Expenditure Variance = Budgeted Variable Overheads for Actual Hours – Actual Variable Overheads
= ₹ 2,400 – 2,600 = ₹ 200 (A)

Variable Overhead Efficiency Variance = Standard Variable Overheads – Budgeted Variable Overheads for Actual hours
= ₹ 2,910 – ₹ 2,400 = 510 (F)
5.46 Advanced Management Accounting

5. **Sales Value Variances**

<table>
<thead>
<tr>
<th>BQ × BP</th>
<th>AQ × AP</th>
<th>AQ ×BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,100 Units × ₹ 20</td>
<td>4,850 units × ₹ 19.71</td>
<td>4,850 × ₹ 20</td>
</tr>
<tr>
<td>= ₹ 1,02,000</td>
<td>= ₹ 95,600</td>
<td>= ₹ 97,000</td>
</tr>
</tbody>
</table>

* ₹ 95,600/ 4,850 units

**Note:**
- BQ = Budgeted Sales Quantity
- AQ = Actual Sales Quantity
- BP = Budgeted Selling Price per Unit
- AP = Actual Selling Price per Unit

Sales Variance = Actual Sales – Budgeted Sales
= AP × AQ – BP × BQ
= ₹ 95,600 – ₹ 1,02,000
= ₹ 6,400 (A)

Sale Price Variance = Actual Sales – Standard Sales
= AP × AQ – BP × AQ
= ₹ 95,600 – ₹ 97,000
= ₹ 1,400 (A)

Sales Volume Variance = Standard Sales – Budgeted Sales
= BP × AQ – BP × BQ
= ₹ 97,000 – ₹ 1,02,000
= ₹ 5,000 (A)

6. **Sales Margin Variances**

<table>
<thead>
<tr>
<th>BQ × BM</th>
<th>AQ × AM</th>
<th>AQ × BM</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,100 Units × ₹ 6</td>
<td>4,850 units × [₹ 95,600 – ₹ 14]</td>
<td>4,850 units × ₹ 6</td>
</tr>
<tr>
<td>= ₹ 30,600</td>
<td>= ₹ 27,700</td>
<td>= ₹ 29,100</td>
</tr>
</tbody>
</table>

**Note:**
- BM = Budgeted Margin
  = (Budgeted Price per Unit – Standard Cost per Unit)
- AM = Actual Margin
  = (Actual Sales Price per Unit – Standard Cost per Unit)
- BQ = Budgeted Sales Quantity
- AQ = Actual Sales Quantity

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Sales Margin Variance = Actual Margin – Budgeted Margin  
= AQ × AM – BQ × BM  
= ₹ 27,700 – ₹ 30,600  
= ₹ 2,900 (A)

Sales Margin Price Variance = Actual Margin – Standard Margin  
= AM × AQ – BM × AQ  
= ₹ 27,700 – ₹ 29,100  
= ₹ 1,400 (A)

Sales Margin Volume Variance = Standard Margin – Budgeted Margin  
= BM × AQ – BM × BQ  
= ₹ 29,100 – ₹ 30,600  
= ₹ 1,500 (A)  
OR  
Sales Margin Volume Variance = [Sales Volume Variance × Budgeted Net Profit Ratio]  
= ₹ 5,000 (A) × \[\frac{\text{₹} 6}{\text{₹} 20} \times 100\]  
= ₹ 1,500 (A)

(b) Operating Statement for the month ended 30th April 2012:

<table>
<thead>
<tr>
<th>Operating Statement</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td></td>
<td>95,600</td>
</tr>
<tr>
<td>Less: Cost of Materials</td>
<td>9,800</td>
<td></td>
</tr>
<tr>
<td>Labour</td>
<td>16,800</td>
<td></td>
</tr>
<tr>
<td>Variable Overhead</td>
<td>2,600</td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead</td>
<td>42,300</td>
<td></td>
</tr>
<tr>
<td>Net Profit</td>
<td></td>
<td>71,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24,100</td>
</tr>
</tbody>
</table>

(c) Reconciliation Statement between ‘Budgeted Profit & Actual Profit’ under ‘Absorption Costing’ method

Reconciliation Statement (Absorption Costing)

<table>
<thead>
<tr>
<th>Budgeted Profit</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted Profit</td>
<td></td>
<td></td>
<td></td>
<td>30,600</td>
</tr>
<tr>
<td>(Budgeted Quantity x Budgeted Margin)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Effect of Variances

Material Cost Variances:
- Material Price Variance: (600)
- Material Usage Variance: 500 (100)

Labour Cost Variances:
Labour Rate Variance 200  
Labour Efficiency Variance 3,400  
Labour Idle Time Variance (1,000) 2,600  

**Variable Overhead Cost Variances:**  
Variable Overhead Expenditure Variance (200)  
Variable Overhead Efficiency Variance 510 310  

**Fixed Overhead Cost Variances:**  
Fixed Variable Overhead Expenditure Variance (4,560)  
Fixed Overhead Volume Variance  
  Fixed Overhead Capacity Variance (8,140)  
  Fixed Overhead Efficiency Variance 6,290 (1,850) (6,410)  

**Sales Margin Variance:**  
Sales Margin Price Variance (1,400)  
Sales Margin Volume Variance (1,500) (2,900) (6,500)  

**Actual Profit**  
| ✓ |  
|---|---|---|---|

Adverse shown by (–) symbol

Overheads can also be affected by Idle time. It is usually assume that overhead expenditure s incurred in active hours only.

### (d) Reconciliation between ‘Budgeted Profit & Actual Profit’ under ‘Marginal Costing’ Method

**Reconciliation Statement (Marginal Costing)**

<table>
<thead>
<tr>
<th>Budgeted Profit</th>
<th></th>
<th></th>
<th>Actual Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted Profit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
  (Budgeted Quantity x Budgeted Margin) | 30,600 |
| Effect of Variances | | | |
| Material Cost Variances: | | | |
| Material Price Variance | (600) | | |
| Material Usage Variance | 500 | (100) |
| Labour Cost Variances: | | | |
| Labour Rate Variance | 200 | | |
Labour Efficiency Variance  3,400
Labour Idle Time Variance (1,000)  2,600

Variable Overhead Cost Variances:
Variable Overhead Expenditure Variance (200)
Variable Overhead Efficiency Variance  510  310

Fixed Overhead Cost Variances:
Fixed Variable Overhead Expenditure Variance (4,560)
Fixed Overhead Volume Variance
Fixed Overhead Capacity Variance NA
Fixed Overhead Efficiency Variance NA NA (4,560)

Sales Margin Variance:
Sales Contribution Price Variance (1,400)
Sales Contribution Volume Variance* (3,350) (4,750) (6,500)

Actual Profit  24,100

Calculation of Sales Contribution Volume Variance

* Sales Contribution Volume Variance = Standard Contribution per Unit × (Actual Quantity – Budgeted Quantity)
  = ₹ 13.40 × (4,850 Units – 5,100 Units)
  = 3,350 (A)
  Or

* Sales Contribution Volume Variance = Sales Margin Volume Variance + Fixed Overhead Volume Variance
  = ₹ 1,500(A) + ₹ 1,850 (A)
  = 3,350 (A)
  Or

* Sales Contribution Volume Variance = Sales Volume Variance × Budgeted PV Ratio
  = ₹ 5,000 (A) × (₹ 13.40/20.00 × 100)%
  = 3,350 (A)

(e) Reconciliation between ‘Standard Profit & Actual Profit’ under ‘Absorption Costing’ method

Reconciliation Statement (Absorption Costing)
Standard Profit  Actual Profit

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Profit</td>
<td></td>
<td></td>
<td></td>
<td>29,100</td>
</tr>
</tbody>
</table>

Adverse shown by (−) symbol
5.50 Advanced Management Accounting

(Actual Quantity x Budgeted Margin)

Effect of Variances

Material Cost Variances:

<table>
<thead>
<tr>
<th>Material Price Variance</th>
<th>Material Usage Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(600)</td>
<td>500 (100)</td>
</tr>
</tbody>
</table>

Labour Cost Variances:

<table>
<thead>
<tr>
<th>Labour Rate Variance</th>
<th>Labour Efficiency Variance</th>
<th>Labour Idle Time Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>3,400</td>
<td>(1,000) 2,600</td>
</tr>
</tbody>
</table>

Variable Overhead Cost Variances:

<table>
<thead>
<tr>
<th>Variable Overhead Expenditure Variance</th>
<th>Variable Overhead Efficiency Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(200)</td>
<td>510</td>
</tr>
</tbody>
</table>

Fixed Overhead Cost Variances:

<table>
<thead>
<tr>
<th>Fixed Variable Overhead Expenditure Variance</th>
<th>Fixed Overhead Volume Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4,560)</td>
<td>8,140</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Overhead Capacity Variance</th>
<th>Fixed Overhead Efficiency Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,290</td>
<td>(8,140)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sales Margin Price Variance</th>
<th>Sales Margin Volume Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1,400)</td>
<td>NA (1,400) (5,000)</td>
</tr>
</tbody>
</table>

Actual Profit: 24,100

Adverse shown by (–) symbol

Now Students should try to attempt Illustration No.25

5.4 Accounting Procedure For Standard Cost

The standard cost operations can be recorded in the books of account. Two important accounting procedures for standard costs are:

Partial Plan: This system uses current standards in which the inventory will be valued at current standard cost figure. Under this method the work-in-progress account is charged at the actual cost of production for the month and is credited with the standard cost of the month’s production of finished product. The closing balance of work-in-progress is also shown at standard cost. The balance after making the credit entries represent the variance from standard for the month. The analysis of the variance is done after the end of the month. This method is simple in operation because variances are analysed after the end of month but may present difficulties if the firm makes a variety of products. The following illustration will explain
the operation of the recording of standard cost under this method.

**Single Plan:** The main purpose of standard costing is cost control. To achieve this purpose, the variances should be analysed according to their causes. Analysis should be timely so that much time is not lost in taking corrective action wherever needed. In the partial plan, we have seen that the variances are analysed at the end of period. The single plan system envisages the posting of all items in the debit side of the work-in-progress account at the standard cost leaving the credit side to represent the standard cost of finished production and work-in-progress. This system enables the ascertainment of variances as and when the transaction is posted to work-in-progress account. In other words, the analysis of variances is done from the original documents like invoices, labour sheets, etc., and this method of analysis is known as analysis at source. Since, the single plan system contemplates the analysis of variances at source, the installation of this system requires more planning so that effective documentation at each stage is introduced for proper recording and analysis of variance. Thus for example, the issue of bill of materials to the stores enables the storekeeper to calculate the standard value of materials. If any material is requisitioned beyond the standard, he can mark the same for material usage variance account. In the production department, as and when the finished output is recorded, the standard waste and actual waste can be compared and necessary entries can be made by the shop supervisors for posting the excessive usage to appropriate variance accounts.

**Illustration 13**

XYZ & Co. manufactures product ‘Gamma’. It uses a standard costing system in which material price variance and labour rate variance are segregated at the point of purchase of material and the incurrence of labour cost respectively.

The standard cost card for product ‘Gamma’ shows the following details:

<table>
<thead>
<tr>
<th>Per unit (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material – 1 Kg. at 6 per Kg.</td>
</tr>
<tr>
<td>Labour – 2.5 Hrs. at ₹ 4 per Hr.</td>
</tr>
<tr>
<td>Overhead – 2.5 Hrs. at ₹ 2 per Hr.</td>
</tr>
<tr>
<td>Standard cost</td>
</tr>
</tbody>
</table>

Overhead rate is ₹ 2 per hour, the budgeted overhead being ₹ 2,000 for 1,000 budgeted hours.

Other information for the month of Nov’2012 is as follows:

**Materials:**
- Opening stock: 400 Kgs. at ₹ 6.00 per Kg.
- Purchase: 500 Kgs. at ₹ 7.00 per Kg.
Issued to production 450 Kgs.

Direct labour: 925 Hours at ₹ 4.40 per Hour.

Overhead: ₹ 2,100

During this month, 360 units are completed and in respect of 40 units, it is estimated that they are complete as to materials, but half complete as to labour and overhead. 300 units are sold at ₹ 30 per unit during the month. Prepare:-

(a) Cost Control Accounts
(b) Variance Accounts
(c) Trial Balance at the end of the month.

Also prepare the Cost Control Accounts, Variance Accounts and Trial Balance if the Company had implemented the ‘Partial Plan’ of accounting for variance.

Solution

Single Plan

(a) Cost Control Accounts

Raw Material Control A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Balance b/d (400 Kg. at ₹ 6)</td>
<td>2,400</td>
</tr>
<tr>
<td>To GL Adjustment A/c (500 Kg. at ₹ 6)</td>
<td>3,000</td>
</tr>
<tr>
<td>By GL Adjustment A/c</td>
<td>3,000</td>
</tr>
<tr>
<td>By GL Adjustment A/c (500 Kg. at ₹ 6)</td>
<td>2,700</td>
</tr>
<tr>
<td>By Balance c/d (450 Kg. at ₹ 6)</td>
<td>2,700</td>
</tr>
<tr>
<td>Total</td>
<td>5,400</td>
</tr>
</tbody>
</table>

Wages Control A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To GL Adjustment A/c (925 hours at ₹ 4)</td>
<td>3,700</td>
</tr>
<tr>
<td>To GL Adjustment A/c (950 hours at ₹ 4)</td>
<td>3,800</td>
</tr>
<tr>
<td>To Efficiency Variance A/c (25 hours at ₹ 4)</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>3,900</td>
</tr>
</tbody>
</table>
### Overhead Control A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>(₹)</th>
<th>By Description</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To GL Adjustment A/c</td>
<td>2,100</td>
<td>By Work – in – Progress Control A/c</td>
<td>1,900</td>
</tr>
<tr>
<td>To Overhead Efficiency Variance A/c</td>
<td>50</td>
<td>By Overhead Expenditure Variance A/c</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>By Overhead Capacity Variance A/c</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>2,150</td>
<td></td>
<td>2,150</td>
</tr>
</tbody>
</table>

### Work-in-Progress Control A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>(₹)</th>
<th>By Description</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Raw Material Control A/c (400 units at ₹ 6)</td>
<td>2,400</td>
<td>By FG Control A/c (360 units at ₹ 21)</td>
<td>7,560</td>
</tr>
<tr>
<td>To Wage Control A/c (380 units at ₹ 10)</td>
<td>3,800</td>
<td>By Balance c/d (40 units)</td>
<td>540</td>
</tr>
<tr>
<td>To Overhead Control A/c (380 units at ₹ 5)</td>
<td>1,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8,100</td>
<td></td>
<td>8,100</td>
</tr>
</tbody>
</table>

*Work-in-Progress Control A/c (Closing Balance) ₹ 540

[Material: 40 units x ₹ 6 = 240, Labour: 20 units x ₹ 10 = 200, Overhead 20 units x ₹ 5]

### Finished Goods (FG) Control A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>(₹)</th>
<th>By Description</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress Control A/c (360 units at ₹ 21)</td>
<td>7,560</td>
<td>By Costing P &amp; L A/c (300 units at ₹ 21)</td>
<td>6,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>By Balance c/d (60 units at ₹ 21)</td>
<td>1,260</td>
</tr>
<tr>
<td></td>
<td>7,560</td>
<td></td>
<td>7,560</td>
</tr>
</tbody>
</table>

### Costing P & L A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>(₹)</th>
<th>By Description</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Finished Goods Control A/c</td>
<td>6,300</td>
<td>By GL Adjustment A/c (Sales)</td>
<td>9,000</td>
</tr>
<tr>
<td>To Material Purchase Price Variance A/c</td>
<td>500</td>
<td>By Labour Efficiency Variance A/c</td>
<td>100</td>
</tr>
<tr>
<td>To Material Usage Variance A/c</td>
<td>300</td>
<td>By Overhead Efficiency Variance A/c</td>
<td>50</td>
</tr>
<tr>
<td>To Labour Rate Variance A/c</td>
<td>370</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.54 Advanced Management Accounting

<table>
<thead>
<tr>
<th>Account Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Overhead Expenditure Variance A/c</td>
<td>100</td>
</tr>
<tr>
<td>To Overhead Capacity Variance A/c</td>
<td>150</td>
</tr>
<tr>
<td>To GL Adjustment A/c (Profit)</td>
<td>1,430</td>
</tr>
<tr>
<td>Total</td>
<td>9,150</td>
</tr>
</tbody>
</table>

General Ledger (GL) Adjustment A/c

<table>
<thead>
<tr>
<th>Account Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Costing P &amp; L A/c</td>
<td>9,000</td>
</tr>
<tr>
<td>To Balance c/d</td>
<td>4,500</td>
</tr>
<tr>
<td>To GL Adjustment A/c</td>
<td>500</td>
</tr>
<tr>
<td>By Balance b/d</td>
<td>2,400</td>
</tr>
<tr>
<td>By Material Control A/c</td>
<td>3,000</td>
</tr>
<tr>
<td>By Material Purchase Price Variance A/c</td>
<td>500</td>
</tr>
<tr>
<td>By Wages Control A/c</td>
<td>3,700</td>
</tr>
<tr>
<td>By Labour Rate Variance A/c</td>
<td>370</td>
</tr>
<tr>
<td>By Overhead Control A/c</td>
<td>2,100</td>
</tr>
<tr>
<td>By Costing P &amp; L A/c (Profit)</td>
<td>1,430</td>
</tr>
<tr>
<td>Total</td>
<td>13,500</td>
</tr>
</tbody>
</table>

(b) Variance Accounts:

Material Purchase Price Variance A/c

<table>
<thead>
<tr>
<th>Account Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>To GL Adjustment A/c</td>
<td>500</td>
</tr>
<tr>
<td>By Costing P &amp; L A/c</td>
<td>500</td>
</tr>
</tbody>
</table>

Material Usage Variance A/c

<table>
<thead>
<tr>
<th>Account Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Raw Material Control A/c</td>
<td>300</td>
</tr>
<tr>
<td>By Costing P &amp; L A/c</td>
<td>300</td>
</tr>
</tbody>
</table>

Labour Rate Variance A/c

<table>
<thead>
<tr>
<th>Account Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>To GL Adjustment A/c</td>
<td>370</td>
</tr>
<tr>
<td>By Costing P &amp; L A/c</td>
<td>370</td>
</tr>
</tbody>
</table>

Labour Efficiency Variance A/c

<table>
<thead>
<tr>
<th>Account Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Costing P &amp; L A/c</td>
<td>100</td>
</tr>
<tr>
<td>By Wages Control A/c</td>
<td>100</td>
</tr>
</tbody>
</table>
Overhead Expenditure Variance A/c

<table>
<thead>
<tr>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Overhead Control A/c 100</td>
<td>By Costing P &amp; L A/c 100</td>
</tr>
</tbody>
</table>

Overhead Capacity Variance A/c

<table>
<thead>
<tr>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Overhead Control A/c 150</td>
<td>By Costing P &amp; L A/c 150</td>
</tr>
</tbody>
</table>

Overhead Efficiency Variance A/c

<table>
<thead>
<tr>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Costing P &amp; L A/c 50</td>
<td>By Overhead Control A/c 50</td>
</tr>
</tbody>
</table>

(c) Trial Balance at the end of the Month

<table>
<thead>
<tr>
<th></th>
<th>Dr. (₹)</th>
<th>Cr. (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GL Adjustment A/c</td>
<td>--</td>
<td>4,500</td>
</tr>
<tr>
<td>Raw Material Control</td>
<td>2,700</td>
<td>--</td>
</tr>
<tr>
<td>Work-in-Progress Control</td>
<td>540</td>
<td>--</td>
</tr>
<tr>
<td>Finished Goods Control</td>
<td>1,260</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>4,500</td>
<td>4,500</td>
</tr>
</tbody>
</table>

Partial Plan

(a) Cost Control Accounts

Raw Material Control A/c

<table>
<thead>
<tr>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Balance b/d  (400 Kg. at ₹ 6) 2,400</td>
<td>By Work-in-Progress Control A/c 2,750</td>
</tr>
<tr>
<td>To GL Adjustment A/c  (500 Kg. at ₹ 7) 3,500</td>
<td>By Balance c/d  (450 Kg. at ₹ 7) 3,150</td>
</tr>
<tr>
<td></td>
<td>5,900</td>
</tr>
</tbody>
</table>

Wages Control A/c

<table>
<thead>
<tr>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To GL Adjustment A/c 4,070</td>
<td>By Work-in-Progress Control A/c 4,070</td>
</tr>
</tbody>
</table>
### Overhead Control A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>₹</th>
<th>Description</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To GL Adjustment A/c</td>
<td>2,100</td>
<td>By Work-in-Progress Control A/c</td>
<td>2,100</td>
</tr>
<tr>
<td></td>
<td>2,100</td>
<td></td>
<td>2,100</td>
</tr>
</tbody>
</table>

### Work-in-Progress Control A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>₹</th>
<th>Description</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Raw Material Control A/c</td>
<td>2,750</td>
<td>By FG Control A/c</td>
<td>7,560</td>
</tr>
<tr>
<td></td>
<td>360 units at ₹ 21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To Wage Control A/c</td>
<td>4,070</td>
<td>By Material Price Variance A/c</td>
<td>50</td>
</tr>
<tr>
<td>To Overhead Control A/c</td>
<td>2,100</td>
<td>By Material Usage Variance A/c</td>
<td>300</td>
</tr>
<tr>
<td>To Labour Efficiency Variance A/c</td>
<td>100</td>
<td>By Overhead Capacity Variance A/c</td>
<td>150</td>
</tr>
<tr>
<td>To Overhead Efficiency Variance A/c</td>
<td>50</td>
<td>By Overhead Expenditure Variance A/c</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>By Labour Rate Variance A/c</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td></td>
<td>By Balance c/d (40 units)*</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td>9,070</td>
<td></td>
<td>9,070</td>
</tr>
</tbody>
</table>

*Work-in-Progress Control A/c (Closing Balance) ₹ 540

Material: 40 units x ₹ 6 = 240, Labour: 20 units x ₹ 10 = 200, Overhead 20 units x ₹ 5

### Finished Goods (FG) Control A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>₹</th>
<th>Description</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress Control A/c</td>
<td>7,560</td>
<td>By Costing P&amp;L A/c</td>
<td>6,300</td>
</tr>
<tr>
<td>(360 units at ₹ 21)</td>
<td></td>
<td>By Balance c/d (60 units at ₹ 21)</td>
<td>1,260</td>
</tr>
<tr>
<td></td>
<td>7,560</td>
<td></td>
<td>7,560</td>
</tr>
</tbody>
</table>

### Costing P & L A/c

<table>
<thead>
<tr>
<th>Description</th>
<th>₹</th>
<th>Description</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To FG Control A/c</td>
<td>6,300</td>
<td>By GL Adjustment A/c (Sales)</td>
<td>9,000</td>
</tr>
<tr>
<td>To Material Price Variance A/c</td>
<td>50</td>
<td>By Labour Efficiency Variance A/c</td>
<td>100</td>
</tr>
<tr>
<td>To Material Usage Variance A/c</td>
<td>300</td>
<td>By Overhead Efficiency Variance A/c</td>
<td>50</td>
</tr>
<tr>
<td>To Labour Rate Variance A/c</td>
<td>370</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To Overhead Expenditure Variance A/c 100
To Overhead Capacity Variance A/c 150
To GL Adjustment A/c (Profit) 1,880

General Ledger (GL) Adjustment A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Costing P &amp; L A/c 9,000</td>
<td>By Balance b/d 2,400</td>
</tr>
<tr>
<td>To Balance c/d 4,950</td>
<td>By Material Control A/c 3,500</td>
</tr>
<tr>
<td></td>
<td>By Wages Control A/c 4,070</td>
</tr>
<tr>
<td></td>
<td>By Overhead Control A/c 2,100</td>
</tr>
<tr>
<td></td>
<td>By Costing P &amp; L A/c (Profit) 1,880</td>
</tr>
<tr>
<td>13,950</td>
<td>13,950</td>
</tr>
</tbody>
</table>

(b) Variance Accounts:

Material Price Variance A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress Control A/c 50</td>
<td>By Costing P &amp; L A/c 50</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Material Usage Variance A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress Control A/c 300</td>
<td>By Costing P &amp; L A/c 300</td>
</tr>
<tr>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

Labour Rate Variance A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress Control A/c 370</td>
<td>By Costing P &amp; L A/c 370</td>
</tr>
<tr>
<td>370</td>
<td>370</td>
</tr>
</tbody>
</table>

Labour Efficiency Variance A/c

<table>
<thead>
<tr>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Costing P &amp; L A/c 100</td>
<td>By Work-in-Progress Control A/c 100</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Overhead Expenditure Variance A/c

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Control A/c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>By Costing P &amp; L A/c</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Overhead Capacity Variance A/c

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Work-in-Progress</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Control A/c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>By Costing P &amp; L A/c</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Overhead Efficiency Variance A/c

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Costing P &amp; L A/c</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>By Work-in-Progress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control A/c</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

(c) Trial Balance at the end of the Month

<table>
<thead>
<tr>
<th></th>
<th>Dr. (₹)</th>
<th>Cr. (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GL Adjustment</td>
<td>--</td>
<td>4,950</td>
</tr>
<tr>
<td>Raw Material Control</td>
<td>3,150</td>
<td>--</td>
</tr>
<tr>
<td>Work-in-Progress Control</td>
<td>540</td>
<td>--</td>
</tr>
<tr>
<td>Finished Goods Control</td>
<td>1,260</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>4,950</td>
<td>4,950</td>
</tr>
</tbody>
</table>

Working Notes:

(1) Equivalent Production:

As regards Material (360 + 40) = 400 Units
As regards Labour and Overhead (360 + ½ X 40) = 380 Units

(2) Material Variances:

<table>
<thead>
<tr>
<th>SQ x SP</th>
<th>AQ x AP</th>
<th>AQ x SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Units x ₹ 6</td>
<td>400 Units x ₹ 6 + 50</td>
<td>450 Units x ₹ 6</td>
</tr>
<tr>
<td>= ₹ 2,400</td>
<td>= ₹ 2,750</td>
<td>= ₹ 2,700</td>
</tr>
</tbody>
</table>

Material Price Variance = SP x AQ – AP x AQ
= ₹ 2,700 – ₹ 2,750 = ₹ 50 (A)
Standard Costing  5.59

Material Usage Variance = SQ x SP – AQ x SP
= ₹ 2,400 – ₹ 2,700 = ₹ 300 (A)

Material Purchase Price Variance = (SP– AP) x PQ
=(₹ 6 – ₹ 7)× 500 Units = ₹ 500(A)

(3) Labour Variances:

<table>
<thead>
<tr>
<th>SH x SR</th>
<th>AH x AR</th>
<th>AH x SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(380 x 2.5) hrs x ₹ 4 = ₹ 3,800</td>
<td>925 hrs x ₹ 4.40 = ₹ 4,070</td>
<td>925 hrs x ₹ 4 = ₹ 3,700</td>
</tr>
</tbody>
</table>

Labour Rate Variance = SR x AH – AR x AH
= ₹ 3,700 – ₹ 4,070 = ₹ 370 (A)

Labour Efficiency Variance = SH x SR – AH x SR
= ₹ 3,800 – ₹ 3,700 = ₹ 100 (F)

(4) Overhead Variances:

<table>
<thead>
<tr>
<th>Absorbed Overheads</th>
<th>Budgeted Overheads</th>
<th>Actual Overheads</th>
<th>Budgeted Overheads for Actual Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>380 Units x ₹ 5 = ₹ 1,900</td>
<td>₹ 2,000 (Given)</td>
<td>₹ 2,100 (Given)</td>
<td>₹ 925 hrs x ₹ 2 = ₹ 1,850</td>
</tr>
</tbody>
</table>

Fixed Overhead Expenditure Variance = Budgeted Overheads – Actual Overheads
= ₹ 2,000 – ₹ 2,100 = ₹ 100 (A)

Fixed Overhead Volume Variance = Absorbed Overheads – Budgeted Overheads
= ₹ 1,900 – ₹ 2,000
= ₹ 100 (A)

Fixed Overhead Capacity Variance = Budgeted Overheads for Actual Hours – Budgeted Overheads
= ₹ 1,850 – ₹ 2,000 = ₹ 150 (A)

Fixed Overhead Efficiency Variance = Absorbed Overheads – Budgeted Overheads for Actual Hours
= ₹ 1,900 – ₹ 1,850 = ₹ 50 (F)

Illustration 14

A company following standard costing system has the following information for the quarter ending 30th June, 2012:

Material purchased 12,000 pieces at ₹ 1.32 = ₹ 15,840.00
Materials consumed 11,400 pieces at ₹ 1.32 = ₹ 15,048.00
Actual wages paid 2,970 hours at ₹ 4.20 = ₹ 12,474.00
Actual factory expenses incurred ₹ 20,400 (Budgeted ₹ 19,800)
Units produced: 1,080 units and sold at ₹ 72 per unit
The standard rates and prices are as under:

- Direct materials ₹ 1.20 per unit
- Standard input 12 pieces per unit
- Direct labour rate ₹ 3.60 per hour
- Standard requirement 3.00 hours per unit
- Overheads ₹ 7.20 per labour hour

You are required to:

(a) Calculate Material, Labour and Overhead Variances.
(b) Prepare Material Control Account and Work in Progress Control Account if the company had adopted the Partial Plan for accounting of variances. Also give Journal Entries for the same.

Solution

(A) Calculation of Variances:

The cost sheet for 1,080 units will appear as under:

<table>
<thead>
<tr>
<th>Cost</th>
<th>Std. Qty.</th>
<th>Std. Rate (₹)</th>
<th>Std. Cost (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Material</td>
<td>12,960</td>
<td>1.20</td>
<td>15,552</td>
</tr>
<tr>
<td>Direct Labour</td>
<td>3,240</td>
<td>3.60</td>
<td>11,664</td>
</tr>
<tr>
<td>Overheads</td>
<td>3,240</td>
<td>7.20</td>
<td>23,328</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50,544</td>
</tr>
</tbody>
</table>

Material Variances

Material Price Variance:

\[ = 11,400 \text{ pcs.} \times (₹ 1.20 – ₹ 1.32) = ₹ 1,368 \] (A)

Material Usage Variance:

\[ = ₹ 1.20 \times (12,960 \text{ pcs.} – 11,400 \text{ pcs.}) \]
\[ = ₹ 1,872 \] (F)

Labour Variances

Labour Rate Variance:

\[ = 2,970 \text{ hrs.} \times (₹ 3.60 – ₹ 4.20) = ₹ 1,782 \] (A)

Labour Efficiency Variance:

\[ = ₹ 3.60 \times (3,240 \text{ hrs.} – 2,970 \text{ hrs.}) = ₹ 972 \] (F)

Overhead Variances:

(a) Charged to Production as per Cost Sheet (Absorbed): ₹ 23,328
(b) Actual Hours × Std. Rate (2,970 hrs. × ₹ 7.20): ₹ 21,384
(c) Overheads as per Budget ₹ 19,800
(d) Actual Overheads ₹ 20,400
    Efficiency Variance: (a) – (b) ₹ 1,944 (F)
    Capacity Variance: (b) – (c) ₹ 1,584 (F)
    Expense Variance: (c) – (d) ₹ 600 (A)
    Total Variance: (a) – (d) ₹ 2,928 (F)

(B) Ledger Accounts:

Material Control A/c

<table>
<thead>
<tr>
<th>Dr.</th>
<th>Cr.</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Opening balance</td>
<td>By Work-in-Progress Control A/c</td>
<td>15,048</td>
</tr>
<tr>
<td>To General Ledger Adjustment A/c</td>
<td>By Balance c/d</td>
<td>792</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15,840</td>
</tr>
</tbody>
</table>

Work-in-Progress Control A/c

<table>
<thead>
<tr>
<th>Dr.</th>
<th>Cr.</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Opening balance</td>
<td>By Finished Stock Control A/c</td>
<td>50,544.00</td>
</tr>
<tr>
<td>To Material Control A/c</td>
<td>By Material Price Variance A/c</td>
<td>1,368.00</td>
</tr>
<tr>
<td>To Wages Control A/c</td>
<td>By Labour Rate Variance A/c</td>
<td>1,782.00</td>
</tr>
<tr>
<td>To Overheads Control A/c</td>
<td>By Overhead Exp Variance A/c</td>
<td>600.00</td>
</tr>
<tr>
<td>To Material Usage Variance A/c</td>
<td>1,872.00</td>
<td></td>
</tr>
<tr>
<td>To Labour Efficiency Variance A/c</td>
<td>972.00</td>
<td></td>
</tr>
<tr>
<td>To Overhead Efficiency Variance A/c</td>
<td>1,944.00</td>
<td></td>
</tr>
<tr>
<td>To Overhead Capacity Variance A/c</td>
<td>1,584.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>54,294.00</td>
</tr>
</tbody>
</table>

Note: Assumed that there is no closing balance of work-in-progress.

(C) Journal Entries:

<table>
<thead>
<tr>
<th>(₹)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Material Control A/c</td>
<td>Dr. 15,840</td>
</tr>
<tr>
<td>To General Ledger Adjustment A/c</td>
<td>15,840</td>
</tr>
<tr>
<td>(Being the purchase value of 12,000 pieces of materials at ₹ 1.32 each)</td>
<td></td>
</tr>
</tbody>
</table>
### 5.62 Advanced Management Accounting

<table>
<thead>
<tr>
<th>(ii)</th>
<th>Work-in-Progress A/c Dr.</th>
<th>15,048</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Material Control A/c</td>
<td>15,048</td>
</tr>
<tr>
<td>(Being the cost of 11,400 pieces of materials actually issued to production at the actual price of ₹ 1.32 each)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(iii)</th>
<th>Work-in-Progress A/c Dr.</th>
<th>12,474</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Wages Control A/c</td>
<td>12,474</td>
</tr>
<tr>
<td>(Being the actual amount of direct wages paid for 2,970 hours at ₹ 4.20 per hour)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(iv)</th>
<th>Work-in-Progress A/c Dr.</th>
<th>20,400</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Overhead Expense Control A/c</td>
<td>20,400</td>
</tr>
<tr>
<td>(Being the actual overhead expenses incurred)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(v)</th>
<th>Finished Stock Control A/c Dr.</th>
<th>50,544</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Work-in-Progres A/c</td>
<td>50,544</td>
</tr>
<tr>
<td>(Being the standard cost of production transferred to finished goods account)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(vi)</th>
<th>Material Price Variance A/c Dr.</th>
<th>1,368</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Labour Rate Variance A/c Dr.</td>
<td>1,782</td>
</tr>
<tr>
<td></td>
<td>Overhead Expense Variance A/c Dr.</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>Work-in-Progress A/c Dr.</td>
<td>2,622</td>
</tr>
<tr>
<td></td>
<td>To Material Usage Variance A/c</td>
<td>1,872</td>
</tr>
<tr>
<td></td>
<td>To Labour Efficiency Variance A/c</td>
<td>972</td>
</tr>
<tr>
<td></td>
<td>To Overhead Efficiency Variance A/c</td>
<td>1,944</td>
</tr>
<tr>
<td></td>
<td>To Overhead Capacity Variance A/c</td>
<td>1,584</td>
</tr>
<tr>
<td>(Being variance charged)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5.5 Miscellaneous Illustrations:

*Note: In some solutions alternate formulas are given with the basic formulas for the better understanding of students.*

#### Computation of All Variances

**Illustration 15**

The Standard Cost Card of producing one unit of Item ‘Q’ is as under:

- **Direct material** —
  - A — 12 Kg. @ ₹ 10/- = 120
  - B — 5 Kg. @ ₹ 6/- = 30

- **Direct wages** — 5 Hrs. @ ₹ 3/- = 15
Fixed production overheads 35
Total standard cost 200

Fixed Production overhead is absorbed on expected annual output of 13,200 units. Actual result for the month of September, 2012 are as under:

Actual production : 1,000 units

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Cost</th>
<th>Actual Cost</th>
<th>Standard Cost of Actual Input in Std. Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12,000</td>
<td>10</td>
<td>1,20,000</td>
</tr>
<tr>
<td>B</td>
<td>5,000</td>
<td>6</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>17,000</td>
<td></td>
<td>1,50,000</td>
</tr>
</tbody>
</table>

Note:
- SQ = Standard Quantity = Expected Consumption for Actual Output
- AQ = Actual Quantity of Material Consumed
- RAQ = Revised Actual Quantity = Actual Quantity Rewritten in Standard Proportion
- SP = Standard Price Per Unit
- AP = Actual Price Per Unit

Statement showing Standard and Actual Labour Cost of 1,000 Units Produced
5.64 Advanced Management Accounting

<table>
<thead>
<tr>
<th>Standard Cost</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours [SH]</td>
<td>Hours [AH]</td>
</tr>
<tr>
<td>Rate [SR] (₹)</td>
<td>Rate [AR] (₹)</td>
</tr>
<tr>
<td>Amount [SH x SR] (₹)</td>
<td>Amount [AH x AR] (₹)</td>
</tr>
<tr>
<td>5,000</td>
<td>5,500</td>
</tr>
<tr>
<td>3</td>
<td>3.1818</td>
</tr>
<tr>
<td>15,000</td>
<td>17,500</td>
</tr>
</tbody>
</table>

Note:

SH = Standard Hours = Expected time (Time allowed) for Actual Output
AH = Actual Hours paid for
SR = Standard Rate per Labour Hour
AR = Actual Rate per Labour Hour Paid

Statement showing Overheads

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>₹35 × 1,000 Units = ₹35,000</td>
<td>₹7* × (1,100 Units × 5 Hrs.)</td>
<td>₹39,000 (Given)</td>
<td>₹7* × 5,500 Hrs. = ₹38,500</td>
</tr>
</tbody>
</table>

* Standard Rate per hour = \[\frac{₹ 35}{5 \text{ Hours}} = ₹ 7/\text{hr.}\]

** Standard Rate per Unit (Given)

Computation of Variances:

Material Cost Variance = Standard Cost – Actual Cost
= SQ × SP – AQ × AP

(A) = ₹ 1,20,000 – ₹ 1,21,000
= ₹ 1,000 (A)

(B) = ₹ 30,000 – ₹ 28,600
= ₹ 1,400 (F)

Total = ₹ 1,000 (A) + ₹ 1,400 (F)
= ₹ 400 (F)

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost
= AQ × SP – AQ × AP
Or
= AQ × (SP – AP)

(A) = 11,000 Kgs. × (₹ 10 – ₹ 11)
Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity
= SQ × SP – AQ × SP
Or
= SP × (SQ – AQ)

(A) = ₹ 10 × (12,000 Kgs. – 11,000 Kgs.)
= ₹ 10,000 (F)

(B) = ₹ 6 × (5,000 Kgs. – 5,200 Kgs)
= ₹ 1,200 (A)

Total = ₹ 10,000 (F) + ₹ 1,200 (A)
= ₹ 8,800 (F)

Material Mix Variance = Standard Cost of Actual Quantity in Standard Proportion – Standard Cost of Actual Quantity
= RAQ × SP – AQ × SP

(A) = 11,435 Kgs. × ₹ 10 – 11,000 Kgs. × ₹ 10
= ₹ 4,350 (F)

(B) = 4,765 Kgs. × ₹ 6 – 5,200 Kgs. × ₹ 6 = ₹ 2,610 (A)

Total = ₹ 1,740 (F)

= SQ × SP – RAQ × SP
Or
= SP × (SQ – RAQ)

(A) = ₹ 10 × (12,000 – 11,435) = ₹ 5,650 (F)

(B) = ₹ 6 × (5,000 – 4,765) = ₹ 1,410 (F)

Total = ₹ 5,650 (F) + ₹ 1,410 (F) = ₹ 7,060 (F)

Labour Cost Variance = Standard Cost – Actual Cost
= SH × SR – AH × AR
= 5,000 hrs. × ₹ 3 – 5,500 hrs. × ₹ 3.818....
= ₹ 2,500 (A)

Labour Rate Variance = Standard Cost of Actual Time – Actual Cost
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Labour Efficiency Variance

\[
\text{Labour Efficiency Variance} = \text{Standard Cost of Standard Time for Actual Output} - \text{Standard Cost of Actual Time}
\]

\[
= SH \times SR - AH \times SR
\]

Or

\[
= SR \times (SH - AH)
\]

\[
= 5,000 \text{ hrs.} \times \text{₹ 3} - 5,500 \text{ hrs.} \times \text{₹ 3.1818} \ldots...
\]

\[
= \text{₹ 1,500 (A)}
\]

Fixed Overhead Cost Variance

\[
\text{Fixed Overhead Cost Variance} = \text{Absorbed Fixed Overheads} - \text{Actual Fixed Overheads}
\]

\[
= SR^{**} \times AO - AR \times AH
\]

\[
= \text{₹ 35} \times 1,000 \text{ units} - \text{₹ 39,000}
\]

\[
= \text{₹ 4,000 (A)}
\]

** Standard Rate per Unit

Fixed Overhead Expenditure Variance

\[
\text{Fixed Overhead Expenditure Variance} = \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads}
\]

\[
= BH \times SR^{*} - AR \times AH
\]

\[
= \text{₹ 7} \times (1,100 \text{ Units} \times 5 \text{ hrs.}) - \text{₹ 39,000}
\]

\[
= \text{₹ 500 (A)}
\]

* Standard Rate per Hour

Fixed Overhead Volume Variance

\[
\text{Fixed Overhead Volume Variance} = \text{Absorbed Fixed Overheads} - \text{Budgeted Fixed Overheads}
\]

\[
= SR^{**} \times AO - SR^{*} \times BH
\]

\[
= \text{₹ 35} \times 1,000 \text{ Units} - 7 \times (1,100 \text{ units} \times 5 \text{ hrs.})
\]

\[
= \text{₹ 3,500 (A)}
\]

** Standard Rate per Unit

Fixed Overhead Capacity Variance

\[
\text{Fixed Overhead Capacity Variance} = \text{Budgeted Fixed Overheads for Actual Hours} - \text{Budgeted Fixed Overheads}
\]

\[
= SR^{*} \times AH - SR^{*} \times BH
\]

\[
= \text{₹ 7} \times 5,500 \text{ hrs.} - \text{₹ 7} \times (1,100 \text{ units} \times 5 \text{ hrs.})
\]

\[
= \text{NIL}
\]

* Standard Rate per Hour
Fixed Overhead Efficiency Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours = SR** × AO – SR* × AH = ₹ 35 × 1,000 units – ₹ 7 × 5,500 hrs. = ₹ 3,500 (A)

** Standard Rate per Unit *Standard Rate per Hour

Illustration 16

HK Corporation produces three products A, B, and C. The master budget called for the sale of 10,000 units of A at ₹ 12, 6,000 units of B at ₹ 15, and 8,000 units of C at ₹ 9. In addition, the standard variable cost for each product was ₹ 7 for A, ₹ 9 for B, and ₹ 6 for C. In fact, the firm actually produced and sold 11,000 units of A at ₹ 11.50, 5,000 units of B at ₹ 15.10, and 9,000 units of C at ₹ 8.55.

The firm uses two inputs to produce each of the products X and Y. The standard price of material X is ₹ 2 and for a unit of material Y is ₹ 1. The materials budgeted to be used for each product were:

<table>
<thead>
<tr>
<th>Products</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X (units)</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
</tr>
</tbody>
</table>

The firm actually used 54,000 units of X at a cost of ₹ 1,09,620 and 72,000 units of Y at a cost of ₹ 73,000.

Required:

Determine the mix, quantity and rate variances for sales as well as the yield, mix and price variance for materials.

Solution

Basic Calculations Sales Variances (Sales Value Method):

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted Sales</th>
<th>Actual Sales</th>
<th>Standard Sales</th>
<th>Revised Actual Quantity [RAQ] (Units)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qty. [BQ] (Units)</td>
<td>Rate [BP] (₹)</td>
<td>Amount [BQ × BP] (₹)</td>
<td>Qty. [AQ] (Units)</td>
</tr>
<tr>
<td>A</td>
<td>10,000</td>
<td>12</td>
<td>1,20,000</td>
<td>11,000</td>
</tr>
<tr>
<td>B</td>
<td>6,000</td>
<td>15</td>
<td>90,000</td>
<td>5,000</td>
</tr>
<tr>
<td>C</td>
<td>8,000</td>
<td>9</td>
<td>72,000</td>
<td>9,000</td>
</tr>
<tr>
<td></td>
<td>24,000</td>
<td>2,82,000</td>
<td>25,000</td>
<td>2,78,950</td>
</tr>
</tbody>
</table>
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Note:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BQ</td>
<td>Budgeted Sales Quantity</td>
</tr>
<tr>
<td>AQ</td>
<td>Actual Sales Quantity</td>
</tr>
<tr>
<td>RAQ</td>
<td>Revised Actual Sales Quantity</td>
</tr>
<tr>
<td>BP</td>
<td>Budgeted Selling Price per Unit</td>
</tr>
<tr>
<td>AP</td>
<td>Actual Selling Price</td>
</tr>
</tbody>
</table>

Computation of Sales Variances (Sales Value Method):

Sales Value Variance = Actual Sales – Budgeted Sales
= AP × AQ – BP × BQ

For Product A = ₹ 1,26,500 – ₹ 1,20,000 = ₹ 6,500 (F)
For Product B = ₹ 75,500 – ₹ 90,000 = ₹ 14,500 (A)
For Product C = ₹ 76,950 – ₹ 72,000 = ₹ 4,950 (F)
Total = ₹ 6,500 (F) + ₹ 14,500 (A) + ₹ 4,950 (F) = ₹ 3,050 (A)

Sales Price Variance = Actual Sales – Standard Sales
= AP × AQ – BP × AQ
  Or
= AQ × (AP – BP)

For Product A = 11,000 Units × (₹ 11.50 – ₹ 12.00) = ₹ 5,500 (A)
For Product B = 5,000 Units × (₹ 15.10 – ₹ 15.00) = ₹ 500 (F)
For Product C = 9,000 Units × (₹ 8.55 – ₹ 9.00) = ₹ 4,050 (A)
Total = ₹ 5,500 (A) + ₹ 500 (F) + ₹ 4,050 (A) = ₹ 9,050 (A)

Sales Volume Variance = Standard Sales – Budgeted Sales
= BP × AQ – BP × BQ
  Or
= BP × (AQ – BQ)

For Product A = ₹ 12 × (11,000 Units – 10,000 Units) = ₹ 12,000 (F)
For Product B = ₹ 15 × (5,000 Units – 6,000 Units) = ₹ 15,000 (A)
For Product C = ₹ 9 × (9,000 Units – 8,000 Units) = ₹ 9,000 (F)
Total = ₹ 12,000 (F) + ₹ 15,000 (A) + ₹ 9,000 (F) = ₹ 6,000 (F)

Sales Mix Variance = Standard Sales – Revised Standard Sales
= BP × AQ – BP × RAQ
  Or
= BP × (AQ – RAQ)

For Product A = ₹ 12 × (11,000 Units – 10,417* Units) = 6,996 (F)
For Product B = ₹ 15 × (5,000 Units – 6,250 Units) = 18,750 (A)
For Product C  
= ₹ 9 × (9,000 Units – 8,333* Units) = 6,003 (F)  
Total  
= ₹ 6,996 (F) + ₹ 18,750 (A) + ₹ 6,003 (F)  
= ₹ 5,751 (A) #

**Sales Mix Variance**  
= Total Actual Qty (units) × (Average Budgeted Price per unit of Actual Mix – Average Budgeted Price per unit of Budgeted Mix)  
= 25,000 Units × \[ \left( \frac{₹ 2,88,000}{25,000 \text{ Units}} \right) - \left( \frac{₹ 2,82,000}{24,000 \text{ Units}} \right) \]  
= 5,750(A)#

# Note: ₹ 1 difference is due to * marked figures, rounded nearest to one.

**Sales Quantity Variance**  
= Revised Standard Sales – Budgeted Sales  
= BP × RAQ – BP × BQ  
Or  
= BP × (RAQ – BQ)  
For Product A  
= ₹ 12 × (10,417* Units – 10,000 Units) = 5,004 (F)  
For Product B  
= ₹ 15 × (6,250 Units – 6,000 Units) = 3,750 (F)  
For Product C  
= ₹ 9 × (8,333* Units – 8,000 Units) = 2,997 (F)  
Total  
= ₹ 5,004 (F) + ₹ 3,750 (F) + ₹ 2,997 (F)  
= ₹ 11,751 (F) #

Or  
**Sales Quantity Variance**  
= Average Budgeted Price per unit of Budgeted Mix × [Total Actual Qty (units) – Total Budgeted Qty (units)]  
= ₹ 11.75 × (1,000 Units)  
= ₹ 11,750 (F) #

# Note: ₹ 1 difference is due to * marked figure we have rounded nearest to one.

### Basic Calculations Sales Variances (Sales Margin Method):

<table>
<thead>
<tr>
<th>Product</th>
<th>[BQ] (Units)</th>
<th>[BM] (₹)</th>
<th>[BQ × BM] (₹)</th>
<th>[AQ] (Units)</th>
<th>[AM] (₹)</th>
<th>[AQ×AM] (₹)</th>
<th>Revised Actual Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10,000</td>
<td>5</td>
<td>50,000</td>
<td>11,000</td>
<td>4.50</td>
<td>49,500</td>
<td>10,417</td>
</tr>
<tr>
<td>B</td>
<td>6,000</td>
<td>6</td>
<td>36,000</td>
<td>5,000</td>
<td>6.10</td>
<td>30,500</td>
<td>6,250</td>
</tr>
<tr>
<td>C</td>
<td>8,000</td>
<td>3</td>
<td>24,000</td>
<td>9,000</td>
<td>2.55</td>
<td>22,950</td>
<td>8,333</td>
</tr>
<tr>
<td></td>
<td>24,000</td>
<td>1,10,000</td>
<td>25,000</td>
<td>1,02,950</td>
<td>1,12,000</td>
<td>25,000</td>
<td></td>
</tr>
</tbody>
</table>
Note:
- BQ = Budgeted Sales Quantity
- AQ = Actual Sales Quantity
- RAQ = Actual Quantity Sold Rewritten in Budgeted Proportion
- BM = Budgeted Margin
- AM = Actual Margin

### Computation of Sales Variances (Sales Margin Method):

#### Sales Margin Variance

\[
\text{Sales Margin Variance} = \text{Actual Margin} - \text{Budgeted Margin} = \text{AQ} \times \text{AM} - \text{BQ} \times \text{BM}
\]

For Product A: \( \text{₹} 49,500 - \text{₹} 50,000 = \text{₹} 500 \) (A)
For Product B: \( \text{₹} 30,500 - \text{₹} 36,000 = \text{₹} 5,500 \) (A)
For Product C: \( \text{₹} 22,950 - \text{₹} 24,000 = \text{₹} 1,050 \) (A)
Total: \( \text{₹} 500 \) (A) + \( \text{₹} 5,500 \) (A) + \( \text{₹} 1,050 \) (A) = \( \text{₹} 7,050 \) (A)

#### Sales Margin Price Variance

\[
\text{Sales Margin Price Variance} = \text{Actual Margin} - \text{Standard Margin} = \text{AQ} \times \text{AM} - \text{AQ} \times \text{BM}
\]

For Product A: \( \text{₹} 11,000 \text{ Units} \times (\text{₹} 4.50 - \text{₹} 5.00) = \text{₹} 5,500 \) (A)
For Product B: \( \text{₹} 5,000 \text{ Units} \times (\text{₹} 6.10 - \text{₹} 6.00) = \text{₹} 500 \) (F)
For Product C: \( \text{₹} 9,000 \text{ Units} \times (\text{₹} 2.55 - 3.00) = \text{₹} 4,050 \) (A)
Total: \( \text{₹} 5,500 \) (A) + \( \text{₹} 500 \) (F) + \( \text{₹} 4,050 \) (A) = \( \text{₹} 9,050 \) (A)

#### Sales Margin Volume Variance

\[
\text{Sales Margin Volume Variance} = \text{Standard Margin} - \text{Budgeted Margin Variance} = \text{AQ} \times \text{BM} - \text{BQ} \times \text{BM}
\]

Or
\[
= \text{BM} \times (\text{AQ} - \text{BQ})
\]

For Product A: \( \text{₹} 5.00 \times (11,000 \text{ Units} - 10,000 \text{ Units}) = \text{₹} 5,000 \) (F)
For Product B: \( \text{₹} 6.00 \times (5,000 \text{ Units} - 6,000 \text{ Units}) = \text{₹} 6,000 \) (A)
For Product C: \( \text{₹} 3.00 \times (9,000 \text{ Units} - 8,000 \text{ Units}) = \text{₹} 3,000 \) (F)
Total: \( \text{₹} 5,000 \) (F) + \( \text{₹} 6,000 \) (A) + \( \text{₹} 3,000 \) (F) = \( \text{₹} 2,000 \) (F)

#### Sales Margin Mix Variance

\[
\text{Sales Margin Mix Variance} = \text{Standard Margin} - \text{Revised Standard Margin} = \text{AQ} \times \text{BM} - \text{RAQ} \times \text{BM}
\]

Or
\[
= \text{BM} \times (\text{AQ} - \text{RAQ})
\]

For Product A: \( \text{₹} 5.00 \times (11,000 \text{ Units} - 10,417* \text{ Units}) = \text{₹} 2,915 \) (F)
For Product B: \( \text{₹} 6.00 \times (5,000 \text{ Units} - 6,250 \text{ Units}) = \text{₹} 7,500 \) (A)
Standard Costing

For Product C = ₹ 3.00 × (9,000 Units – 8,333* Units) = ₹ 2,001 (F)
Total = ₹ 2,915 (F) + ₹ 7,500 (A) + ₹ 2,001 (F) = ₹ 2,584* (A)

Sales Margin Mix Variance = Total Actual Quantity (units) × (Average Budgeted Margin per unit of Actual Mix – Average Budgeted Margin per unit of Budgeted Mix)

= 25,000 Units × \( \frac{₹ 1,12,000}{25,000 \text{ units}} - \frac{₹ 1,10,000}{24,000 \text{ units}} \) = ₹ 2,583* (A)

Note: ₹ 1 difference is due to * marked figures, rounded nearest to one.

Sales Margin Quantity Variance = Revised Standard Margin – Budgeted Margin
For Product A = ₹ 5 × (10,417* Units – 10,000 Units) = ₹ 2,085 (F)
For Product B = ₹ 6 × (6,250 Units – 6,000 Units) = ₹ 1,500 (F)
For Product C = ₹ 3 × (8,333* Units – 8,000 Units) = ₹ 999 (F)
Total = ₹ 2,085 (F) + ₹ 1,500 (F) + ₹ 999 (F) = 4,584* (F)

Sales Margin Quantity Variance = Average Budgeted Margin per unit of Budgeted Mix × [Total Actual Quantity (units) – Total Budgeted Quantity (units)]

= \( \frac{₹ 1,10,000}{24,000 \text{ units}} \) × (25,000 Units – 24,000 Units) = ₹ 4,583* (F)

Note: ₹ 1 difference is due to * marked figures, rounded nearest to one.

Basic Calculations: Material Variance

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Cost</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qty.</td>
<td>Price</td>
</tr>
<tr>
<td>X</td>
<td>[SQ] (Units)</td>
<td>[SP] (₹)</td>
</tr>
<tr>
<td></td>
<td>51,000*</td>
<td>2</td>
</tr>
<tr>
<td>Y</td>
<td>74,000**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1,25,000</td>
<td>1,76,000</td>
</tr>
</tbody>
</table>

* (11,000 × 2 + 5,000 × 4 + 9,000 × 1 = 51,000)
** (11,000 × 3 + 5,000 × 1 + 9,000 × 4 = 74,000)
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Note:
- SQ = Standard Quantity = Expected Consumption for Actual Output
- AQ = Actual Quantity of Material Consumed
- RAQ = Revised Actual Quantity = Actual Quantity Rewritten in Standard Proportion
- SP = Standard Price per unit
- AP = Actual Price per unit

Computation of Material Variances:

Material Cost Variance = Standard Cost – Actual Cost
= SQ × SP – AQ × AP
For Material ‘X’ = ₹ 1,02,000 – ₹ 1,09,620
= ₹ 7,620 (A)
For Material ‘Y’ = ₹ 74,000 – ₹ 73,000
= ₹ 1,000 (F)
Total = ₹ 7,620 (A) + ₹ 1,000 (F)
= ₹ 6,620 (A)

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost
= AQ × SP – AQ × AP
Or
AQ × (SP – AP)
For Material ‘X’ = 54,000 Units × (₹ 2.00 – ₹ 2.03) = ₹ 1,620 (A)
For Material ‘Y’ = 72,000 Units × (₹ 1.00 – ₹ 1.0139) = ₹ 1,000 (A)
Total = ₹ 1,620 (A) + ₹ 1,000 (A) = ₹ 2,620 (A)

Material Usage Variance = Standard Cost of Standard Quantity for Actual Output –
Standard Cost of Actual Quantity
= SQ × SP – AQ × SP
Or
SP × (SQ – AQ)
For Material ‘X’ = ₹ 2 × (51,000 Units – 54,000 Units) = ₹ 6,000 (A)
For Material ‘Y’ = ₹ 1 × (74,000 Units – 72,000 Units) = ₹ 2,000 (F)
Total = ₹ 6,000 (A) + ₹ 2,000 (F) = ₹ 4,000 (A)

Material Mix Variance = Standard Cost of Actual Quantity in Standard Proportion –
Standard Cost of Actual Quantity
RAQ × SP – AQ × SP
Or
= SP × (RAQ – AQ)
For Material ‘X’  =  ₹ 2 \times (51,408 \text{ Units} – 54,000 \text{ Units}) = ₹ 5,184 \text{ (A)}

For Material ‘Y’  =  ₹ 1 \times (74,592 \text{ Units} – 72,000 \text{ Units}) = ₹ 2,592 \text{ (F)}

Total  =  ₹ 5,184 \text{ (A)} + ₹ 2,592 \text{ (F)} = ₹ 2,592 \text{ (A)}

Or

Material Mix Variance  =  \text{Total Actual Quantity (units)} \times (\text{Average Standard Price per unit of Standard Mix} – \text{Average Standard Price per unit of Actual Mix})

=  1,26,000 \text{ Units} \times \left( \frac{₹ 1,76,000}{1,25,000 \text{ units}} - \frac{₹ 1,80,000}{1,26,000 \text{ units}} \right)

=  ₹ 2,592 \text{ (A)}

Material Yield Variance  =  \text{Standard Cost of Standard Quantity for Actual Output} – \text{Standard Cost of Actual Quantity in Standard Proportion}

=  \text{SP} \times (\text{SQ} – \text{RAQ})

For Material ‘X’  =  ₹ 2 \times (51,000 \text{ Units} – 51,408 \text{ Units}) = ₹ 816 \text{ (A)}

For Material ‘Y’  =  ₹ 1 \times (74,000 \text{ Units} – 74,592 \text{ Units}) = ₹ 592 \text{ (A)}

Total  =  ₹ 816 \text{ (A)} + ₹ 592 \text{ (A)}

=  ₹ 1,408 \text{ (A)}

Or

Material Yield Variance  =  \text{Average Standard Price per unit of Standard Mix} \times [\text{Total Standard Quantity (units)} – \text{Total Actual Quantity (units)}]

=  \left( \frac{₹ 1,76,000}{1,25,000 \text{ Units}} \right) \times (1,25,000 \text{ Units} – 1,26,000 \text{ Units})

=  ₹ 1,408 \text{ (A)}

Equivalent Concept – Variance Analysis

Illustration 17

GFE Associates undertake to prepare Property Tax returns. They use the weighted average method and actual costs for financial reporting purpose. However, for internal reporting, they use a standard cost system. The standards, on equivalent performance, have been established as follows:

\begin{align*}
\text{Labour per return} & \quad 10 \text{ hrs.} \times ₹ 30 \text{ per hour} \\
\text{Overhead per return} & \quad 10 \text{ hrs.} \times ₹ 15 \text{ per hour}
\end{align*}

For June 2012 performance, budgeted overhead is ₹108,000 for the standard labour hours allowed.

The following additional information pertains to the month of June 2012:

\begin{align*}
\text{June 1} & \quad \text{Returns in process (25% complete)} \quad 180 \text{ Nos.} \\
& \quad \text{Returns started in Jun} \quad 820 \text{ Nos.}
\end{align*}
June 30

Returns in process (80% complete) 200 Nos.

Cost Data

June 1

Returns in process:
Labour ₹ 16,000
Overheads 8,000

June 1 to 30
Labour (4,000 hrs.) 2,00,000
Overheads 1,00,000

You are required to compute:

(a) For each cost element, equivalent units of performance and the actual cost per equivalent unit.

(b) Actual cost of returns in process on June 30

(c) The standard cost per return, and

(d) The labour rate Variance, labour efficiency variance, overhead volume and overhead expenditure variance.

Solution

(a) Statement showing cost elements equivalent units of performance and the actual cost per equivalent unit:

<table>
<thead>
<tr>
<th>Detail of Returns</th>
<th>Detail of Input Units</th>
<th>Details</th>
<th>Equivalent Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Output Units</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Units %</td>
</tr>
<tr>
<td>Returns in Process at Start</td>
<td>180</td>
<td>Returns Completed in June</td>
<td>800</td>
</tr>
<tr>
<td>Returns Started in June</td>
<td>820</td>
<td>Returns in Process at the end of June</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,000</td>
</tr>
</tbody>
</table>

Costs:

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>From previous month</td>
<td>16,000</td>
<td>8,000</td>
</tr>
<tr>
<td>During the month</td>
<td>2,00,000</td>
<td>1,00,000</td>
</tr>
<tr>
<td>Total Cost</td>
<td>2,16,000</td>
<td>1,08,000</td>
</tr>
<tr>
<td>Cost per Equivalent Unit</td>
<td>225.00</td>
<td>112.50</td>
</tr>
</tbody>
</table>

Note: Since company follows Weighted Average Method, the stages of completion of returns at the beginning of June has been ignored.
(b) Actual cost of returns in process on June 30:

<table>
<thead>
<tr>
<th></th>
<th>Numbers</th>
<th>Stage of Completion</th>
<th>Rate per Return (₹)</th>
<th>Total (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour</td>
<td>200 returns</td>
<td>0.80</td>
<td>225.00</td>
<td>36,000</td>
</tr>
<tr>
<td>Overhead</td>
<td>200 returns</td>
<td>0.80</td>
<td>112.50</td>
<td>18,000</td>
</tr>
</tbody>
</table>

Total: 54,000

(c) Standard Cost per Return:
Labour: 10 Hrs x ₹30 per hour = ₹ 300
Overhead: 10 Hrs x ₹15 per hour = ₹ 150
450

(d) Computation of Variances:

<table>
<thead>
<tr>
<th>Statement showing output (Jun only) element wise</th>
<th>Labour</th>
<th>Overhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual performance in June in terms of equivalent units as Calculated above</td>
<td>960</td>
<td>960</td>
</tr>
<tr>
<td>Less: Returns in process at the beginning of June in terms of equivalent units i.e. 25% of returns (180)</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>915</td>
<td>915</td>
</tr>
</tbody>
</table>

Variance Analysis:

**Labour Rate Variance**
= Actual Time x (Standard Rate – Actual Rate)
= Standard Rate x Actual Time – Actual Rate x Actual Time
= ₹ 30 x 4,000 hrs. – ₹ 2,00,000 = ₹ 80,000(A)

**Labour Efficiency Variance**
= Standard Rate x (Standard Time – Actual Time)
= Standard Rate x Standard Time – Standard Rate x Actual Time
= ₹ 30 x (915 units x 10 hrs.) – ₹ 30 x 4,000 hrs. = ₹ 154,500(F)

**Overhead Expenditure or Budgeted Variance**
= Budgeted Overhead – Actual Overhead
= ₹ 108,000 – ₹ 100,000
= ₹ 8,000(F)

**Overhead Volume Variance**
= Recovered/Absorbed Overhead – Budgeted Overhead
= 915 Units x 10 hrs. x ₹ 15 – ₹ 108,000 = ₹ 29,250(F)
Illustration 18

Electro-Soft Ltd. has prepared the following cost sheet based on 8,000 units of output per month

\[
\begin{array}{l}
\text{Direct Materials 1.5 kg @ ₹ 24 per kg} \\
\text{Direct Labour 3 hours @ ₹ 4 per hours} \\
\text{Factory overheads} \\
\text{Total}
\end{array}
\]

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials</td>
<td>36.00</td>
</tr>
<tr>
<td>Direct Labour</td>
<td>12.00</td>
</tr>
<tr>
<td>Factory overheads</td>
<td>12.00</td>
</tr>
<tr>
<td>Total</td>
<td>60.00</td>
</tr>
</tbody>
</table>

The flexible budget for factory overhead is as under:

<table>
<thead>
<tr>
<th>Output (units)</th>
<th>6,000</th>
<th>7,500</th>
<th>9,000</th>
<th>10,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory overhead (₹)</td>
<td>81,600</td>
<td>92,400</td>
<td>1,03,200</td>
<td>1,14,000</td>
</tr>
</tbody>
</table>

The actual results for the month of October, 2002 are given below:

- Direct Materials purchased and consumed were 11,224 kg at ₹ 2,66,750.
- Direct Labour hours worked were 22,400 and Direct Wages paid amounted to ₹ 96,320.
- Factory overhead incurred amounted to ₹ 96,440 out of which the variable overhead is ₹ 2.60 per direct hour worked.
- Actual output is 7,620 units.
- Work-in-progress:
  - Opening WIP: 300 units:
    - Materials 100% complete; Labour and Overhead 60% complete
  - Closing WIP: 200 units:
    - Materials 50% complete; Labour and Overheads 40% complete

You are required to analyse the variances.

Solution

<table>
<thead>
<tr>
<th>Statement of Equivalent Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Output of Units produced</td>
</tr>
<tr>
<td>Add: Closing WIP</td>
</tr>
<tr>
<td>(200 units × 50% for Materials)</td>
</tr>
<tr>
<td>(200 units × 40% for Labour &amp; Overhead)</td>
</tr>
<tr>
<td>Less: Opening WIP</td>
</tr>
<tr>
<td>(300 units × 100% Complete)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statement Showing Standard Cost &amp; Actual Cost of Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qty. [SQ] (Kg.)</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>11,130 (7,420 × 1.5)</td>
</tr>
</tbody>
</table>

* Amount/Quantity

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Note:

SQ = Standard Quantity = Expected Consumption for Actual Output
AQ = Actual Quantity of Material Consumed
SP = Standard Price Per Unit
AP = Actual Price Per Unit

Material Cost Variance = Standard Cost – Actual Cost
= SQ × SP – AQ × AP
= ₹ 2,67,120 – ₹ 2,66,750
= ₹ 370 (F)

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost
= AQ × SP – AQ × AP
Or
= AQ × (SP – AP)
= 11,224 × (₹ 24 – ₹ 23.766)
= 2,626 (F)

Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost for Actual Quantity
= SQ × SP – AQ × SP
Or
= SP × (SP – AQ)
= ₹ 24 × (11,130 Kg. – 11,224 Kg.)
= ₹ 2,256 (A)

Statement showing Standard Cost & Actual Cost: Labour

<table>
<thead>
<tr>
<th>Standard Cost</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Rate</td>
</tr>
<tr>
<td>SH (Hrs.)</td>
<td>SR (₹)</td>
</tr>
<tr>
<td>22,560</td>
<td>4</td>
</tr>
</tbody>
</table>

22,560
[7,520 Units × 3 Hrs.]

*Amount/Hrs.

Note:

SH = Standard Hours = Expected time (Time allowed) for Actual Output.
AH = Actual Hours paid for
SR = Standard Rate per Labour Hour
AR = Actual Rate per Labour Hour Paid

Labour Cost Variance = Standard Cost – Actual Cost
= SH × SR – AH × AR
= ₹ 90,240 – ₹ 96,320
= ₹ 6,080 (A)
Labour Rate Variance  
\[ \text{Labour Rate Variance} = \text{Standard Cost of Actual Time} - \text{Actual Cost} \]
\[ = AH \times SR - AH \times AR \]
\[ = AH \times (SR - AR) \]
\[ = 22,400 \times (4 - 4.30) \]
\[ = \text{₹ 6,720 (A)} \]

Labour Efficiency Variance  
\[ \text{Labour Efficiency Variance} = \text{Standard Cost of Standard Time for Actual Output} - \text{Standard Cost of Actual Time} \]
\[ = SH \times SR - AH \times SR \]
\[ = SR \times (SH - AH) \]
\[ = 4 \times (22,560 \text{ hrs} - 22,400 \text{ hrs}) \]
\[ = \text{₹ 640 (F)} \]

**Statement Showing Standard/ Actual/ Budgeted Variable Overheads**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[7,520 Units × 3 Hrs.] × ₹2.40</td>
<td>22,400 Hrs. × ₹2.60 = ₹58,240</td>
<td>22,400 Hrs. × ₹2.40 = ₹53,760</td>
</tr>
<tr>
<td>= ₹54,144</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

- SH = Standard Hours = Expected Time for Actual Output
- SR = Standard Rate per Hour
- AH = Actual Hours Worked
- AR = Actual Rate per Hour

Variable Overhead Cost Variance  
\[ \text{Variable Overhead Cost Variance} = \text{Standard Variable Overheads} - \text{Actual Variable Overheads} \]
\[ = SH \times SR - AH \times AR \]
\[ = 54,144 - 58,240 = \text{₹ 4,096 (A)} \]

Variable Overhead Expenditure Variance  
\[ \text{Variable Overhead Expenditure Variance} = \text{Budgeted Variable Overheads for Actual hours} - \text{Actual Variable Overheads} \]
\[ = SR \times AH - AR \times AH \]
\[ = 53,760 - 58,240 = \text{₹ 4,480 (A)} \]

Variable Overhead Efficiency Variance  
\[ \text{Variable Overhead Efficiency Variance} = \text{Standard Variable Overheads} - \text{Budgeted Variable Overheads} \]
\[ \text{Overheads for Actual Hours} \]
\[ = SH \times SR - SR \times AH \]
\[ = 54,144 - 53,760 = \text{₹ 384 (F)} \]
### Statement showing Absorbed/Budgeted/Actual Fixed Overheads

<table>
<thead>
<tr>
<th>Absorbed Fixed Overheads</th>
<th>Budgeted Fixed Overheads</th>
<th>Actual Fixed Overheads</th>
<th>Budgeted Fixed Overheads for Actual Hours*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SH × SR)</td>
<td>(BH × SR)</td>
<td>(AR × AH)</td>
<td>(SR × AH)</td>
</tr>
<tr>
<td>(7,520 Units × 3 Hrs.) × ₹ 1.60</td>
<td>(8,000 Units × 3 hrs.) × ₹ 1.60</td>
<td>22,400 Hrs. × ₹1.7054*</td>
<td>× 2,400 hrs.</td>
</tr>
<tr>
<td>= ₹ 36,096</td>
<td>= ₹ 38,400</td>
<td>= ₹ 38,200</td>
<td></td>
</tr>
</tbody>
</table>

* Amount/Hrs.

**Note:**
- SH = Standard Hours = Expected Time for Actual Output
- SR = Standard Rate per Hour
- BH = Budgeted Hours = Expected Time for Budgeted Output
- AH = Actual Hours Worked
- AR = Actual Rate per Hour

**Workings:**

Standard Variable Overhead Rate per Unit = (₹ 92,400 – ₹ 81,600)/(7,500 units – 6,000 units) = ₹ 7.20 per unit

Standard Variable Overhead Rate per Hour = 2.40 per hour (7.20 per unit/3 hrs.)

Standard Fixed Overhead Rate per Unit = Total Standard Factory Overhead per Unit – Standard Variable Overhead per unit

Standard Fixed Overhead per Unit = ₹ 12 – ₹ 7.20 = ₹ 4.80

Standard Fixed Overhead Rate per hour = ₹ 4.80/3 = ₹ 1.60 per hour

Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads

= SH × SR – AR × AH

= ₹ 36,096 – ₹ 38,200 = ₹ 2,104 (A)

Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

= BH × SR – AR × AH

= ₹ 38,400 – ₹ 38,200 = ₹ 200 (F)

Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

= SH × SR – BH × SR

= ₹ 36,096 – ₹ 38,400 = ₹ 2,304 (A)

Fixed Overhead Capacity Variance = Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Overheads

= SR × AH – BH × SR

= ₹ 35,840 – ₹ 38,400 = 2,560 (A)
Fixed Overhead Efficiency Variance  = Absorbed Fixed Overheads – Budgeted Overheads for Actual hours
= SH×SR – SR × AH
= ₹ 36,096 – ₹ 35,840
= ₹ 256 (F)

Preparation of Financial Profit & Loss Statement with given Variances

**Illustration 19**

The following is the Operating Statement of a company for April 2012:

<table>
<thead>
<tr>
<th></th>
<th>Favourable</th>
<th>Adverse</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Budgeted Profit</strong></td>
<td>2,00,000</td>
<td></td>
</tr>
<tr>
<td>Variances:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>8,000</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>19,200</td>
<td></td>
</tr>
<tr>
<td>Direct Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>9,920</td>
<td></td>
</tr>
<tr>
<td>Usage</td>
<td>12,800</td>
<td></td>
</tr>
<tr>
<td>Direct Labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>7,200</td>
<td></td>
</tr>
<tr>
<td>Fixed Overheads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>7,200</td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>8,000</td>
<td></td>
</tr>
<tr>
<td>Expense</td>
<td>2,800</td>
<td>11,920 (A)</td>
</tr>
<tr>
<td>Actual Profit</td>
<td>34,000</td>
<td>45,920</td>
</tr>
<tr>
<td></td>
<td>188,080</td>
<td></td>
</tr>
</tbody>
</table>

Additional information is as under:

- **Budget for the year** 1,20,000 units
- **Budgeted fixed overheads** ₹ 9,60,000 per annum
- **Standard cost of one unit of product is:**
  - **Direct Materials** 5 kg. @ ₹8 per kg.
  - **Direct Labour** 2 hours @ ₹6 per hour
- **Fixed overheads are absorbed on direct labour hour basis.**
- **Profit** 25% on sales

You are required to prepare the Annual Financial Profit / Loss Statement for April, 2012 in the following format:
Standard Costing

### Solution

**Working Notes:**

1. (a) Budgeted Fixed Overhead (per unit):
   
   \[
   \text{Budgeted Fixed Overheads p.a.} / \text{Budgeted Output for the Year} \\
   = \text{₹9,60,000} / 1,20,000 \text{ units} = \text{₹8 (per unit)}
   \]

   (b) Budgeted Fixed Overhead Hour:
   
   \[
   \text{Budgeted Fixed Overhead (per unit)} / \text{Standard Labour Hours (per unit)} \\
   = \text{₹8} / 2 \text{ hours} = \text{₹4 per hour}
   \]

2. Statement showing Standard Cost and Budgeted Selling Price

<table>
<thead>
<tr>
<th>Account</th>
<th>Qty./ Hours</th>
<th>Rate / Price (₹)</th>
<th>Actual Value (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Labour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Overheads</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. (a) Actual Output (units) for April, 2012:

   Fixed Overhead Volume Variance:
   
   \[
   \text{Efficiency Variance} + \text{Capacity Variance}
   \]
5.82 Advanced Management Accounting

\[ \text{Fixed Overhead Volume Variance:} = \text{Absorbed Overheads} - \text{Budgeted Overheads} = (\text{Standard Hours for Actual Output} - \text{Budgeted Hours}) \times \text{Standard Fixed Overhead Rate} \]

\[ \Rightarrow (2 \text{ hrs} \times \text{Actual Output} - 10,000 \text{ units} \times 2 \text{ hrs}) \times ₹ 4 = (-) ₹3,200 \]

\[ \text{Actual Output} = 9,600 \text{ units} \]

(b) Actual Fixed Overhead Expenses:

\[ \text{Fixed Overhead Expenses Variance} = (\text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads}) \]

\[ \Rightarrow (₹80,000 - \text{Actual Fixed Overheads}) = ₹2,800 \text{ (F)} \]

\[ \Rightarrow \text{Actual Fixed Overheads} = ₹77,200 \]

4. (a) Actual Sales Quantity (units):

Sales Margin Volume Variance

\[ = \text{Budgeted Margin per unit} \times \left( \frac{\text{Actual Sales Quantity} - \text{Budgeted Sales Quantity}}{\text{units}} \right) \]

\[ \Rightarrow ₹20 \text{ (Actual Sales Quantity} - 10,000 \text{ units}) = ₹8,000 \text{ (A)} \]

\[ \Rightarrow \text{Actual Sales Quantity} = 9,600 \text{ units} \]

(b) Actual Selling Price (per unit):

Sales Price Variance

\[ = \left( \frac{\text{Actual Selling Price per unit} - \text{Budgeted Selling Price per unit}}{\text{per unit}} \right) \times \text{Actual Sales} \]

\[ \Rightarrow (\text{Actual Selling Price per unit} - ₹80) \times 9,600 \text{ units} = ₹19,200 \text{ (F)} \]

\[ \Rightarrow \text{Actual Selling Price per unit} = ₹82 \]

5. (a) Actual Quantity of Material Consumed:

Material Usage Variance

\[ = \left( \frac{\text{Standard Quantity} - \text{Actual Quantity}}{\text{Quantity}} \right) \times \text{Standard Price per unit} \]

\[ \Rightarrow (9,600 \text{ units} \times 5 \text{ kg.} - \text{Actual Quantity}) \times ₹8 = ₹12,800 \text{ (A)} \]

\[ \Rightarrow \text{Actual Quantity} = 49,600 \text{ Kg.} \]

(b) Actual Price per kg:

Material Price Variance

\[ = (\text{Standard Price per kg.} - \text{Actual Price per kg.}) \times \text{Actual Quantity of Material Consumed} \]

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(₹8 – Actual Price per kg.) x 49,600 Kg. = 9,920 (A)

Actual Price per kg ₹ 8.20

6. (a) Actual Direct Labour Hours Used:

Labour Efficiency Variance = (Standard Hours – Actual Hours) x Standard Rate per hour

(9,600 units × 2 hrs – Actual Hours) x ₹6 = ₹7,200 (F)

Actual Direct Labour Hours = 18,000 hours

(b) Actual Direct Labour Hour Rate:

Labour Rate Variance = (Standard Rate per hour – Actual Rate per hour) x 18,000 hours = ₹7,200 (A)

Actual Direct Labour Hour Rate = ₹6.40 per hour

### Annual financial Profit /Loss Statement
(for April, 2012)

<table>
<thead>
<tr>
<th>Account</th>
<th>Qty./ Hours</th>
<th>Rate/Price</th>
<th>Actual Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
</tr>
<tr>
<td>Sales: (A)</td>
<td></td>
<td>9,600 units</td>
<td>82</td>
</tr>
<tr>
<td>[Refer to working note 4]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Materials:</td>
<td></td>
<td>49,600 kgs.</td>
<td>8.20 per kg.</td>
</tr>
<tr>
<td>[Refer to working note 5]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Labour:</td>
<td></td>
<td>18,000 hours</td>
<td>6.40 per hour</td>
</tr>
<tr>
<td>[Refer to working note 6]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Overheads:</td>
<td></td>
<td>18,000 hours</td>
<td>4.288... per hour</td>
</tr>
<tr>
<td>[Refer to working note 6 (a) and 3 (b)]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(₹77,200/18,000 hours)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(absorbed on direct labour hour basis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Costs: (B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit : [(A) – (B)]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Factors Contributing to Change in Profit

Illustration 20

The working results of a company for two corresponding years are shown below:

<table>
<thead>
<tr>
<th></th>
<th>Year 1 (` in lakhs)</th>
<th>Year 2 (` in lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1,200</td>
<td>1,540</td>
</tr>
<tr>
<td>Direct Material</td>
<td>600</td>
<td>648</td>
</tr>
<tr>
<td>Direct Wages and Variable Overheads</td>
<td>360</td>
<td>412</td>
</tr>
<tr>
<td>Fixed Overheads</td>
<td>160</td>
<td>300</td>
</tr>
<tr>
<td>Profit</td>
<td>80</td>
<td>180</td>
</tr>
</tbody>
</table>

In year 2, there has been an increase in the selling price by 10%. Following are the details of material consumption and utilization of direct labour hours during the two years.

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Material</td>
<td>5,00,000</td>
<td>5,40,000</td>
</tr>
<tr>
<td>Consumption in m/t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Labour Hours</td>
<td>75,00,000</td>
<td>80,00,000</td>
</tr>
</tbody>
</table>

You are required to:

(i) Keeping year 1 as base year, analyse the results of year 2 and work out the amount which each factor has contributed to change in profit.

(ii) Find out the break even sales for both years.

(iii) Calculate the percentage increase in selling price that would be needed over the sale value of year 2 to earn a margin of safety of 45%.

Solution

(i) Reconciliation statement showing which factor has contributed change in profit (` in lacs)

<table>
<thead>
<tr>
<th></th>
<th>Favourable</th>
<th>Adverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in Contribution Due to Increase in Volume (<code>280 lacs –</code> 240 lacs) (Refer to working note 3)</td>
<td>40</td>
<td>—</td>
</tr>
<tr>
<td>Sales Price Variance (Refer to working note 3)</td>
<td>140</td>
<td>—</td>
</tr>
<tr>
<td>Material Usage Variance (Refer to working note 4)</td>
<td>52</td>
<td>—</td>
</tr>
<tr>
<td>Material Price Variance (Refer to working note 4)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Direct Labour Rate Variance (Refer to working note 4)</td>
<td>—</td>
<td>28</td>
</tr>
<tr>
<td>Direct Labour Efficiency Variance (Refer to working note 4)</td>
<td>36</td>
<td>—</td>
</tr>
</tbody>
</table>
Fixed Overhead Expenditure Variance (Refer to working note 3) | — | 140
| Change in Profit | 268 | 168
| Change in Profit (Net) | | 100

### (ii) Break-even sales

Break-even Sales (Year 1) = \( \frac{\text{Fixed cost}}{\text{P/V ratio}} \)

(Refer to working note 3)

Break-even Sales (Year 2) = \( \frac{\text{₹ 160 lacs}}{\left( \frac{\text{₹ 240 lacs}}{\text{₹ 1,200 lacs}} \right)} = \text{₹ 800 lacs} \)

(Refer to working note 3)

\[ \text{Break-even Sales (Year 2)} = \frac{\text{₹ 300 lacs}}{\left( \frac{\text{₹ 480 lacs}}{\text{₹ 1,540 lacs}} \right)} = \text{₹ 962.50 lacs} \]

### (iii) Percentage increase in selling price needed over the sales value of year 2 to earn a margin of safety of 45% in year 2

P/V Ratio = (₹ 480 lacs/₹ 1,540 lacs) × 100 = 31.169%

Break-even Sales = \( \frac{\text{₹ 962.50 lacs}}{\text{₹ 1,540 lacs}} \times 100 = 62.5\% \)

(as % to sales)

If Margin of Safety to be earned is 45% then Break-even Point should be 55%

Contribution increase required = \( \frac{62.5 \times 31.169}{55} = 35.4193\% \)

Revised Contribution = \( 1,540 \text{ lacs} \times 35.4193\% = 545.45 \text{ lacs} \)

Present Contribution = ₹ 480 lacs

Increase in Selling Price required = ₹ 65.45 lacs (₹ 545.45 lacs – ₹ 480 lacs)

Percentage increase in Selling Price over the Sales Value of year 2 = \( \frac{\text{₹ 65.45 lacs}}{\text{₹ 1,540 lacs}} \times 100 = 4.25\% \)

**Working Notes :**

1. **Budgeted Sales in year 2**

   If Actual Sales in year 2 is ₹ 110 then Budgeted Sales is ₹ 100.

   If Actual Sales in year 2 is ₹ 1 then Budgeted Sales = \( \frac{\text{₹ 100}}{\text{₹ 110}} \)
If Actual Sales in year 2 are ₹ 15,40,00,000 then Budgeted Sales are

\[
\text{Budgeted Sales} = \frac{\text{Actual Sales} \times 100}{110} = \frac{15,40,00,000 \times 100}{110} = ₹1,400 \text{ lacs}
\]

2. **Budgeted figures of direct material; direct wages; and variable overhead worked out on the basis of % of sales in year 2:**

- **Direct Material % to Sales (in year 1):**
  
  \[
  \text{Direct Material %} = \frac{\text{Direct Wages and Variable Overhead}}{\text{Sales}} = \frac{600}{1,200} \times 100 = 50\%
  \]

- **Budgeted figure of Direct Material (in year 2):**
  
  \[50\% \times ₹1,400 \text{ lacs} = 700 \text{ lacs}\]

- **Direct Wages and Variable Overhead (% to sales in year 1):**
  
  \[
  \text{Direct Wages and Variable Overhead} = \frac{\text{Direct Wages and Variable Overhead}}{\text{Sales}} = \frac{360}{1,200} \times 100 = 30\%
  \]

- **Budgeted figure of Direct Wages and Variable Overhead (in year 2):**
  
  \[30\% \times ₹1,400 \text{ lacs} = 420 \text{ lacs}\]

3. **Statement of figures extracted from working results of a company**

**Figure in lacs of ₹**

<table>
<thead>
<tr>
<th></th>
<th>Year 1 [Actual] (a)</th>
<th>Year 2 [Budgeted] (b)</th>
<th>Year 2 [Actual] (c)</th>
<th>Total [Variance] (d) = (c) – (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales: (A)</td>
<td>1,200</td>
<td>1,400</td>
<td>1,540</td>
<td>140 (F)</td>
</tr>
<tr>
<td>(*Refer to working note 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Material... (a)</td>
<td>600</td>
<td>700</td>
<td>648</td>
<td>52 (F)</td>
</tr>
<tr>
<td>(*Refer to working note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Wages and Variable Overhead... (b)</td>
<td>360</td>
<td>420</td>
<td>412</td>
<td>8 (F)</td>
</tr>
<tr>
<td>(*Refer to working note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Variable Costs: (B) = (a + b)</td>
<td>960</td>
<td>1,120</td>
<td>1,060</td>
<td>60 (F)</td>
</tr>
<tr>
<td>Contribution (C) = (A) – (B)</td>
<td>240</td>
<td>280</td>
<td>480</td>
<td>200 (F)</td>
</tr>
<tr>
<td>Less : Fixed Cost</td>
<td>160</td>
<td>160</td>
<td>300</td>
<td>140 (A)</td>
</tr>
<tr>
<td>Profit</td>
<td>80</td>
<td>120</td>
<td>180</td>
<td>60 (F)</td>
</tr>
</tbody>
</table>
(4) (i) Data for Material Variances:

<table>
<thead>
<tr>
<th>Standard Cost for Actual Output</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of Material (m/t)</td>
<td>Rate per m/t (₹)</td>
</tr>
<tr>
<td>5,83,333</td>
<td>120</td>
</tr>
</tbody>
</table>

*₹* 600 lacs / 5 lacs m/t

Material Price Variance = (Standard Rate – Actual Rate) × Actual Quantity = Nil

Material Usage Variance = (Standard Quantity – Actual Quantity) × Standard Rate per m/t

= (5,83,333 – 5,40,000) × ₹ 120 = ₹ 52 lacs (F)

(ii) Data for labour variances overhead variances

<table>
<thead>
<tr>
<th>Standard Cost for Actual Output</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Hours</td>
<td>Rate per hour (₹)</td>
</tr>
<tr>
<td>87,50,000</td>
<td>4.80</td>
</tr>
</tbody>
</table>

*₹* 360 lacs / 75 lacs hours

Labour Rate Variance:

= (Standard Rate – Actual Rate) x Actual Labour Hours

= (₹ 4.80 – ₹ 5.15) x 80,00,000 = ₹ 28 lacs (A)

Labour and Variable Overhead Efficiency Variance:

= (Standard Labour Hours – Actual Labour Hours) × Standard Rate per Hour

= (87,50,000 – 80,00,000) x ₹ 4.80 = ₹ 36 lacs (F)

**Selling Cost Variance**

*Illustration 21*

*Ravi, Richard, Rahim and Roop Singh are regional salesmen distributing the product of Super Perfumes Ltd. The selling price of the product is ₹ 400 per unit. The sales quota and the standard selling expenses for the year are:*
Actual data for the year were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Ravi</th>
<th>Richard</th>
<th>Rahim</th>
<th>Roop Singh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days on field work</td>
<td>200</td>
<td>175</td>
<td>225</td>
<td>250</td>
</tr>
<tr>
<td>Kilometres covered</td>
<td>20,000</td>
<td>18,000</td>
<td>18,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Sales</td>
<td>8,00,000</td>
<td>10,00,000</td>
<td>10,50,000</td>
<td>5,20,000</td>
</tr>
<tr>
<td>Salary</td>
<td>80,000</td>
<td>80,000</td>
<td>80,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Free samples</td>
<td>9,000</td>
<td>7,500</td>
<td>5,375</td>
<td>8,000</td>
</tr>
<tr>
<td>Postage and stationery</td>
<td>8,000</td>
<td>9,000</td>
<td>10,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Other expenses</td>
<td>9,000</td>
<td>5,000</td>
<td>4,000</td>
<td>10,000</td>
</tr>
</tbody>
</table>

The salesmen are allowed conveyance allowance of ₹ 1.50 per kilometre and a daily allowance of ₹ 80 per day for the days spent on field work. Ravi gets a commission of 6 percent on sales and others are given a commission of 5 percent on sales. Corporate sales office expenses are chargeable at the rate of ₹ 30 per unit sold in the case of Ravi and Richard and ₹ 40 per unit in the case of Rahim and Roop Singh. Prepare a schedule showing the selling cost variances by salesmen.

Solution

Working Note:

<table>
<thead>
<tr>
<th></th>
<th>Ravi</th>
<th>Richard</th>
<th>Rahim</th>
<th>Roop Singh</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Standard Sales Units (Sales Quota ÷ ₹ 400)</td>
<td>1,875</td>
<td>2,250</td>
<td>2,875</td>
<td>1,500</td>
</tr>
<tr>
<td>(ii) Standard Selling Expenses per Unit (₹ ) (Std. Selling Expenses/Std. Sales Units)</td>
<td>120</td>
<td>110</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>(iii) Actual Sales Units (Actual Sales ÷ ₹ 400)</td>
<td>2,000</td>
<td>2,500</td>
<td>2,625</td>
<td>1,300</td>
</tr>
<tr>
<td>(iv) Actual Selling Costs</td>
<td>₹</td>
<td>₹</td>
<td>₹</td>
<td>₹</td>
</tr>
<tr>
<td>Daily Allowance</td>
<td>16,000</td>
<td>14,000</td>
<td>18,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Conveyance Allowances</td>
<td>30,000</td>
<td>27,000</td>
<td>27,000</td>
<td>45,000</td>
</tr>
<tr>
<td>Salaries</td>
<td>80,000</td>
<td>80,000</td>
<td>80,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Free Samples</td>
<td>9,000</td>
<td>7,500</td>
<td>5,375</td>
<td>8,000</td>
</tr>
<tr>
<td></td>
<td>Actual</td>
<td>Standard</td>
<td>Sales Budgets (units)</td>
<td>Standard Selling Expenses (Refer to Working Note (v))</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Rs.</td>
<td>Rs.</td>
<td></td>
<td>2,40,000</td>
</tr>
<tr>
<td>Postage &amp; Stationery</td>
<td>8,000</td>
<td>9,000</td>
<td>10,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>9,000</td>
<td>5,000</td>
<td>4,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Commission on Sales</td>
<td>48,000</td>
<td>50,000</td>
<td>52,500</td>
<td>26,000</td>
</tr>
<tr>
<td>Corporate Sales Office</td>
<td>60,000</td>
<td>75,000</td>
<td>1,05,000</td>
<td>52,000</td>
</tr>
<tr>
<td>Total Actual Selling Cost</td>
<td>2,60,000</td>
<td>2,67,500</td>
<td>3,01,875</td>
<td>2,47,000</td>
</tr>
<tr>
<td>(v) Standard Selling Cost</td>
<td>2,40,000</td>
<td>2,75,000</td>
<td>2,62,500</td>
<td>1,95,000</td>
</tr>
</tbody>
</table>

**Calculation of Variances:**

Since all the selling expenses have been related to sales units, only one variance can be calculated by comparing the standard and actual selling costs as is shown in the schedule below:

**Schedule showing the selling cost variances by salesman**

<table>
<thead>
<tr>
<th></th>
<th>Ravi</th>
<th>Richard</th>
<th>Rahim</th>
<th>Roop Singh</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Selling Expenses</td>
<td>2,40,000</td>
<td>2,75,000</td>
<td>2,62,500</td>
<td>1,95,000</td>
<td>9,72,500</td>
</tr>
<tr>
<td>Actual Selling Expenses</td>
<td>2,60,000</td>
<td>2,67,500</td>
<td>3,01,875</td>
<td>2,47,000</td>
<td>10,76,375</td>
</tr>
<tr>
<td>Selling Cost Variance</td>
<td>20,000 (A)</td>
<td>7,500 (F)</td>
<td>39,375(A)</td>
<td>52,000(A)</td>
<td>1,03,875(A)</td>
</tr>
</tbody>
</table>

**Illustration 22**

*X Manufacturing company takes over sales from the Selling Agents. In the first month of operation of direct sales, the following costs have been incurred. Prepare the actual percentage of selling cost on total sales, compare with the standard selling cost. Compute the variances and offer your comments about the standards, which are based on actual for the previous year, and performance of the Zonal offices.

<table>
<thead>
<tr>
<th>Zonal offices</th>
<th>Sales Budgets (units)</th>
<th>Standard Selling Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern India (E.I.)</td>
<td>20,000</td>
<td>₹ 16,000</td>
</tr>
<tr>
<td>Western India (W.I.)</td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Northern India (N.I.)</td>
<td>6,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Southern India (S.I.)</td>
<td>15,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Central India (C.I.)</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Northern Western India (N.W.I.)</td>
<td>5,000</td>
<td>8,000</td>
</tr>
</tbody>
</table>

Selling (price per unit) – ₹ 25
### Solution

**COMPARATIVE COST STATEMENT OF SELLING EXPENSES**

<table>
<thead>
<tr>
<th>Actual:</th>
<th>E.I.</th>
<th>W.I.</th>
<th>N.I.</th>
<th>S.I.</th>
<th>C.I.</th>
<th>N.W.I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units Sold ('000 units)</td>
<td>19</td>
<td>10</td>
<td>5.9</td>
<td>17.5</td>
<td>9.5</td>
<td>5</td>
</tr>
<tr>
<td>Salesmen’s Salaries (₹ '000)</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Sales Travelling (₹ '000)</td>
<td>4</td>
<td>5</td>
<td>3.6</td>
<td>2.7</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Halting Charges &amp; Bhatta (₹)</td>
<td>850</td>
<td>800</td>
<td>500</td>
<td>500</td>
<td>700</td>
<td>500</td>
</tr>
<tr>
<td>Salesmen’s Commission on Selling Prices @</td>
<td>1%</td>
<td>1.25%</td>
<td>1%</td>
<td>0.9%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Standard Data**

<table>
<thead>
<tr>
<th>Standard Data</th>
<th>E.I.</th>
<th>W.I.</th>
<th>N.I.</th>
<th>S.I.</th>
<th>C.I.</th>
<th>N.W.I</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Selling Exp. (₹)</td>
<td>16,000</td>
<td>12,000</td>
<td>8,000</td>
<td>12,000</td>
<td>10,000</td>
<td>8,000</td>
</tr>
<tr>
<td>2. Budgeted Sales (units)</td>
<td>20,000</td>
<td>12,000</td>
<td>6,000</td>
<td>15,000</td>
<td>10,000</td>
<td>5,000</td>
</tr>
<tr>
<td>3. Selling Cost (per unit) (₹)</td>
<td>0.80</td>
<td>1.00</td>
<td>1.33</td>
<td>0.80</td>
<td>1.00</td>
<td>1.60</td>
</tr>
<tr>
<td>4. Actual Sales (units)</td>
<td>19,000</td>
<td>10,000</td>
<td>5,900</td>
<td>17,500</td>
<td>9,500</td>
<td>5,000</td>
</tr>
<tr>
<td>5. Standard Selling Cost for Actual Sales (₹)</td>
<td>[(3)×(4)]</td>
<td>15,200</td>
<td>10,000</td>
<td>7,847</td>
<td>14,000</td>
<td>9,500</td>
</tr>
</tbody>
</table>

**Actual Selling Actual Data**

<table>
<thead>
<tr>
<th>Actual Selling Actual Data</th>
<th>E.I.</th>
<th>W.I.</th>
<th>N.I.</th>
<th>S.I.</th>
<th>C.I.</th>
<th>N.W.I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salesmen’s Salaries (₹)</td>
<td>8,000</td>
<td>7,000</td>
<td>5,000</td>
<td>7,000</td>
<td>6,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Sales Travelling (₹)</td>
<td>4,000</td>
<td>5,000</td>
<td>3,600</td>
<td>2,700</td>
<td>2,700</td>
<td>1,800</td>
</tr>
<tr>
<td>Halting Charges etc. (₹)</td>
<td>850</td>
<td>800</td>
<td>500</td>
<td>500</td>
<td>700</td>
<td>500</td>
</tr>
<tr>
<td>Salesmen’s Commission (₹)</td>
<td>4,750</td>
<td>3,125</td>
<td>1,475</td>
<td>3,937</td>
<td>2,375</td>
<td>1,250</td>
</tr>
<tr>
<td>6. Total Actual Selling Costs (₹)</td>
<td>17,600</td>
<td>15,925</td>
<td>10,575</td>
<td>14,137</td>
<td>11,775</td>
<td>8,550</td>
</tr>
</tbody>
</table>

**Analysis**

<table>
<thead>
<tr>
<th>Analysis</th>
<th>E.I.</th>
<th>W.I.</th>
<th>N.I.</th>
<th>S.I.</th>
<th>C.I.</th>
<th>N.W.I</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Selling Costs Variance (₹) [1]</td>
<td>-2,400</td>
<td>-5,925</td>
<td>-2,728</td>
<td>-137</td>
<td>-2,275</td>
<td>-550</td>
</tr>
<tr>
<td>8. Budgeted Sales</td>
<td>[Budgeted Qty.×Budgeted Price] (₹)</td>
<td>5,00,000</td>
<td>3,00,000</td>
<td>1,50,000</td>
<td>3,75,000</td>
<td>2,50,000</td>
</tr>
</tbody>
</table>


9. Budgeted Selling Expenses as a % of Budgeted Sales

\[
\left(\frac{1}{8}\times 100\right)
\]

\[
\begin{array}{|c|c|c|c|c|c|}
\hline
& 3.20\% & 4.00\% & 5.33\% & 3.20\% & 4.00\% & 6.40\% \\
\hline
\text{Actual Sales (₹)} & 4,75,000 & 2,50,000 & 1,47,500 & 4,37,500 & 2,37,000 & 1,25,000 \\
\text{Actual Selling Expenses as a % of Actual Sales} & 3.71\% & 6.37\% & 7.17\% & 3.23\% & 4.97\% & 6.84\% \\
\hline
\end{array}
\]

Comments: The above table shows that except for southern India and North–western India Zonal offices, actual sales expenses widely differ from budgeted selling expenses. However, the following points have to be noted:

(i) The standards are based on the actual expenses for the last year. Truly speaking they are not standards and, therefore, they cannot provide realistic guidance for exercising control over the selling expenses. Variances may be there because current year’s conditions might have completely changed or circumstances which were applicable last year may have ceased to become applicable now.

(ii) The causes of the variances cannot be correctly spelt out in the absence of details about the “Standard selling expenses.” The details of actual selling expenses have been given but the details of standard selling expenses have not been given. Salesmen’s salaries is a fixed charge, variance may be there on account of increase in their salaries. Sales travelling expenses are of a semi-variable nature. Less volume of sales might have resulted in less recovery of fixed sales travelling expenses such as railway freight, hotel charges.

Finding of Missing Information, Variance Analysis

Illustration 23

Following is the standard cost card of a component:

<table>
<thead>
<tr>
<th>Materials</th>
<th>2 Units at ₹ 15</th>
<th>₹ 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour</td>
<td>3 Hours at ₹ 20</td>
<td>₹ 60</td>
</tr>
<tr>
<td>Total overheads</td>
<td>3 Hours at ₹ 10</td>
<td>₹ 30</td>
</tr>
</tbody>
</table>

During a particular month 10,000 units of the component were produced and the same was found to be at 60% capacity of the budget. In preparing the variance report for the month, the cost accountant gathered the following information:

| Labour | ₹ 6,00,000 |
| Variable overheads | ₹ 2,00,000 |
| Fixed overheads | ₹ 3,00,000 |
| Material price variance | ₹ 70,000 (A) |
| Material cost variance | ₹ 50,000 (A) |
| Labour rate variance | ₹ 50,000 (F) |
| Fixed overhead expenditure variance | ₹ 50,000 (A) |
You are required to prepare from the above details:

1. Actual material cost incurred
2. Standard cost of materials actually consumed
3. Labour efficiency variance
4. Variable OH efficiency variance
5. Variance OH expenditure variance
6. Fixed OH efficiency variance
7. Fixed OH capacity variance
8. Fixed OH volume variance

Solution

Computation of Requirements of the Question:

1. Actual Material Cost Incurred

\[
\text{Material Cost Variance} = (\text{Standard Cost of Std. Qty. for Actual Output}) - (\text{Actual Cost})
\]

Or

\[
\text{Actual Cost} = (\text{Standard Cost of Std. Qty for Actual Output}) - (\text{Material Cost Variance})
\]

\[
= 10,000 \text{ units} \times 2 \text{ units} \times \text{ Rs. 15} + \text{ Rs. 50,000}
\]

\[
= \text{ Rs. 3,00,000} + \text{ Rs. 50,000} = \text{ Rs. 3,50,000}
\]

2. Standard Cost of Materials Actually Consumed

\[
\text{Material Price Variance} = (\text{Standard Price} - \text{Actual Price}) \times \text{Actual Quantity}
\]

Or

\[
\text{Standard Cost of Actual Quantity} = (\text{Actual Cost}) + (\text{Material Price Variance})
\]

\[
= \text{ Rs. 3,50,000} - \text{ Rs. 70,000} = \text{ Rs. 2,80,000}
\]

3. Labour Efficiency Variance

(Refer to working note 1)

\[
\text{Labour Efficiency Variance} = (\text{Standard Hours} - \text{Actual Hours}) \times \text{Standard Rate per Hour}
\]

\[
= (10,000 \text{ units} \times 3 \text{ hours} - 35,000 \text{ hours}) \times \text{ Rs. 20}
\]

\[
= (\text{ Rs. 6,00,000} - \text{ Rs. 7,00,000}) = \text{ Rs. 1,00,000 (A)}
\]

4. Variable Overhead Efficiency Variance

(Refer to working note 2)

\[
\text{Variable Overhead Efficiency Variance} = (\text{Standard Hours for Actual Output} - \text{Actual Hours}) \times \text{Standard Variable Overhead Rate per Hour}
\]

\[
= \text{ Rs. 5} \times (30,000 \text{ Hours} - 35,000 \text{ Hours}) = \text{ Rs. 25,000 (A)}
\]
5. **Variable Overhead Expenditure Variance**  
*(Refer to working note 1)*

\[
\text{Variable Overhead Expenditure Variance} = (\text{Budgeted Variable Overheads for Actual Hours}) - (\text{Actual Variable Overheads})
\]

\[
= (₹ 5 \times 35,000 \text{ Hours} - ₹ 2,00,000) = ₹ 25,000 \text{ (A)}
\]

6. **Fixed Overhead Efficiency Variance**  
*(Refer to working notes 1 & 2)*

\[
\text{Fixed Overhead Efficiency Variance} = (\text{Standard Hours for Actual Output} - \text{Actual Hours}) \times \text{Standard Fixed Overhead Rate per Hour}
\]

\[
= ₹ 5 \times (30,000 \text{ Hours} - 35,000 \text{ Hours}) = ₹ 25,000 \text{ (A)}
\]

7. **Fixed Overhead Capacity Variance**  
*(Refer to working notes 1 & 2)*

\[
\text{Fixed Overhead Capacity Variance} = (\text{Actual Hours} - \text{Budgeted Hours}) \times \text{Standard Fixed Overhead Rate per Hour}
\]

\[
= ₹ 5 \times (35,000 \text{ Hours} - 50,000 \text{ Hours})
= ₹ 75,000 \text{ (A)}
\]

8. **Fixed Overhead Volume Variance**  
*(Refer to working note 2)*

\[
\text{Fixed Overhead Volume Variance} = (\text{Actual Output} - \text{Budgeted Output}) \times \text{Standard Fixed Overhead Rate per Unit}
\]

\[
= ₹ 15 \times [10,000 \text{ units} - (50,000 \text{ hours} / 3 \text{ hours p. u.})]
= ₹ 1,50,000 - ₹ 2,50,000 = ₹ 1,00,000 \text{ (A)}
\]

**Basic Calculations:**

1. Labour Rate Variance = (Standard Rate per Hour x Actual Hours) – (Actual Cost)
   
   Or  ₹50,000 = ₹20 \times \text{Actual Hours} – ₹6,50,000
   Or  Actual Hours = 35,000

2. Standard Hours = 10,000 Units × 3 Hours = 30,000 Hours

   Budgeted Hours = \left\{ \frac{30,000 \text{ hours} \times 100\%}{60\%} \right\} = 50,000 \text{ Hours}

   Budgeted Fixed Overheads=\text{ Actual Fixed Overheads + Expenditure Variance}
   
   = ₹ 3,00,000 – ₹ 50,000 = ₹ 2,50,000

   \left\{ \frac{\text{Standard fixed overhead recovery rate per hour}}{50,000 \text{ hours}} \right\} = ₹ 2,50,000
   
   = ₹ 5 \text{ per hour}
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Total Overhead Rate per Hour = ₹ 10
Variable Overhead Rate per Hour (₹ 10 – ₹ 5) = ₹ 5
3. Standard Fixed Overhead per Unit (3 hours × ₹ 5) = ₹ 15

Illustration 24

Mr. M provides the following information relating to 1,000 units of product ‘ZED’ during the month of April, 2012

Standard price per kg. of raw material – ₹ 3
Actual total direct material cost – ₹ 10,000
Standard direct labour hours – 1,600
Actual direct labour hours – 1,800
Total standard direct labour cost – ₹ 8,000
Standard variable overhead per direct labour hour – ₹ 1
Standard variable cost per unit of ZED – ₹ 1.60
Total standard variable overheads – ₹ 1,600
Actual total variable overheads – ₹ 1,620
The material usage variance is ₹ 600 (adverse) and the overall cost variance per unit of ZED is ₹ 0.07 (adverse) as compared to the total standard cost per unit of ZED of ₹ 21.

You are required to compute the following:
(a) Standard quantity of raw-material per unit of ZED.
(b) Standard direct labour rate per hour.
(c) Standard direct material cost per unit of ZED.
(d) Standard direct labour cost per unit of ZED.
(e) Standard total material cost for the output.
(f) Actual total direct labour cost for the output
(g) Material price variance.
(h) Labour rate variance.
(i) Labour efficiency variance.
(j) Variable overhead expenditure variance.
(k) Variable overheads efficiency variance.

Solution

Basic Calculations:

1. **Standard Cost of Raw-Material Consumed:**
   
   Total Standard Cost of ZED (1,000 units × ₹ 21)  
   ₹ 21,000
   Less: Standard Cost: Labour
   Overheads
   ₹ 8,000
   ₹ 1,600
   Standard Cost of Raw Materials Used
   ₹ 11,400
2. **Standard Cost of Raw-Material per Finished Unit:**

   \[
   \text{Total Cost of Material} = \frac{\text{₹ 11,400}}{\text{1,000 Units}} = \text{₹ 11.40}
   \]

3. **Standard Quantity of Raw Material per Finished Unit and Total Quantity of Raw Material Required:**

   \[
   \frac{\text{Standard Cost of Material per Unit}}{\text{Standard Rate per Kg.}} = \frac{\text{₹ 11.40}}{\text{₹ 3.00}} = 3.8 \text{ Kg. per finished unit}
   \]

   Total Quantity = 3.8 Kg. × 1,000 units = 3,800 Kg.

4. **Total Material Cost Variance:**

   \[
   \text{Actual Cost of Raw Material} = \text{₹ 10,000}
   \]

   \[
   \text{Standard Cost of Raw Material} = \text{₹ 11,400}
   \]

   \[
   \text{Total Material Cost Variance} = \text{₹ 1,400 (F)}
   \]

5. **Actual Quantity (AQ) of Raw-Material (in Kg):**

   Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

   \[
   = \text{Standard Rate} \times (\text{Standard Quantity for Actual Output} – \text{Actual Quantity})
   \]

   \[
   \text{Or}\ \text{₹ 600 (A)} = \text{₹ 3} \times (3,800 \text{ Kg.} – \text{AQ})
   \]

   Or 3AQ = 12,000 Kg. or, AQ = 4,000 Kg.

   (Material usage variance is as given in the question and standard quantity is as per (3) above)

6. **Actual Rate of Raw Material per Kg.**

   \[
   \text{Actual Material Cost} = \frac{\text{₹ 10,000}}{4,000 \text{ Kg.}} = \text{₹ 2.50 per Kg.} \text{ (*As per (5) above)}
   \]

7. **Standard Direct Labour Rate**

   \[
   \text{Standard Direct Labour Hours} = 1,600 \text{ (given)}
   \]

   \[
   \text{Standard Direct Labour Cost} = \text{₹ 8,000} \text{ (given)}
   \]

   \[
   \text{Standard Direct Labour Hour Rate} = \frac{\text{₹ 8,000}}{1,600 \text{ hrs.}} = \text{₹ 5}
   \]

8. **Actual Labour Cost and Actual Labour Rate per Hour:**

   \[
   \text{Actual Total Cost of 1,000 Units} = \text{₹ 21,070}
   \]

   \[
   \text{1,000 units (₹ 21 + ₹ 0.07)}
   \]

   \[
   \text{Less: Actual Cost of Material} = \text{₹ 10,000}
   \]

   \[
   \text{Actual Variable Overheads} = \text{₹ 1,620}
   \]

   \[
   \text{Actual Direct Labour Cost} = \text{₹ 9,450}
   \]
5.96 Advanced Management Accounting

Actual Direct Labour Rate per Hr. = \frac{₹ 9,450}{1,800 \text{ hrs.}} = ₹ 5.25

9. **Standard Labour Hours to Produce One Unit:**

\[
\frac{\text{Standard Hours}}{\text{Output in Units}} = \frac{1,600 \text{ hours}}{1,000 \text{ units}} = 1.6 \text{ hours}
\]

10. **Standard Labour Cost per Unit:**

Standard Labour Cost per Unit = 1.6 hours × ₹ 5 = ₹ 8

11. **Actual Hourly Rate of Variable Overheads:**

\[
\frac{\text{Actual Variable Overheads}}{\text{Actual Hours}} = \frac{₹ 1,620}{1,800 \text{ hours}} = ₹ 0.90
\]

**Computations of Requirements:**

(a) **Standard Quantity of Raw Material per Unit of ZED:** 3.8 kg. (Refer to working note 3).

(b) **Standard Direct Labour Rate per Hour:** ₹ 5 (Refer to working note 7).

(c) **Standard Direct Material Cost per Unit of ZED:** ₹ 11.40 (Refer to working note 2).

(d) **Standard Direct Labour Cost per Unit of ZED:** ₹ 8 (Refer to working note 10).

(e) **Standard Total Material Cost for the Output:** ₹ 11,400 (Refer to working note 1).

(f) **Actual Total Direct Labour Cost for the Output:** ₹ 9,450 (Refer to working note 8).

(g) **Material Price Variance:**

\[
\text{Material Cost Variance} – \text{Material Usage Variance.}
\]

\[
= ₹ 1,400 (F)^* - ₹ 600 (A)
\]

\[
= ₹ 2,000 (F)
\]

Alternatively,

\[
= \text{Actual Quantity} \times (\text{Standard Price} – \text{Actual Price})
\]

\[
= 4,000 \text{ units} (₹ 3 – ₹ 2.50*)
\]

\[
= ₹ 2,000 (F)^*
\]

(h) **Labour Rate Variance:**

\[
= \text{Actual Hours} \times (\text{Standard Rate} – \text{Actual Rate})
\]

\[
= 1,800 \text{ Hours} \times (₹ 5 – ₹ 5.25)
\]

\[
= ₹ 450 (A)
\]

(i) **Labour Efficiency Variance:**

\[
= \text{Standard Rate} \times (\text{Standard Hours} – \text{Actual Hours})
\]

\[
= ₹ 5 \text{ per hour} \times (1,600 \text{ hours} – 1,800 \text{ hours}) = ₹ 1,000 (A)
\]
(j) **Variable Overhead Expenditure Variance:**

\[ = \text{Actual Hours} \times (\text{Standard Rate per Hour} - \text{Actual Rate per Hour}) \]

\[ = 1,800 \times (\text{Re. 1} - \text{Re. 0.90}) = \text{Re. 180 (F)} \]

(*Refer to working note 11*)

(k) **Variable Overhead Efficiency Variance:**

\[ = \text{Standard Variable Overhead Rate per Hour} \times (\text{Standard Hours for Actual Output} - \text{Actual Hours}) \]

\[ = \text{Re. 1 per hour} \times (1,600 \text{ hours} - 1,800 \text{ hours}) = \text{Re. 200 (A)} \]

**Reconciliation between Budgeted Profit and Actual Profit through given Variances**

**Illustration 25**

The budgeted output of a single product manufacturing company for the year ending 31st March was 5,000 units. The financial results in respect of the actual output of 4,800 units achieved during the year were as under:

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>29,700</td>
</tr>
<tr>
<td>Direct wages</td>
<td>44,700</td>
</tr>
<tr>
<td>Variable overheads</td>
<td>72,750</td>
</tr>
<tr>
<td>Fixed overheads</td>
<td>39,000</td>
</tr>
<tr>
<td>Profit</td>
<td>36,600</td>
</tr>
<tr>
<td>Sales</td>
<td>2,22,750</td>
</tr>
</tbody>
</table>

The standard wage rate is ₹ 4.50 per hour and the standard variable overhead rate is ₹ 7.50 per hour.

The cost accounts recorded the following variances for the year:

<table>
<thead>
<tr>
<th>Variances</th>
<th>Favourable</th>
<th>Adverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material price</td>
<td>₹300</td>
<td></td>
</tr>
<tr>
<td>Material usage</td>
<td>₹600</td>
<td></td>
</tr>
<tr>
<td>Wage rate</td>
<td>₹750</td>
<td></td>
</tr>
<tr>
<td>Labour efficiency</td>
<td>₹2,250</td>
<td></td>
</tr>
<tr>
<td>Variable overhead expenses</td>
<td>₹3,000</td>
<td></td>
</tr>
<tr>
<td>Variable overhead efficiency</td>
<td>₹3,750</td>
<td></td>
</tr>
<tr>
<td>Fixed overhead expense</td>
<td>₹1,500</td>
<td></td>
</tr>
<tr>
<td>Selling price</td>
<td>₹6,750</td>
<td></td>
</tr>
</tbody>
</table>

**Required:**

(i) Prepare a statement showing the original budget.
(ii) Prepare the standard product cost sheet per unit.
(iii) Prepare a statement showing the reconciliation of originally budgeted profit and the actual profit.

Solution

Basic Calculations:

(a) Actual Sales

\[ \text{Less: Price Variance (Favourable)} \]
\[ \text{Standard Sales} \]
\[ \text{Units Sold} \]

Budgeted Price per Unit: \[ \frac{\text{Standard Sales}}{\text{Units Sold}} = \frac{\text{Rs. 2,16,000}}{4,800 \text{ units}} = \text{Rs. 45} \]

(b) Material Used

\[ \text{Less: Price Variance (Adverse)} \]
\[ \text{Usage Variance (Adverse)} \]

Standard Cost

Standard Material Cost per Unit: \[ \frac{\text{Standard Cost}}{\text{Units Sold}} = \frac{\text{Rs. 28,800}}{4,800 \text{ units}} = \text{Rs. 6} \]

(c) Direct Wages Spent

\[ \text{Add: Wage Rate Variance (Favourable)} \]
\[ \text{Less: Efficiency Variance (Adverse)} \]

Standard Wages

Standard Wage Rate per Unit: \[ \frac{\text{Standard Wages}}{\text{Units Sold}} = \frac{\text{Rs. 43,200}}{4,800 \text{ units}} = \text{Rs. 9} \]

(d) Standard Direct Wage Rate is Rs. 4.50 per Hour

Hence Standard Time per Unit: \[ \text{Rs. 9} \div 4.50 \text{ Hour} = 2 \text{ Hours} \]

(e) Variable Overheads:

Standard Rate Rs. 7.50 per Hour

Variable Overhead per Unit: \[ 2 \text{ hrs.} \times \text{Rs. 7.50} = \text{Rs. 15} \]
(Note: Alternatively, this may be calculated by adjusting variances as in other cases)

(f) Fixed Overhead Spent
   Less : Fixed Overhead Expense Variance (Adverse)
   Budgeted Overheads
   Std. Fixed Overhead Rate per Unit : \[
   \frac{\text{₹ 37,500}}{5,000 \text{ units}} = \text{₹ 7.50}
   \]

(g) Fixed Overhead Recovered: 4,800 Units × ₹ 7.50 = ₹ 36,000 (Absorbed)

(h) Fixed Overhead Volume Variance
   (Absorbed Overheads – Budgeted Overheads) = ₹ 36,000 – ₹ 37,500
   = ₹ 1,500 (Adverse)

(i) Budgeted Sales: 5,000 units × ₹ 45 = ₹ 2,25,000

(j) Actual Sales = ₹ 2,22,750

(k) Sale Volume Variance
   ₹45 × (4,800 Units – 5,000 Units) = ₹9,000 (A)

(i) Statement Showing the Original Budget:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted Sales</td>
<td>₹2,25,000</td>
</tr>
<tr>
<td>Less: Budgeted Costs:</td>
<td></td>
</tr>
<tr>
<td>Direct Material</td>
<td>₹30,000</td>
</tr>
<tr>
<td>Direct Wages</td>
<td>₹45,000</td>
</tr>
<tr>
<td>Variable Overheads</td>
<td>₹75,000</td>
</tr>
<tr>
<td>Fixed Overheads</td>
<td>₹37,500</td>
</tr>
<tr>
<td>Profit</td>
<td>₹37,500</td>
</tr>
</tbody>
</table>

(ii) Statement Showing Standard Product Cost Sheet per Unit:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials</td>
<td>₹6.00</td>
</tr>
<tr>
<td>Direct Wages</td>
<td>₹9.00</td>
</tr>
<tr>
<td>Prime Cost</td>
<td>₹15.00</td>
</tr>
<tr>
<td>Variable Overheads</td>
<td>₹15.00</td>
</tr>
<tr>
<td>Fixed Overheads</td>
<td>₹7.50</td>
</tr>
<tr>
<td>Total Cost</td>
<td>₹37.50</td>
</tr>
<tr>
<td>Profit</td>
<td>₹7.50</td>
</tr>
<tr>
<td>Selling Price</td>
<td>₹45.00</td>
</tr>
</tbody>
</table>
(iii) Statement Showing Reconciliation of the Original Budgeted Profit and the Actual Profit

<table>
<thead>
<tr>
<th>Particulars</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Budgeted Profit:</strong></td>
<td></td>
<td></td>
<td>37,500.00</td>
</tr>
<tr>
<td>(Budgeted Quantity x Budgeted Margin)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sales Margin Variances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Margin Volume Variance*</td>
<td></td>
<td></td>
<td>(1,500.00)</td>
</tr>
<tr>
<td><strong>Standard Profit</strong></td>
<td></td>
<td></td>
<td>36,000.00</td>
</tr>
</tbody>
</table>

**Effect of Other Variances**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Cost Variances:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Price Variance</td>
<td>(300.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Usage Variance</td>
<td>(600.00)</td>
<td>(900.00)</td>
<td></td>
</tr>
<tr>
<td><strong>Labour Cost Variances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour Rate Variance</td>
<td>750.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour Efficiency Variance</td>
<td>(2,250.00)</td>
<td>(1,500.00)</td>
<td></td>
</tr>
<tr>
<td><strong>Variable Overhead Cost Variances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Overhead Expenditure Variance</td>
<td>3,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Overhead Efficiency Variance</td>
<td>(3,750.00)</td>
<td>(750.00)</td>
<td></td>
</tr>
<tr>
<td><strong>Fixed Overhead Cost Variances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead Expenditure Variance</td>
<td>(1,500.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Overhead Volume Variance</td>
<td>(1,500.00)</td>
<td>(3,000.00)</td>
<td></td>
</tr>
<tr>
<td><strong>Sales Margin Variances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Margin Price Variance</td>
<td>6,750.00</td>
<td>600.00</td>
<td></td>
</tr>
</tbody>
</table>

**Actual Profit for the Month**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Profit for the Month</td>
<td>36,600.00</td>
</tr>
</tbody>
</table>

Adverse Shown by (-) Symbol

*Sales Margin Volume Variance = Sales Volume Variance x Budgeted Net Profit Ratio

\[ = ₹ 9,000 (A) \times \left(\frac{7.50}{45} \times 100\right) \% = 1,500 (A) \]

Reconciliation between Standard Profit and Actual Profit, Analysis of Variances

**Illustration 26**

The following information is available in respect of Y Ltd. for a week:

(a) 400 kg of raw material were actually used in producing product ‘EXE’. The purchase cost thereof being ₹ 24,800. The standard price per kg of raw material is ₹ 60. The expected output is 12 units of product ‘EXE’ from each kg of raw material. Raw material price variance and usage variance as computed by cost accountant are ₹ 800 (adverse) and ₹
600 (adverse) respectively.

(b) The week is of 40 hours. The standard time to produce one unit of ‘EXE’ is 30 minutes. The standard wage rate is ₹ 5 per labour hour. The company employs 60 workers who have been paid hourly wage rate as under:

<table>
<thead>
<tr>
<th>Number of workers</th>
<th>6</th>
<th>8</th>
<th>46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hourly wage rate (₹)</td>
<td>4.80</td>
<td>5.20</td>
<td>5.00</td>
</tr>
</tbody>
</table>

(c) Budgeted overheads for a four-weekely period is ₹ 81,600. The actual fixed overheads spent during the said week are ₹ 19,800.

(d) Entire output of ‘EXE’ has been sold at its standard selling price of ₹ 15 per unit.

You are required to:

(i) Compute the variances relating to labour and overheads.

(ii) Prepare a statement showing total standard costs, standard profit and actual profit for the week.

Solution

Basic Calculations:

1. **Standard Quantity and Cost of Raw Material required for Actual Output:**

   Material Cost Variance = Standard Material Cost – Actual Material Cost

   \[ \text{Material Cost Variance} = \text{Standard Material Cost} - \text{Actual Material Cost} \]

   \[ \Rightarrow \text{₹ 800(A)} + \text{₹ 600(A)} = \text{Standard Material Cost} - \text{₹ 24,800} \]

   \[ \Rightarrow \text{Standard Material Cost} = \text{₹ 23,400} \]

   \[ \Rightarrow \text{Standard Price per Kg.} \times \text{Standard Qty. for Actual Output} = \text{₹ 23,400} \]

   \[ \Rightarrow \text{Standard Qty. for Actual Output} = \text{₹ 23,400/60} = \text{390 Kg.} \]

   \[ \Rightarrow \text{Standard Qty. per Unit Output} \times \text{Actual Output in Units} = \text{390 Kg.} \]

   \[ \Rightarrow \text{Actual Output in Units} = \text{390 Kg.} \times 12 = 4,680 Units \]

2. **Basic data for the computation of Labour Variances:**

<table>
<thead>
<tr>
<th>Standard Labour Cost for Actual Output</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Hours</td>
<td>Rate Per Hour</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
</tr>
<tr>
<td>2,340 hrs.</td>
<td>₹ 5</td>
</tr>
<tr>
<td>(4,680 units × 1/2 hr.)</td>
<td></td>
</tr>
<tr>
<td>2,340 hrs.</td>
<td></td>
</tr>
</tbody>
</table>

   \[ \Rightarrow \text{Actual Cost} = \text{₹ 12,016} \]
3. Basic data for the computation of Fixed Overhead Variances:

<table>
<thead>
<tr>
<th>Budgeted Std. Data</th>
<th>Actual Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted Fixed Overhead (₹ )</td>
<td>Actual Fixed Overhead (₹ )</td>
</tr>
<tr>
<td>(for 1 week)</td>
<td>20,400</td>
</tr>
<tr>
<td>Budgeted Hours</td>
<td>2,400</td>
</tr>
<tr>
<td>(60 workers x 40 hrs. per week)</td>
<td>Actual Labour Hours</td>
</tr>
<tr>
<td>Budgeted Output (units)</td>
<td>2,400</td>
</tr>
<tr>
<td>Std. Rate p.h. (₹ )</td>
<td>4.800</td>
</tr>
<tr>
<td>Std. Rate p.u. (₹ )</td>
<td>8.50</td>
</tr>
</tbody>
</table>

**Computation of Variances:**

(i) Computation of labour and overhead (variances):

**Labour Cost Variance:** (Refer to Working note 2)

\[ \text{Labour Cost Variance} = (\text{Std. Cost} - \text{Actual Cost}) \]

\[ = \₹ 11,700 - \₹ 12,016 = \₹ 316 \text{ (A)} \]

**Labour Rate Variance:**

\[ = \text{Standard Cost of Actual Time} - \text{Actual Cost} \]

\[ = \₹ 12,000 - \₹ 12,016 \]

\[ = \₹ 16 \text{ (A)} \]

**Labour Efficiency Variance:**

\[ = \text{Standard Cost of Standard Time for Actual Output} - \text{Standard Cost of Actual Time} \]

\[ = (\₹ 11,700 - \₹ 12,000) = \₹ 300 \text{ (A)} \]

**Fixed Overhead Cost Variance:**

\[ = \text{Fixed Overheads Absorbed} - \text{Actual Fixed Overheads} \]

\[ = 4,680 \text{ Units} \times \₹ 4.25 - \₹ 19,800 \]

\[ = \₹ 19,890 - \₹ 19,800 = \₹ 90 \text{ (F)} \]

**Fixed Overhead Volume Variance:**

\[ = \text{Std. Fixed Overhead Rate per Unit} \times (\text{Actual Output} - \text{Budgeted Output}) \]

\[ = \₹ 4.25 \times (4,680 \text{ units} - 4,800 \text{ units}) \]

\[ = \₹ 510 \text{ (A)} \]

**Fixed Overhead Expenditure Variance:**

\[ = \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads} \]

\[ = \₹ 20,400 - \₹ 19,800 \]

\[ = \₹ 600 \text{ (F)} \]
(ii) **Statement showing Total Standard Cost, Standard Profit and Actual Profit for the week**

<table>
<thead>
<tr>
<th>Description</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>70,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>((4,680 \text{ units} \times \₹ 15))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Standard Costs of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Material</td>
<td>23,400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Labour</td>
<td>11,700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overheads</td>
<td>19,890</td>
<td>(54,990)</td>
<td></td>
</tr>
<tr>
<td>((4,680 \times \₹ 4.25))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Refer to working notes 1 to 3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Profit</td>
<td>15,210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Adjustment for Variance:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Material</td>
<td>1,400 (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price Variance</td>
<td>800 (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usage Variance</td>
<td>600 (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour</td>
<td>316 (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate Variance</td>
<td>16 (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency Variance</td>
<td>300 (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead</td>
<td>90 (F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenditure variance</td>
<td>600 (F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume variance</td>
<td>510 (A)</td>
<td>(1,626)</td>
<td></td>
</tr>
<tr>
<td>Actual profit</td>
<td>13,584</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5.6 Behavioural Aspects of Standard Costing

1. *Projection of fixed overheads and estimated selling price in a Standard Cost Sheet is a circular exercise with no added value.*

   In an award winning article, "COST / MANAGEMENT ACCOUNTING: THE 21ST CENTURY PARADIGM," published in Management Accounting (USA), December 1995, William L Ferrara argues that while preparing a Standard Cost Sheet, one of the objectives of which is to assist management in pricing products, a professional cannot project fixed overheads until and unless he is aware of the production quantum to be effected. The forecast of future production can only be made if a tentative selling price of the product is known because, in a competitive market, it is the selling price which decides the sale quantity and therefore the production volume. The authors contend that in case the selling price is known at the time of projecting fixed overheads then the re-computation of the same is a valueless exercise.

2. *Traditional costing tools like standard costing induce a static behaviour in the employees.*

   During the past decade and a half, various writers such as Johnson and Kaplan, Ferrara
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and Monden etc have questioned the productivity and use of traditional systems such as standard costing and variance analysis. They argue that the use of standard costing renders employees static and curbs innovation and that companies following traditional standard costing find it difficult to improve upon standards because of severe resistance from employees who are convinced that the established best practise cannot be improved further.

3. **Fear of adverse variances forces managers to give undue importance to material price, labour rate and efficiency and capacity utilisation. These concepts are detrimental to the modern day world class manufacturing environment characterised by concepts of JIT and TQM.**

In a World Class Manufacturing environment, characterised by Just in Time policies, the focus of the management is to produce only as much as is required. This requires purchase of small quantities of raw material, increase in the number of set ups and minimal importance to capacity utilisation. Policies like this result in increased adverse variances related to raw material prices, labour efficiency and production volume. Critics argue that the fear of such adverse variances affects goal congruence and forces managers to behave against their company’s policies.

4. **Traditional costing does not provide the management with what is the allowable cost; rather it emphasises on the standard or actual costs.**

This is looked upon as one of the major reasons for lack of innovation especially in the global era where competition amongst companies is unprecedented. It is argued that techniques like Target costing are much more motivating when compared to Traditional costing since the former encourage the use of concepts like value engineering and value analysis.