Standard Costing

Basic Concepts

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Costing</td>
<td>Standard costing is a method of costing which measure the performance or an activity by comparing actual cost with standard cost, analyses the variances and reporting of variances for investigation.</td>
</tr>
<tr>
<td>Standard Cost</td>
<td>It is a planned unit cost of the product, component or service produced in a period.</td>
</tr>
<tr>
<td>Standard Price</td>
<td>A predetermined price fixed on the basis of a specification of a product or service and of all factors affecting that price.</td>
</tr>
<tr>
<td>Standard Time</td>
<td>The total time in which task should be completed at standard performance.</td>
</tr>
<tr>
<td>Variance</td>
<td>A divergence from the predetermined rates, expressed ultimately in money value, generally used in standard costing and budgetary control systems.</td>
</tr>
<tr>
<td>Variance Analysis</td>
<td>The analysis of variances arising in standard costing system into their constituent parts.</td>
</tr>
<tr>
<td>Ideal Standards</td>
<td>These represent the level of performance attainable when prices for material and labour are most favourable, when the highest output is achieved with the best equipment and layout and when the maximum efficiency in utilization of resources results in maximum output with minimum cost.</td>
</tr>
<tr>
<td>Normal Standards</td>
<td>These are standards that may be achieved under normal operating conditions.</td>
</tr>
<tr>
<td>Basic or Bogey Standards</td>
<td>These standards are used only when they are likely to remain constant or unaltered over a long period.</td>
</tr>
<tr>
<td>Current Standard</td>
<td>These standards reflect the management anticipation of what actual cost will be for the current period.</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Controllable Variances</strong></td>
<td>Controllable variances are those which can be controlled by the department heads. Responsibility centres are answerable for the all adverse variances.</td>
</tr>
<tr>
<td><strong>Un-controllable Variances</strong></td>
<td>These variances are arising from the conditions which are beyond the control of the concerned department.</td>
</tr>
<tr>
<td><strong>Favourable Variance</strong></td>
<td>Variances which are profitable for the organisation are known as favourable variance.</td>
</tr>
<tr>
<td><strong>Adverse Variance</strong></td>
<td>Variances which increase the cost for the organisation are known as adverse variance.</td>
</tr>
<tr>
<td><strong>Material Variance Cost</strong></td>
<td>This is the difference between standard material cost for the actual output and actual cost incurred.</td>
</tr>
<tr>
<td><strong>Material Variance Price</strong></td>
<td>It measures variance arises in the material cost due to difference in actual material purchase price from standard material price.</td>
</tr>
<tr>
<td><strong>Material Variance Usage</strong></td>
<td>It measures the variance in material cost due to usage/consumption of materials.</td>
</tr>
<tr>
<td><strong>Material Variance Mix</strong></td>
<td>Variance in material consumption which arise due to difference in proportion actually used from the set standard proportion. It arises only when two or more inputs are used to produce a product.</td>
</tr>
<tr>
<td><strong>Material Variance Yield</strong></td>
<td>Variance in material consumption which arises due to yield or productivity of the inputs. It may arise due to use of sub standard quality of materials or inefficiency or workers or due to wrong processing.</td>
</tr>
<tr>
<td><strong>Labour Variance Cost</strong></td>
<td>This is difference between the standard labour costs for actual hours worked and actual wages paid.</td>
</tr>
<tr>
<td><strong>Labour Variance Rate</strong></td>
<td>This arises due to the difference in actual rate paid from the standard rate.</td>
</tr>
</tbody>
</table>
### Labour Efficiency Variance
Labour efficiency variance is the difference between the actual hours worked by the worker and the standard hours required to produce the actual quantity.

### Labour Mix/ Gang Variance
Labour efficiency variance which arises due to change in the proportion or combination or different skills set.

### Labour Yield Variance
Labour efficiency variance which arises due to the productivity of workers from the set standard productivity.

### Idle Time Variance
It is calculated for the unproductive labour hours.

### Variable Overhead Cost Variance
This is the difference between the actual variable overhead paid and the standard variable overhead.

### Variable Overhead Expenditure Variance
This is difference between the actual rate of variable overhead and standard variable overhead rate.

### Variable Overhead Efficiency Variance
This is the difference between the actual hours worked and standard hours required for the actual volume of work.

### Fixed Overhead Cost Variance
This is the difference between the actual fixed overhead incurred and absorbed fixed overhead.

### Fixed Overhead Expenditure Variance
This the difference between the actual fixed overhead incurred and budgeted fixed overhead.

### Fixed Overhead Volume Variance
Variance in fixed overhead which arises due to the volume of production.

### Fixed Overhead Efficiency Variance
This is the difference between the actual hours worked and the standard hours required.

### Fixed Overhead Capacity Variance
This is the difference between the budgeted capacity and the actual hours worked.

### Fixed Overhead Calendar Variance
This is the difference between the actual number of days and budgeted number of working days.
# Basic Formulae

## Material Variances

<table>
<thead>
<tr>
<th>Material Cost Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(\text{Standard Cost} - \text{Actual Cost})]</td>
</tr>
<tr>
<td>(The difference between the Standard Material Cost of the actual production volume and the Actual Cost of Material)</td>
</tr>
<tr>
<td>([(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})])</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Price Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(\text{Standard Cost of Actual Quantity} - \text{Actual Cost})]</td>
</tr>
<tr>
<td>(The difference between the Standard Price and Actual Price for the Actual Quantity Purchased)</td>
</tr>
<tr>
<td>([(\text{SP} - \text{AP}) \times \text{AQ}])</td>
</tr>
<tr>
<td>(\text{Or } [(\text{SP} \times \text{AQ}) - (\text{AP} \times \text{AQ})])</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Usage Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(\text{Standard Cost of Standard Quantity for Actual Production} - \text{Standard Cost of Actual Quantity})]</td>
</tr>
<tr>
<td>(The difference between the Standard Quantity specified for actual production and the Actual Quantity used, at Standard Price)</td>
</tr>
<tr>
<td>([(\text{SQ} - \text{AQ}) \times \text{SP}])</td>
</tr>
<tr>
<td>(\text{Or } [(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{SP})])</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Mix Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(\text{Standard Cost of Actual Quantity in Standard Proportion} - \text{Standard Cost of Actual Quantity})]</td>
</tr>
<tr>
<td>(The difference between the Actual Quantity in standard proportion and Actual Quantity in actual proportion, at Standard Price)</td>
</tr>
<tr>
<td>([(\text{RSQ} - \text{AQ}) \times \text{SP}])</td>
</tr>
<tr>
<td>(\text{Or } [(\text{RSQ} \times \text{SP}) - (\text{AQ} \times \text{SP})])</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Yield Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>[(\text{Standard Cost of Standard Quantity for Actual Production} - \text{Standard Cost of Actual Quantity in Standard Proportion})]</td>
</tr>
<tr>
<td>(The difference between the Standard Quantity specified for actual production and Actual Quantity in standard proportion, at Standard Purchase Price)</td>
</tr>
<tr>
<td>([(\text{SQ} - \text{RSQ}) \times \text{SP}])</td>
</tr>
<tr>
<td>(\text{Or } [(\text{SQ} \times \text{SP}) - (\text{RSQ} \times \text{SP})])</td>
</tr>
</tbody>
</table>

**Note:**

- \(\text{SQ} = \text{Standard Quantity = Expected Consumption for Actual Output}\)
- \(\text{AQ} = \text{Actual Quantity of Material Consumed}\)
- \(\text{RSQ} = \text{Revised Standard Quantity = Actual Quantity Rewritten in Standard Proportion}\)
- \(\text{SP} = \text{Standard Price per Unit}\)
- \(\text{AP} = \text{Actual Price per Unit}\)
### Labour Variances

#### Labour Cost Variance

<table>
<thead>
<tr>
<th>Standard Cost – Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The difference between the Standard Labour Cost and the Actual Labour Cost incurred for the production achieved)</td>
</tr>
<tr>
<td>[(SH \times SR) – (AH^* \times AR)]</td>
</tr>
</tbody>
</table>

#### Labour Rate Variance

<table>
<thead>
<tr>
<th>[Standard Cost of Actual Time – Actual Cost]</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The difference between the Standard Rate per hour and Actual Rate per hour for the Actual Hours paid)</td>
</tr>
<tr>
<td>[(SR – AR) \times AH^*]</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>[(SR \times AH^<em>) – (AR \times AH^</em>)]</td>
</tr>
</tbody>
</table>

#### Labour Idle Time Variance

<table>
<thead>
<tr>
<th>[Standard Rate per Hour x Actual Idle Hours]</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The difference between the Standard Hours specified for actual production and Actual Hours worked at Standard Rate)</td>
</tr>
<tr>
<td>[(AH^* – AH^#) \times SR]</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>[(AH^* \times SR) – (AH^# \times SR)]</td>
</tr>
</tbody>
</table>

#### Labour Efficiency Variance

<table>
<thead>
<tr>
<th>[Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time]</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The difference between the Standard Hours specified for actual production and Actual Hours worked at Standard Rate)</td>
</tr>
<tr>
<td>[(SH – AH^#) \times SR]</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>[(SH \times SR) – (AH^# \times SR)]</td>
</tr>
</tbody>
</table>

#### Labour Mix Variance

<table>
<thead>
<tr>
<th>[Standard Cost of Actual Time Worked in Standard Proportion – Standard Cost of Actual Time Worked]</th>
</tr>
</thead>
<tbody>
<tr>
<td>(The difference between the Actual Hours worked in standard proportion and Actual Hours worked in actual proportion, at Standard Rate)</td>
</tr>
<tr>
<td>[(RSH – AH^#) \times SR]</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>[(RSH \times SR) – (AH^# \times SR)]</td>
</tr>
</tbody>
</table>

#### Labour Yield Variance

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(The difference between the Standard Hours specified for actual production and Actual Hours worked in standard proportion, at Standard Rate)</td>
</tr>
<tr>
<td>[(SH – RSH) \times SR]</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>[(SH \times SR) – (RSH \times SR)]</td>
</tr>
</tbody>
</table>
Alternate Formula

\[
\text{Alternate Formula} \\
\left[ \frac{\text{Total Actual Time Worked (hours)}}{\text{Average Standard Rate per hour of Standard Gang} \times \text{Less} \times \text{Average Standard Rate per hour of Actual Gang}} \right] \\
\text{on the basis of hours worked}
\]

Alternate Formula

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

Note:

- SH = Standard Hours = Expected time (Time allowed) for Actual Output
- AH* = Actual Hours paid for
- AH# = Actual Hours worked
- RSH = Revised Standard Hours = Actual Hours (worked) rewritten in Standard Proportion
- SR = Standard Rate per Labour Hour
- AR = Actual Rate per Labour Hour Paid

In the absence of idle time: 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 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.

Variable Overhead Variances

Variable Overhead Cost Variance

(Standard Variable Overheads for Production – Actual Variable Overheads)

Variable Overhead Expenditure (Spending) Variance

(Standard Variable Overheads for Actual Hours#)

Less

(Actual Variable Overheads)

\[(SR – AR) \times AH#\]

Or

\[(SR \times AH#) – (AR \times AH#)\]

Variable Overhead Efficiency Variance

(Standard Variable Overheads for Production)

Less

(Standard Variable Overheads for Actual Hours#)

\[(SH – AH#) \times SR\]

Or

\[(SH \times SR) – (AH# \times SR)\]

© The Institute of Chartered Accountants of India
## Fixed Overhead Variances

### Fixed Overhead Cost Variance

(Absorbed Fixed Overheads) Less (Actual Fixed Overheads)

### Fixed Overhead Expenditure Variance

- (Budgeted Fixed Overheads) Less (Actual Fixed Overheads)
- Or \((BH \times SR) - (AH \times AR)\)

### Fixed Overhead Volume Variance

(Absorbed Fixed Overheads) Less (Budgeted Fixed Overheads)

- Or \((SH \times SR) - (BH \times SR)\)

### Fixed Overhead Capacity Variance

- SR \((AH - BH)\)
- Or \((AH \times SR) - (BH \times SR)\)

### Fixed Overhead Calendar Variance

Std. Fixed Overhead rate per day (Actual no. of Working days – Budgeted Working days)

### Fixed Overhead Efficiency Variance

- SR \((AH - SH)\)
- Or \((AH \times SR) - (SH \times SR)\)

### Fixed Overhead Efficiency Variance

(Absorbed Fixed Overheads) – (Budgeted Fixed Overheads for Actual Hours)

- Or

(Standard Fixed Overhead Rate per Hour \times Standard Hours for Actual Output) – (Standard Fixed Overhead Rate per Hour \times Actual Hours)

- Or

Standard Fixed Overhead Rate per Hour \times (Standard Hours for Actual Output – Actual Hours)

### Fixed Overhead Capacity Variance

(Budgeted Fixed Overheads for Actual Hours) – (Budgeted Fixed Overheads)

- Or

(Standard Fixed Overhead Rate per Hour \times Actual Hours) – (Standard Fixed Overhead Rate per Hour \times Budgeted Hours)
Or
Standard Fixed Overhead Rate per Hour × (Actual Hours – Budgeted Hours)

**Fixed Overhead Volume Variance (when rate per unit is given)**

(Absorbed Fixed Overheads) – (Budgeted Fixed Overheads)

Or
(Standard Fixed Overhead Rate per Unit × Actual Output) – (Standard Fixed Overhead Rate per Unit × Budgeted Output)

Or
Standard Fixed Overhead Rate per Unit × (Actual Output – Budgeted Output)

**Fixed Overhead Volume Variance (when rate per hour is given)**

(Absorbed Fixed Overheads) – (Budgeted Fixed Overheads)

Or
(Standard Fixed Overhead Rate per Hour × Standard Hours for Actual Output) – (Standard Fixed Overhead Rate per Hour × Budgeted Hours)

Or
Standard Fixed Overhead Rate per Hour × (Standard Hours for Actual Output – Budgeted Hours)

Or
Standard Fixed Overhead Rate per Hour × (Standard Hours per Unit × Actual Output – Standard Hours per Unit × Budgeted Output)

Or
(Standard Fixed Overhead Rate per Hour × Standard Hours per Unit) × (Actual Output – Budgeted Output)

Or
Standard Fixed Overhead Rate per Unit × (Actual Output – Budgeted Output)
### Question-1

Describe three distinct groups of variances that arise in standard costing.

**Solution:**

The three distinct groups of variances that arise in standard costing are:

(i) **Variances of efficiency.** These are the variance, which arise due to efficiency or inefficiency in use of material, labour etc.

(ii) **Variances of prices and rates.** These are the variances, which arise due to changes in procurement price and standard price.
(iii) Variances due to volume: These represent the effect of difference between actual activity and standard level of activity.

Question-2

“Calculation of variances in standard costing is not an end in itself, but a means to an end.” Discuss.

Solution:
The crux of standard costing lies in variance analysis. Standard costing is the technique whereby standard costs are predetermined and subsequently compared with the recorded actual costs. It is a technique of cost ascertainment and cost control. It establishes predetermined estimates of the cost of products and services based on management’s standards of efficient operation. It thus lays emphasis on “what the cost should be”. These should be costs are when compared with the actual costs. The difference between standard cost and actual cost of actual output is defined as the variance.

The variance in other words in the difference between the actual performance and the standard performance. The calculations of variances are simple. A variance may be favourable or unfavourable. If the actual cost is less than the standard cost, the variance is favourable but if the actual cost is more than the standard cost, the variance will be unfavourable. They are easily expressible and do not provide detailed analysis to enable management of exercise control over them. It is not enough to know the figures of these variances from month to month. We in fact are required to trace their origin and causes of occurrence for taking necessary remedial steps to reduce / eliminate them. A detailed probe into the variance particularly the controllable variances helps the management to ascertain:

(i) the amount of variance
(ii) the factors or causes of their occurrence
(iii) the responsibility to be laid on executives and departments and
(iv) corrective actions which should be taken to obviate or reduce the variances.

Mere calculation and analysis of variances is of no use. The success of variance analysis depends upon how quickly and effectively the corrective actions can be taken on the analysed variances. In fact variance gives information. The manager needs to act on the information provided for taking corrective action. Information is the means and action taken on it is the end. In other words, the calculation of variances in standard costing is not an end in itself, but a means to an end.

Question-3

Describe the various steps involved in adopting standard costing system in an organization.
Solution:
The Steps of standard costing is as below:

(i) **Setting of Standards**: The first step is to set standards which are to be achieved.

(ii) **Ascertainment of actual costs**: Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.

(iii) **Comparison of actual cost and standard cost**: Actual costs are compared with the standards costs and variances are determined.

(iv) **Investigation of variances**: Variances arises are investigated for further action. Based on this performance is evaluated and appropriate actions are taken.

(v) **Disposition of variances**: Variances arise are disposed off by transferring it the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.

**SECTION- B**

**Question 1**

Calculate Efficiency and Capacity ratio from the following figures:

- **Budgeted production**: 80 units
- **Actual production**: 60 units
- **Standard time per unit**: 8 hours
- **Actual hours worked**: 500 hours.

**Solution**:

Efficiency Ratio = \( \frac{\text{Actual output in terms of standard hours}}{\text{Actual hour worked}} \times 100 \)

Or, \( \frac{60 \text{ units} \times 8 \text{ hours}}{500 \text{ hours}} \times 100 \) = 96%

Or, \( \frac{480 \text{ hours}}{500 \text{ hours}} \times 100 = 96\% \)

Capacity Ratio = \( \frac{\text{Actual hours worked}}{\text{Budgeted hours}} \times 100 \)

Or, \( \frac{500 \text{ hours}}{80 \text{ units} \times 8 \text{ hours}} \times 100 \) = 78.12%

Or, \( \frac{500 \text{ hours}}{640 \text{ hours}} \times 100 = 78.12\% \)
KPR Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. The Standard Cost Card of a product is as under:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Unit cost (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>5 kg @ ₹ 4.20</td>
</tr>
<tr>
<td>Direct labour</td>
<td>3 hours @ ₹ 3.00</td>
</tr>
<tr>
<td>Factory overhead</td>
<td>₹ 1.20 per labour hour</td>
</tr>
<tr>
<td><strong>Total manufacturing cost</strong></td>
<td></td>
</tr>
</tbody>
</table>

The production schedule for the month of June, 2013 required completion of 40,000 units. However, 40,960 units were completed during the month without opening and closing work-in-process inventories.

Purchases during the month of June, 2013, 2,25,000 kg. of material at the rate of ₹ 4.50 per kg. Production and Sales records for the month showed the following actual results.

- Material used 2,05,600 kg.
- Direct labour 1,21,200 hours; cost incurred ₹ 3,87,840
- Total factory overhead cost incurred ₹ 1,00,000
- Sales 40,000 units

Selling price to be so fixed as to allow a mark-up of 20 per cent on selling price.

Required:

(i) Calculate material variances based on consumption of material.

(ii) Calculate labour variances and the total variance for factory overhead.

(iii) Prepare Income statement for June, 2013 showing actual gross margin.

(iv) An incentive scheme is in operation in the company whereby employees are paid a bonus of 50% of direct labour hour saved at standard direct labour hour rate. Calculate the Bonus amount.

Solution

(i) Material variances:

(a) Direct Material Cost Variance = Standard Cost – Actual Cost

= (40,960 units × 5 kg × ₹ 4.20) – (2,05,600 kg × ₹ 4.50)

= ₹ 8,60,160 – ₹ 9,25,200 = ₹ 65,040 (A)

(b) Material Price Variance = Actual Qty. (Std. Price – Actual Price)

= 2,05,600* kg. (₹ 4.20 – ₹ 4.50) = ₹ 61,680 (A)
11.13 Cost Accounting

(*Material variances are calculated on the basis of consumption)

(c) Material Usages Variance = Std. Price (Std. Qty. – Actual Qty.)
   = ₹ 4.20 (40,960 units × 5 kg. – 2,05,600 kg.)
   = ₹ 3,360 (A)

(ii) Labour Variances and Overhead Variances:

(a) Labour Cost Variance = Standard cost – Actual cost
   = (40,960 units × 3 hours × ₹ 3) – ₹ 3,87,840
   = ₹ 19,200 (A)

(b) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
   = 1,21,200 hours (₹ 3 – ₹ 3.20)
   = ₹ 24,240 (A)

(c) Labour Efficiency Variance = Std. Rate (Std. Hour – Actual Hour)
   = ₹ 3 (40,960 units × 3 hour – 1,21,200 hour)
   = ₹ 5,040 (F)

(d) Total Factory Overhead Variance
   = Factory Overhead Absorbed – Actual Factory Overhead
   = (Actual Hours × Std. Rate) – Actual Factory Overhead
   = (40,960 units × 3 hours × ₹ 1.20) – ₹ 1,00,000
   = ₹ 47,456 (F)

(iii) Preparation of Income Statement

<table>
<thead>
<tr>
<th>Calculation of unit selling price</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>21.00</td>
</tr>
<tr>
<td>Direct labour</td>
<td>9.00</td>
</tr>
<tr>
<td>Factory overhead</td>
<td>3.60</td>
</tr>
<tr>
<td>Factory cost</td>
<td>33.60</td>
</tr>
<tr>
<td>Margin 25% on factory cost</td>
<td>8.40</td>
</tr>
<tr>
<td>Selling price</td>
<td>42.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income Statement</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (40,000 units × ₹ 42)</td>
<td>16,80,000</td>
</tr>
</tbody>
</table>
Less: Standard cost of goods sold (40,000 units × ₹33.60)  
<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Cost of Goods Sold</td>
<td>13,44,000</td>
</tr>
<tr>
<td></td>
<td>3,36,000</td>
</tr>
<tr>
<td><strong>Less: Adverse Variances:</strong></td>
<td></td>
</tr>
<tr>
<td>Material Price variance</td>
<td>61,680</td>
</tr>
<tr>
<td>Material Usage variance</td>
<td>3,360</td>
</tr>
<tr>
<td>Labour Rate variance</td>
<td>24,240</td>
</tr>
<tr>
<td><strong>Add: Favourable Variances:</strong></td>
<td></td>
</tr>
<tr>
<td>Labour efficiency variance</td>
<td>5,040</td>
</tr>
<tr>
<td>Factory overhead</td>
<td>47,456</td>
</tr>
<tr>
<td>Actual gross margin</td>
<td>2,99,216</td>
</tr>
</tbody>
</table>

(iv)  

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour hour saved</td>
<td></td>
</tr>
<tr>
<td>Standard labour hours (40,960 units × 3 hours)</td>
<td>1,22,880</td>
</tr>
<tr>
<td>Actual labour hour worked</td>
<td>1,21,200</td>
</tr>
<tr>
<td>Labour hour saved</td>
<td>1,680</td>
</tr>
</tbody>
</table>

Bonus for saved labour = 50% (1,680 hours × ₹ 3) = ₹ 2,520.

Question 3

UV Ltd. presents the following information for November, 2013:

*Budgeted production of product P = 200 units.*

*Standard consumption of Raw materials = 2 kg. per unit of P.*

*Standard price of material A = ₹ 6 per kg.*

Actually, 250 units of P were produced and material A was purchased at ₹ 8 per kg and consumed at 1.8 kg per unit of P. Calculate the Material Cost Variances.

**Solution:**

Actual production of P = 250 units

Standard quantity of material A for actual production = 2 kg. × 250 units = 500 kg. (SQ)

Actual quantity of material A for actual production = 1.8 kg. × 250 units = 450 kg. (AQ)

Standard price per kg. of material A = ₹ 6 (SP)

Actual price per kg. of material A = ₹ 8 (AP)
11.15 Cost Accounting

(1) Total Material Cost Variance  = (Standard Price × Standard Quantity)  
– (Actual Price × Actual Quantity)  
= (₹ 6 × 500 kg.) – (₹ 8 × 450 kg.)  
= ₹ 3,000 – ₹ 3,600 = ₹ 600 (A)

(2) Material Price Variance  = (Standard Price – Actual Price) × Actual Quantity  
= (₹ 6 – ₹ 8) × 450 kg. = 900 (A)

(3) Material Usage Variance  = (Standard Quantity – Actual Quantity) × Standard Price  
= (500 kg. – 450 kg.) × ₹ 6 = 300 (F)

Question 4

The following information is available from the cost records of Vatika & Co. For the month of August, 2013:

Material purchased 24,000 kg ₹ 1,05,600
Material consumed 22,800 kg
Actual wages paid for 5,940 hours ₹ 29,700
Unit produced 2,160 units.

Standard rates and prices are:
Direct material rate is ₹ 4.00 per unit
Direct labour rate is ₹ 4.00 per hour
Standard input is 10 kg. for one unit
Standard labour requirement is 2.5 hours per unit.

Calculate all material and labour variances for the month of August, 2013.

Solution:

Material Variances:

(i) Material Cost Variance  
= (Std. Qty. × Std. Price) – (Actual Qty. × Actual Price)  
= (2,160 units × 10 kg. × ₹ 4) – (22,800 kg. × ₹ 4.40)  
= ₹ 86,400 – ₹ 1,00,320 = ₹ 13,920 (A)

(ii) Material Price Variance  
= Actual Q (SP – AP)  
= 24,000 kg. (₹ 4 – ₹ 4.40)  
= ₹ 9,600 (A)
Standard Costing  11.16

(Here AQ means actual quantity of material purchased)

(iii) Material Usage Variance

\[
\text{Material Usage Variance} = \text{SP} \times (\text{SQ} - \text{AQ})
\]

\[
= \text{₹} 4 \times (21,600 \text{ kg.} - 22,800 \text{ kg.}) = \text{₹} 4,800 (A)
\]

Labour Variances:

(i) Labour Cost Variance

\[
\text{Labour Cost Variance} = (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR})
\]

\[
= (2,160 \text{ units} \times 2.50 \text{ hours} \times \text{₹} 4) - \text{₹} 29,700
\]

\[
= \text{₹} 21,600 - \text{₹} 29,700 = \text{₹} 8,100 (A)
\]

(ii) Labour Rate Variance

\[
\text{Labour Rate Variance} = \text{AH} \times (\text{SR} - \text{AR})
\]

\[
= \text{₹} 5,940 \text{ hours} \times (\text{₹} 4 - \text{₹} 5) = \text{₹} 5,940 (A)
\]

(iii) Labour Efficiency Variance

\[
\text{Labour Efficiency Variance} = \text{SR} \times (\text{SH} - \text{AH})
\]

\[
= \text{₹} 4 \times (5,400 \text{ hours} - 5,940 \text{ hours}) = \text{₹} 2,160 (A)
\]

Question 5

SB Constructions Limited has entered into a big contract at an agreed price of ₹1,50,00,000 subject to an escalation clause for material and labour as spent out on the contract and corresponding details are as follows:

<table>
<thead>
<tr>
<th>Material:</th>
<th>Standard</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Rate per Ton</td>
</tr>
<tr>
<td></td>
<td>(Tons)</td>
<td>(₹)</td>
</tr>
<tr>
<td>A</td>
<td>3,000</td>
<td>1,000</td>
</tr>
<tr>
<td>B</td>
<td>2,400</td>
<td>800</td>
</tr>
<tr>
<td>C</td>
<td>500</td>
<td>4,000</td>
</tr>
<tr>
<td>D</td>
<td>100</td>
<td>30,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Labour:</th>
<th>Hours</th>
<th>Hourly Rate</th>
<th>Hours</th>
<th>Hourly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(₹)</td>
<td>(₹)</td>
<td>(₹)</td>
<td>(₹)</td>
</tr>
<tr>
<td>L₁</td>
<td>60,000</td>
<td>15</td>
<td>56,000</td>
<td>18</td>
</tr>
<tr>
<td>L₂</td>
<td>40,000</td>
<td>30</td>
<td>38,000</td>
<td>35</td>
</tr>
</tbody>
</table>

You are required to:

Calculate the following variances and verify them:

© The Institute of Chartered Accountants of India
11.17 Cost Accounting

(a) Material Cost Variance
(b) Material Price Variance
(c) Material Usage Variance
(d) Labour Cost Variance
(e) Labour Rate Variance
(f) Labour Efficiency Variance.

Solution:

Material Variances

<table>
<thead>
<tr>
<th></th>
<th>(SQ × SP)</th>
<th>(₹)</th>
<th>(AQ × AP)</th>
<th>(₹)</th>
<th>(AQ × SP)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3,000 × 1,000</td>
<td>30,00,000</td>
<td>3,400 × 1,100</td>
<td>37,40,000</td>
<td>3,400 × 1,000</td>
<td>34,00,000</td>
</tr>
<tr>
<td>B</td>
<td>2,400 × 800</td>
<td>19,20,000</td>
<td>2,300 × 700</td>
<td>16,10,000</td>
<td>2,300 × 800</td>
<td>18,40,000</td>
</tr>
<tr>
<td>C</td>
<td>500 × 4,000</td>
<td>20,00,000</td>
<td>600 × 3,900</td>
<td>23,40,000</td>
<td>600 × 4,000</td>
<td>24,00,000</td>
</tr>
<tr>
<td>D</td>
<td>100 × 30,000</td>
<td>30,00,000</td>
<td>90 × 31,500</td>
<td>28,35,000</td>
<td>90 × 30,000</td>
<td>27,00,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>99,20,000</td>
<td></td>
<td>1,05,25,000</td>
<td></td>
<td>1,03,40,000</td>
</tr>
</tbody>
</table>

(a) Material Cost Variance (MCV) = (SQ × SP) – (AQ × AP) = ₹ 99,20,000 – ₹ 1,05,25,000 = ₹ 6,05,000 (A)

(b) Material Price Variance (MPV) = AQ (SP – AP) or (AQ × SP) – (AQ × AP) = ₹ 1,03,40,000 – ₹ 1,05,25,000 = ₹ 1,85,000 (A)

(c) Material Usage Variance (MUV) = (SQ × SP) – (AQ × SP) = ₹ 99,20,000 – ₹ 1,03,40,000 = ₹ 4,20,000 (A)

Verification, MCV = MPV + MUV
Or, ₹ 6,05,000 (A) = ₹ 1,85,000 (A) + ₹ 4,20,000 (A)
Or, ₹ 6,05,000 (A) = ₹ 6,05,000 (A)

Labour Variances

<table>
<thead>
<tr>
<th></th>
<th>(SH × SR)</th>
<th>(₹)</th>
<th>(AH× AR)</th>
<th>(₹)</th>
<th>(AH× SR)</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>60,000 × 15</td>
<td>9,00,000</td>
<td>56,000 × 18</td>
<td>10,08,000</td>
<td>56,000 × 15</td>
<td>8,40,000</td>
</tr>
<tr>
<td>L2</td>
<td>40,000 × 30</td>
<td>12,00,000</td>
<td>38,000 × 35</td>
<td>13,30,000</td>
<td>38,000 × 30</td>
<td>11,40,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>21,00,000</td>
<td></td>
<td>23,38,000</td>
<td></td>
<td>19,80,000</td>
</tr>
</tbody>
</table>

(a) Labour Cost Variance (LCV) = (SH × SR) – (AH × AR) = ₹ 21,00,000 – ₹ 23,38,000 = ₹ 2,38,000 (A)
(b) Labour Rate Variance (LRV) = (AH × SR) – (AH × AR)
= ₹ 19,80,000 – ₹ 23,38,000 = ₹ 3,58,000 (A)

(c) Labour Efficiency Variance (LEV) = (SH × SR) – (AH × SR)
= ₹ 21,00,000 – ₹ 19,80,000 = ₹ 1,20,000 (F)

Verification, LCV = LRV + LEV
Or, ₹ 2,38,000 (A) = ₹ 3,58,000 (A) + ₹ 1,20,000 (F)
Or, ₹ 2,38,000 (A) = ₹ 2,38,000 (A)

Question 6
Compute the sales variances (total, price and volume) from the following figures:

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted Quantity</th>
<th>Budgeted Price per Unit (₹)</th>
<th>Actual Quantity</th>
<th>Actual Price per unit (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>4000</td>
<td>25</td>
<td>4800</td>
<td>30</td>
</tr>
<tr>
<td>Q</td>
<td>3000</td>
<td>50</td>
<td>2800</td>
<td>45</td>
</tr>
<tr>
<td>R</td>
<td>2000</td>
<td>75</td>
<td>2400</td>
<td>70</td>
</tr>
<tr>
<td>S</td>
<td>1000</td>
<td>100</td>
<td>800</td>
<td>105</td>
</tr>
</tbody>
</table>

Solution:

Working:

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted Price (₹)</th>
<th>Actual Price (₹)</th>
<th>Budgeted Qty.</th>
<th>Actual Qty.</th>
<th>Budgeted Sales (₹)</th>
<th>Standard Sales (Actual at Budgeted price) (₹)</th>
<th>Actual sales (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>25</td>
<td>30</td>
<td>4,000</td>
<td>4,800</td>
<td>1,00,000</td>
<td>1,20,000</td>
<td>1,44,000</td>
</tr>
<tr>
<td>Q</td>
<td>50</td>
<td>45</td>
<td>3,000</td>
<td>2,800</td>
<td>1,50,000</td>
<td>1,40,000</td>
<td>1,26,000</td>
</tr>
<tr>
<td>R</td>
<td>75</td>
<td>70</td>
<td>2,000</td>
<td>2,400</td>
<td>1,50,000</td>
<td>1,80,000</td>
<td>1,68,000</td>
</tr>
<tr>
<td>S</td>
<td>100</td>
<td>105</td>
<td>1,000</td>
<td>800</td>
<td>1,00,000</td>
<td>80,000</td>
<td>84,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,00,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,20,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,22,000</td>
</tr>
</tbody>
</table>

Calculation of Variances:

Sale Price Variance = Actual Quantity (Actual Price – Budgeted Price)

= Actual Sales – Standard Sales

= ₹ 5,22,000 – ₹ 5,20,000 = ₹ 2,000 (F)
Sales Volume Variance  = Budgeted Price (Actual Quantity – Budgeted Quantity)
= Standard Sales – Budgeted Sales
= ₹ 5,20,000 – ₹ 5,00,000 = ₹ 20,000 (F)

Total Sales Variance  = Actual Sales – Budgeted Sales
= ₹ 5,22,000 – ₹ 5,00,000 = ₹ 22,000 (F)

Verification, Total Sales Variance = Sales Price Variance + Sales Volume Variance
₹ 22,000 (F) = ₹ 2,000 (F) + ₹ 20,000 (F)

Question 7
Gama Ltd. has furnished the following standard cost data per unit of production:
Material 10 kg @ ₹ 10 per kg.
Labour 6 hours @ ₹ 5.50 per hour
Variable overhead 6 hours @ ₹ 10 per hour.
Fixed overhead ₹ 4,50,000 per month (Based on a normal volume of 30,000 labour hours.)

The actual cost data for the month of August 2013 are as follows:
Material used 50,000 kg at a cost of ₹ 5,25,000.
Labour paid ₹ 1,55,000 for 31,000 hours worked
Variable overheads ₹ 2,93,000
Fixed overheads ₹ 4,70,000
Actual production 4,800 units.

Calculate:
(i) Material Cost Variance.
(ii) Labour Cost Variance.
(iii) Fixed Overhead Cost Variance.
(iv) Variable Overhead Cost Variance.

Solution:
Budgeted Production 30,000 hours ÷ 6 hours per unit = 5,000 units
Budgeted Fixed Overhead Rate = ₹ 4,50,000 ÷ 5,000 units = ₹ 90 per unit Or
= ₹ 4,50,000 ÷ 30,000 hours = ₹ 15 per hour.

(i) Material Cost Variance = (Std. Qty. × Std. Price) – (Actual Qty. × Actual Price)
= (4,800 units × 10 kg. × ₹10) - ₹ 5,25,000
Standard Costing  11.20

= ₹ 4,80,000 – ₹ 5,25,000
= ₹ 45,000 (A)

(ii) Labour Cost Variance = (Std. Hours × Std. Rate) – (Actual Hours × Actual rate)
= (4,800 units × 6 hours × ₹ 5.50) – ₹1,55,000
= ₹ 1,58,400 – ₹ 1,55,000
= ₹ 3,400 (F)

(iii) Fixed Overhead Cost Variance = (Budgeted Rate × Actual Qty) – Actual Overhead
OR = (Budgeted Rate × Std. Hours) – Actual Overhead
= (₹ 90 x 4,800 units) – ₹ 4,70,000
= ₹ 38,000 (A)

(iv) Variable Overhead Cost Variance= (Std. Rate × Std. Hours) – Actual Overhead
= (4,800 units × 6 hours × ₹ 10) - ₹ 2,93,000
= ₹ 2,88,00 - ₹ 2,93,000
= ₹ 5,000 (A)

Question 8

SJ Ltd. has furnished the following information:

| Standard overhead absorption rate per unit | ₹ 20 |
| Standard rate per hour | ₹ 4 |
| Budgeted production | 12,000 units |
| Actual production | 15,560 units |

Actual overheads were ₹ 2,95,000 out of which ₹ 62,500 fixed.

Actual hours 74,000

Overheads are based on the following flexible budget

<table>
<thead>
<tr>
<th>Production (units)</th>
<th>8,000</th>
<th>10,000</th>
<th>14,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Overheads (₹)</td>
<td>1,80,000</td>
<td>2,10,000</td>
<td>2,70,000</td>
</tr>
</tbody>
</table>

You are required to calculate the following overhead variances (on hour’s basis) with appropriate workings:

(i) Variable overhead efficiency and expenditure variance
(ii) Fixed overhead efficiency and capacity variance.

Solution:

Workings:

(a) Variable Overhead rate per unit

\[
= \frac{\text{Difference of Overhead at two level}}{\text{Difference in Production units}}
\]

\[
= \frac{₹2,10,000 - ₹1,80,000}{10,000\text{ units} - 8,000\text{ units}} = ₹15
\]

(b) Fixed Overhead = ₹1,80,000 – (8,000 units × ₹15) = ₹60,000

(c) Standard hours per unit of production

\[
= \frac{\text{Std. Overhead Absorption Rate}}{\text{Std. Rate per hour}}
\]

\[
= \frac{₹20}{₹4} = 5 \text{ hours}
\]

(d) Standard Variable Overhead Rate per hour

\[
= \frac{\text{Variable Overhead per unit}}{\text{Std. hour per unit}}
\]

\[
= \frac{₹15}{5 \text{ hours}} = ₹3
\]

(e) Standard Fixed Overhead Rate per hour

\[
= ₹4 - ₹3 = ₹1
\]

(f) Actual Variable Overhead

\[
= ₹2,95,000 - ₹62,500 = ₹2,32,500
\]

(g) Actual Variable Overhead Rate per Hour

\[
= \frac{₹2,32,500}{74,000\text{ hours}} = ₹3.1419
\]

(h) Budgeted hours

\[
= 12,000\text{ units} \times 5 \text{ hours} = 60,000 \text{ hours}
\]

(i) Standard Hours for Actual Production

\[
= 15,560\text{ units} \times 5 \text{ hours} = 77,800 \text{ hours}
\]

(i) Variable Overhead Efficiency and Expenditure Variance:

Variable Overhead Efficiency Variance

\[
= \text{Std. Rate per hour (Std. Hours – Actual Hours)}
\]

\[
= ₹3 (77,800\text{ hours} – 74,000\text{ hours})
\]

\[
= ₹11,400 \text{ (F)}
\]

Variable Overhead Expenditure Variance

\[
= \text{Actual Hours (Std. Rate - Actual Rate)}
\]

\[
= 74,000\text{ hours} (₹3 - ₹3.1419)
\]

\[
= ₹10,500 \text{ (A)}
\]
(ii) Fixed Overhead Efficiency and Capacity Variance:

Fixed Overhead Efficiency Variance  = Std. Rate per Hour (Std. Hours-Actual Hours)
= ₹ 1(77,800 hours -74,000 hours) = ₹ 3,800 (F)

Fixed Overheads Capacity Variance  = Std. Rate per Hour (Actual Hours -Budgeted Hours)
= ₹ 1(74,000 hours − 60,000 hours)
= ₹ 74,000 − ₹ 60,000= ₹ 14,000 (F)

Question 9

The standard labour employment and the actual labour engaged in a 40 hours week for a job are as under:

<table>
<thead>
<tr>
<th>Category of Workers</th>
<th>Standard</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of workers</td>
<td>Wage Rate per hour (₹)</td>
</tr>
<tr>
<td>Skilled</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td>Semi-skilled</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Unskilled</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Standard output: 2,000 units; Actual output: 1,800 units

Abnormal Idle time 2 hours in the week

Calculate:
(i) Labour Cost Variance
(ii) Labour Efficiency Variance
(iii) Labour Idle Time Variance.

Solution:

Working Note:

<table>
<thead>
<tr>
<th>Worker</th>
<th>Standard Hours (a)</th>
<th>Standard Rate per Hour (b)</th>
<th>Standard Cost for Actual Output (c) = (a x b)</th>
<th>Actual Hours Paid (d)</th>
<th>Actual Rate per hour (e)</th>
<th>Actual Cost (f) = (d) x (e)</th>
<th>Idle time (g)</th>
<th>Actual hours worked (h) = (d) - (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled</td>
<td>2,340 hrs. (65 Workers x 40 hrs. + 2,000 units)</td>
<td>₹ 45</td>
<td>₹ 1,05,300</td>
<td>2,000 hrs. (50 Workers x 40 hrs.)</td>
<td>₹ 50</td>
<td>₹ 1,00,000</td>
<td>100 hrs. (50 Workers x 2 hrs.)</td>
<td>1,900 hrs.</td>
</tr>
<tr>
<td>Semi-skilled</td>
<td>720 hrs. (20 Workers)</td>
<td>₹ 30</td>
<td>₹ 21,600</td>
<td>1,200 hrs. (30 Workers)</td>
<td>₹ 35</td>
<td>₹ 42,000</td>
<td>60 hrs. (30)</td>
<td>1,140 hrs.</td>
</tr>
</tbody>
</table>
Calculation of Variances

(i) Labour Cost Variance  
= Standard Cost for actual output – Actual cost

Skilled worker  
= ₹1,05,300 - ₹1,00,000  
= ₹5,300 (F)

Semi-skilled worker  
= ₹21,600 - ₹42,000  
= ₹20,400 (A)

Unskilled Worker  
= ₹8,100 - ₹8,000  
= ₹100 (F)

Total  
= ₹5,300 (F) + ₹20,400 (A) + ₹100 (F)  
= ₹25,800 (A)

(ii) Labour Efficiency Variance  
= Std. Rate x (Standard hours – Actual hours worked)

Skilled worker  
= ₹45 x (2,340 hrs. - 1,900 hrs.)  
= ₹19,800 (F)

Semi-skilled worker  
= ₹30 x (720 hrs. - 1,140 hrs.)  
= ₹12,600 (A)

Unskilled Worker  
= ₹15 x (540 hrs. - 760 hrs.)  
= ₹3,300 (A)

Total  
= ₹19,800 (F) + ₹12,600 (A) + ₹3,300 (A)  
= ₹35,700 (F)

(iii) Labour Idle Time Variance  
= Std. Rate x Idle Time (Hrs.)

Skilled worker  
= ₹45 x 100 hrs.  
= ₹4,500 (A)

Semi-skilled worker  
= ₹30 x 60 hrs.  
= ₹1,800 (A)
Question 10

Following are the details of the product Phomex for the month of April 2013:

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard quantity of material required per unit</td>
<td>5 kg</td>
</tr>
<tr>
<td>Actual output</td>
<td>1000 units</td>
</tr>
<tr>
<td>Actual cost of materials used</td>
<td>₹7,14,000</td>
</tr>
<tr>
<td>Material price variance</td>
<td>₹51,000 (Fav)</td>
</tr>
</tbody>
</table>

Actual price per kg of material is found to be less than standard price per kg of material by ₹10.

You are required to calculate:

(i) Actual quantity and Actual price of materials used.

(ii) Material Usage Variance

(iii) Material Cost Variance.

Solution:

(i) Actual Quantity and Actual Price of material used

Material Price Variance = Actual Quantity (Std. Price – Actual Price) = ₹51,000

Or, AQ (SP – AP) = ₹51,000

Or, 10 AQ = ₹51,000

Or, AQ = 5,100 kgs

Actual cost of material used is given i.e.

AQ x AP = ₹7,14,000

Or, 5,100 AP = ₹7,14,000

AP = ₹140

∴ Actual price is less by ₹10

So, Standard Price = ₹140 + ₹10 = ₹150 per kg

Actual Quantity = 5,100 kgs

Actual Price = ₹140/kg

(ii) Material Usage Variance

Std. Price (Std. Quantity – Actual Quantity)

Or, SP (SQ – AQ) = ₹150 (1,000 units x 5 kg – 5,100 kg)

= ₹15,000 (A)
(iii) Material Cost Variance = Std. Cost – Actual Cost
= (SP x SQ) – (AP x AQ)
= ₹ 150 x 5,000 – ₹ 140 x 5,100
= ₹ 7,50,000 – ₹ 7,14,000
= ₹ 36,000 (F)

OR
Material Price Variance + Material Usage Variance
₹ 51,000 (F) + ₹15,000 (A)= ₹ 36,000 (F)

Question 11
SP Limited produces a product 'Tempex' which is sold in a 10 Kg. packet. The standard cost card per packet of 'Tempex' are as follows:

(₹)
Direct materials 10 kg @ ₹45 per kg 450
Direct labour 8 hours @ ₹50 per hour 400
Variable Overhead 8 hours @ ₹10 per hour 80
Fixed Overhead 200
1,130

Budgeted output for the third quarter of a year was 10,000 Kg. Actual output is 9,000 Kg.
Actual cost for this quarter are as follows :
(₹)
Direct Materials 8,900 Kg @ ₹46 per Kg. 4,09,400
Direct Labour 7,000 hours @ ₹52 per hour 3,64,000
Variable Overhead incurred 72,500
Fixed Overhead incurred 1,92,000

You are required to calculate :
(i) Material Usage Variance
(ii) Material Price Variance
(iii) Material Cost Variance
(iv) Labour Efficiency Variance
(v) Labour Rate Variance
(vi) Labour Cost Variance
(vii) Variable Overhead Cost Variance
(viii) Fixed Overhead Cost Variance.
Solution:

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
   = ₹ 45 (9,000 kg. – 8,900 kg.)
   = ₹ 4,500 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
    = 8,900 kg. (₹ 45 – ₹ 46) = ₹ 8,900 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
    = (SQ × SP) – (AQ × AP)
    = (9,000 kg. × ₹ 45) – (8,900 kg. × ₹ 46)
    = ₹ 4,05,000 – ₹ 4,09,400
    = ₹ 4,400 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
    = ₹ 50 (\(\frac{9,000}{10}\) × 8 hours – 7,000 hrs.)
    = ₹ 50 (7,200 hrs. – 7,000 hrs.)
    = ₹ 10,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
    = 7,000 hrs. (₹ 50 – ₹ 52)
    = ₹ 14,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
    = (SH × SR) – (AH × AR)
    = (7,200 hrs. × ₹ 50) – (7,000 hrs. × ₹ 52)
    = ₹ 3,60,000 – ₹ 3,64,000
    = ₹ 4,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
    = (7,200 hrs. × ₹ 10) – ₹ 72,500
    = ₹ 500 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
    = ₹ 200 × 9,000 kgs. = ₹ 1,92,000
    = ₹ 1,80,000 – ₹ 1,92,000 = ₹ 12,000 (Adverse)
Question 12

XYZ Co. Ltd. provides the following information:

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>4,000 Units</td>
<td>3,800 Units</td>
</tr>
<tr>
<td>Working Days</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Fixed Overhead</td>
<td>₹40,000</td>
<td>₹39,000</td>
</tr>
<tr>
<td>Variable Overhead</td>
<td>₹12,000</td>
<td>₹12,000</td>
</tr>
</tbody>
</table>

You are required to calculate following overhead variances:

(a) Variable Overhead Variance

(b) Fixed Overhead Variances
   (i) Expenditure Variance
   (ii) Volume Variance

Solution:

Workings:

Standard Variable Overhead rate per unit = ₹ \( \frac{12,000}{4,000 \text{ units}} \) = ₹ 3

Standard Fixed Overhead rate per unit = ₹ \( \frac{40,000}{4,000 \text{ units}} \) = ₹ 10

(a) Variable Overhead Variance = Recovered Variable Overhead - Actual Variable overhead

   = 3,800 units × ₹ 3 – ₹ 12,000

   = ₹ 11,400 – ₹12,000 = ₹ 600 (Adverse)

(b) (i) Fixed Overhead Expenditure Variance = Budgeted Overhead – Actual Overhead

   = ₹ 40,000 – ₹ 39,000

   = ₹ 1,000 (Favourable)

(ii) Fixed Overhead Volume Variance = Recovered Overhead – Budgeted Overhead

   = 3,800 units × ₹ 10 – ₹ 40,000

   = ₹ 38,000 – ₹ 40,000

   = ₹ 2,000 (Adverse)
Question 13

Jigyasa Pharmaceuticals Ltd. is engaged in producing dietary supplement ‘Funkids’ for growing children. It produces ‘Funkids’ in a batch of 10 kgs. Standard material inputs required for 10 kgs. of ‘Funkids’ are as below:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity (in kgs.)</th>
<th>Rate per kg. (in ₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-X</td>
<td>5</td>
<td>110</td>
</tr>
<tr>
<td>Proto-D</td>
<td>3</td>
<td>320</td>
</tr>
<tr>
<td>Mine-L</td>
<td>3</td>
<td>460</td>
</tr>
</tbody>
</table>

During the month of March, 2014, actual production was 5,000 kgs. of ‘Funkids’ for which the actual quantities of material used for a batch and the prices paid thereof are as under:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity (in kgs.)</th>
<th>Rate per kg. (in ₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-X</td>
<td>6</td>
<td>115</td>
</tr>
<tr>
<td>Proto-D</td>
<td>2.5</td>
<td>330</td>
</tr>
<tr>
<td>Mine-L</td>
<td>2</td>
<td>405</td>
</tr>
</tbody>
</table>

You are required to calculate the following variances based on the above given information for the month of March, 2014 for Jigyasa Pharmaceuticals Ltd.:

(i) Material Cost Variance;
(ii) Material Price Variance;
(iii) Material Usage Variance;
(iv) Material Mix Variance;
(v) Material Yield Variance.

Solution:

<table>
<thead>
<tr>
<th>Material</th>
<th>SQ* × SP</th>
<th>AQ** × SP</th>
<th>AQ** × AP</th>
<th>RSQ*** × SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-X</td>
<td>₹ 2,75,000 (2,500 kg. × ₹ 110)</td>
<td>₹ 3,30,000 (3,000 kg. × ₹ 110)</td>
<td>₹ 3,45,000 (3,000 kg. × ₹ 115)</td>
<td>₹ 2,62,460 (2,386 kg. × ₹ 110)</td>
</tr>
<tr>
<td>Proto-D</td>
<td>₹ 4,80,000 (1,500 kg. × ₹ 320)</td>
<td>₹ 4,00,000 (1,250 kg. × ₹ 320)</td>
<td>₹ 4,12,500 (1,250 kg. × ₹ 330)</td>
<td>₹ 4,58,240 (1,432 kg. × ₹ 320)</td>
</tr>
<tr>
<td>Mine-L</td>
<td>₹ 6,90,000 (1,500 kg. × ₹ 460)</td>
<td>₹ 4,60,000 (1,000 kg. × ₹ 460)</td>
<td>₹ 4,05,000 (1,000 kg. × ₹ 405)</td>
<td>₹ 6,58,720 (1,432 kg. × ₹ 460)</td>
</tr>
<tr>
<td>Total</td>
<td>₹ 14,45,000</td>
<td>₹ 11,90,000</td>
<td>₹ 11,62,500</td>
<td>₹ 13,79,420</td>
</tr>
</tbody>
</table>

* Standard Quantity of materials for actual output:

© The Institute of Chartered Accountants of India
11.29 Cost Accounting

<table>
<thead>
<tr>
<th>Material</th>
<th>Actual Quantity</th>
<th>Revised Standard Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-X</td>
<td>5kgs. × 5,000kgs. = 2,500kgs.</td>
<td>5kgs. × 5,250kgs. = 2,386kgs.</td>
</tr>
<tr>
<td>Proto-D</td>
<td>3kgs. × 5,000kgs. = 1,500kgs.</td>
<td>3kgs. × 5,250kgs. = 1,432kgs.</td>
</tr>
<tr>
<td>Mine-L</td>
<td>3kgs. × 5,000kgs. = 1,500kgs.</td>
<td>3kgs. × 5,250kgs. = 1,432kgs.</td>
</tr>
</tbody>
</table>

**Actual Quantity of Material used for actual output:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Actual Quantity</th>
<th>Revised Standard Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-X</td>
<td>6kgs. × 5,000kgs. = 3,000kgs.</td>
<td>5kgs. × 5,250kgs. = 2,386kgs.</td>
</tr>
<tr>
<td>Proto-D</td>
<td>2.5kgs. × 5,000kgs. = 1,250kgs.</td>
<td>3kgs. × 5,250kgs. = 1,432kgs.</td>
</tr>
<tr>
<td>Mine-L</td>
<td>2kgs. × 5,000kgs. = 1,000kgs.</td>
<td>3kgs. × 5,250kgs. = 1,432kgs.</td>
</tr>
</tbody>
</table>

***Revised Standard Quantity (RSQ):***

<table>
<thead>
<tr>
<th>Material</th>
<th>Revised Standard Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-X</td>
<td>5kgs. × 5,250kgs. = 2,386kgs.</td>
</tr>
<tr>
<td>Proto-D</td>
<td>3kgs. × 5,250kgs. = 1,432kgs.</td>
</tr>
<tr>
<td>Mine-L</td>
<td>3kgs. × 5,250kgs. = 1,432kgs.</td>
</tr>
</tbody>
</table>

(i) **Material Cost Variance**

\[
= (\text{Std. Qty.} \times \text{Std. Price}) - (\text{Actual Qty.} \times \text{Actual Price})
\]

Or

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

\[
\text{Vita-X} = ₹ 2,75,000 - ₹ 3,45,000 = ₹ 70,000 \quad \text{(A)}
\]

\[
\text{Proto-D} = ₹ 4,80,000 - ₹ 4,12,500 = ₹ 67,500 \quad \text{(F)}
\]

\[
\text{Mine-L} = ₹ 6,90,000 - ₹ 4,05,000 = ₹ 2,85,000 \quad \text{(F)}
\]

\[
₹ 2,82,500 \quad \text{(F)}
\]

(ii) **Material Price Variance**

\[
= \text{Actual Quantity (Std. Price – Actual Price)}
\]

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

\[
\text{Vita-X} = ₹ 3,30,000 - ₹ 3,45,000 = ₹ 15,000 \quad \text{(A)}
\]

© The Institute of Chartered Accountants of India
(iii) Material Usage Variance

\[
\text{Vita-X} = \text{Std. Price (Std. Qty. – Actual Qty.)} = ₹ 2,75,000 - ₹ 3,30,000 = ₹ 55,000 \quad (A)
\]
\[
\text{Proto-D} = ₹ 4,80,000 - ₹ 4,00,000 = ₹ 80,000 \quad (F)
\]
\[
\text{Mine-L} = ₹ 6,90,000 - ₹ 4,60,000 = ₹ 2,30,000 \quad (F)
\]

\[
\text{Total} = ₹ 27,500 \quad (F)
\]

(iv) Material Mix Variance

\[
\text{Vita-X} = \text{Std. Price (Revised Std. Qty. – Actual Qty.)} = ₹ 2,62,460 - ₹ 3,30,000 = ₹ 67,540 \quad (A)
\]
\[
\text{Proto-D} = ₹ 4,58,240 - ₹ 4,00,000 = ₹ 58,240 \quad (F)
\]
\[
\text{Mine-L} = ₹ 6,58,720 - ₹ 4,60,000 = ₹ 1,98,720 \quad (F)
\]
\[
\text{Total} = ₹ 1,89,420 \quad (F)
\]

(v) Material Yield Variance

\[
\text{Vita-X} = \text{Std. Price (Std. Qty. – Revised Std. Qty.)} = ₹ 2,75,000 - ₹ 2,62,460 = ₹ 12,540 \quad (F)
\]
\[
\text{Proto-D} = ₹ 4,80,000 - ₹ 4,58,240 = ₹ 21,760 \quad (F)
\]
\[
\text{Mine-L} = ₹ 6,90,000 - ₹ 6,58,720 = ₹ 31,280 \quad (F)
\]
\[
\text{Total} = ₹ 65,580 \quad (F)
\]

Question 14

*ABC Ltd. had prepared the following estimation for the month of April:*

<table>
<thead>
<tr>
<th></th>
<th>Quantity</th>
<th>Rate (₹)</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material-A</strong></td>
<td>800 kg.</td>
<td>45.00</td>
<td>36,000</td>
</tr>
<tr>
<td><strong>Material-B</strong></td>
<td>600 kg.</td>
<td>30.00</td>
<td>18,000</td>
</tr>
<tr>
<td><strong>Skilled labour</strong></td>
<td>1,000 hours</td>
<td>37.50</td>
<td>37,500</td>
</tr>
<tr>
<td><strong>Unskilled labour</strong></td>
<td>800 hours</td>
<td>22.00</td>
<td>17,600</td>
</tr>
</tbody>
</table>

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.
At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
<th>Rate (₹)</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material-A</td>
<td>900 kg.</td>
<td>43.00</td>
<td>38,700</td>
</tr>
<tr>
<td>Material-B</td>
<td>650 kg.</td>
<td>32.50</td>
<td>21,125</td>
</tr>
<tr>
<td>Skilled labour</td>
<td>1,200 hours</td>
<td>35.50</td>
<td>42,600</td>
</tr>
<tr>
<td>Unskilled labour</td>
<td>860 hours</td>
<td>23.00</td>
<td>19,780</td>
</tr>
</tbody>
</table>

You are required to calculate:
(a) Material Cost Variance;
(b) Material Price Variance;
(c) Material Mix Variance;
(d) Material Yield Variance;
(e) Labour Cost Variance;
(f) Labour Efficiency Variance and
(g) Labour Yield Variance.

Solution:

Material Variances:

<table>
<thead>
<tr>
<th>Material</th>
<th>SQ (WN-1)</th>
<th>SP (₹)</th>
<th>SQ × SP (₹)</th>
<th>RSQ (WN-2)</th>
<th>RSQ × SP (₹)</th>
<th>AQ (₹)</th>
<th>AQ × SP (₹)</th>
<th>AP (₹)</th>
<th>AQ × AP (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>940 kg.</td>
<td>45.00</td>
<td>42,300</td>
<td>886 kg.</td>
<td>39,870</td>
<td>900 kg.</td>
<td>40,500</td>
<td>43.00</td>
<td>38,700</td>
</tr>
<tr>
<td>B</td>
<td>705 kg.</td>
<td>30.00</td>
<td>21,150</td>
<td>664 kg.</td>
<td>19,920</td>
<td>650 kg.</td>
<td>19,500</td>
<td>32.50</td>
<td>21,125</td>
</tr>
<tr>
<td></td>
<td>1645 kg.</td>
<td>63.450</td>
<td>1550 kg.</td>
<td>59,790</td>
<td>59,790</td>
<td>60,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WN-1: Standard Quantity (SQ):

Material A- \[ \frac{800\text{ kg.}}{0.9\times1,400\text{ kg.}} \times 1,480\text{ kg.} = 939.68 \text{ or } 940 \text{ kg.} \]

Material B- \[ \frac{600\text{ kg.}}{0.9\times1,400\text{ kg.}} \times 1,480\text{ kg.} = 704.76 \text{ or } 705 \text{ kg.} \]
WN- 2: Revised Standard Quantity (RSQ):

Material A- \( \left( \frac{800\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} \right) = 885.71 \) or 886 kg.

Material B- \( \left( \frac{600\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} \right) = 664.28 \) or 664 kg.

(a) Material Cost Variance (A + B) = \( \{(SQ \times SP) - (AQ \times AP)\} \)
= \( (63,450 - 59,825) = 3,625 \) (F)

(b) Material Price Variance (A + B) = \( \{(AQ \times SP) - (AQ \times AP)\} \)
= \( (60,000 - 59,825) = 175 \) (F)

(c) Material Mix Variance (A + B) = \( \{(RSQ \times SP) - (AQ \times SP)\} \)
= \( (59,790 - 60,000) = 210 \) (A)

(d) Material Yield Variance (A + B) = \( \{(SQ \times SP) - (RSQ \times SP)\} \)
= \( (63,450 - 59,790) = 3,660 \) (F)

Labour Variances:

<table>
<thead>
<tr>
<th>Labour</th>
<th>SH (WN-3)</th>
<th>SR (₹)</th>
<th>SH × SR (₹)</th>
<th>RSH (WN-4)</th>
<th>RSH × SR (₹)</th>
<th>AH (₹)</th>
<th>AH × SR (₹)</th>
<th>AR (₹)</th>
<th>AH × AR (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled</td>
<td>1,116 hrs</td>
<td>37.50</td>
<td>41,850</td>
<td>1144</td>
<td>42,900</td>
<td>1,200</td>
<td>45,000</td>
<td>35.50</td>
<td>42,600</td>
</tr>
<tr>
<td>Unskilled</td>
<td>893 hrs</td>
<td>22.00</td>
<td>19,646</td>
<td>916</td>
<td>20,152</td>
<td>860</td>
<td>18,920</td>
<td>23.00</td>
<td>19,780</td>
</tr>
<tr>
<td></td>
<td>2,009 hrs</td>
<td>61,496</td>
<td>2,060</td>
<td>63,052</td>
<td>2,060</td>
<td>63,920</td>
<td>62,380</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WN- 3: Standard Hours (SH):

Skilled labour- \( \left( \frac{0.95 \times 1,000\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 1,115.87 \) or 1,116 hrs.

Unskilled labour- \( \left( \frac{0.95 \times 800\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 892.69 \) or 893 hrs.

WN- 4: Revised Standard Hours (RSH):

Skilled labour- \( \left( \frac{1,000\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} \right) = 1,144.44 \) or 1,144 hrs.
(e) Labour Cost Variance (Skilled + Unskilled)  
\[ = (SH \times SR) - (AH \times AR) \]
\[ = (61,496 - 62,380) = 884 \text{ (A)} \]

(f) Labour Efficiency Variance (Skilled + Unskilled)  
\[ = (SH \times SR) - (AH \times SR) \]
\[ = (61,496 - 63,920) = 2,424 \text{ (A)} \]

(g) Labour Yield Variance (Skilled + Unskilled)  
\[ = (SH \times SR) - (RSH \times SR) \]
\[ = (61,496 - 63,052) = 1,556 \text{ (A)} \]

Question 15

The following information has been provided by a company:

Number of units produced and sold  \( 6,000 \)

Standard labour rate per hour  \( \text{₹} \ 8 \)

Standard hours required for 6,000 units  

Actual hours required  \( 17,094 \text{ hours} \)

Labour efficiency  \( 105.3\% \)

Labour rate variance  \( \text{₹} \ 68,376 \text{ (A)} \)

You are required to calculate:

(i) Actual labour rate per hour
(ii) Standard hours required for 6,000 units
(iii) Labour Efficiency variance
(iv) Standard labour cost per unit
(v) Actual labour cost per unit.

Solution:

SR – Standard labour Rate per Hour
AR – Actual labour rate per hour
SH – Standard Hours
AH – Actual hours

(i) Labour rate Variance  
\[ = AH(SR – AR) \]
\[ = 17,094 (8 – AR) = 68,376 \text{ (A)} = - 68,476 \]
\[ = 8 – AR = -4 \]
(ii) Labour Efficiency  
\[ = \frac{SH}{AH} \times 100 = 105.3 \]
\[ = SH = \frac{AH \times 105.3}{100} = \frac{17,094 \times 105.3}{100} \]
\[ = 17,999.982 \]
\[ = SH = 18,000 \text{ hours} \]

(iii) Labour Efficiency Variance  
\[ = SR \ (SH - AH) \]
\[ = 8(18,000 - 17,094) \]
\[ = 8 \times 906 \]
\[ = ₹ 7,248 \ (F) \]

(iv) Standard Labour Cost per Unit  
\[ = \frac{18,000 \times 8}{6,000} = ₹ 24 \]

(v) Actual Labour Cost Per Unit  
\[ = \frac{17,094 \times 12}{6,000} = ₹ 34.19 \]