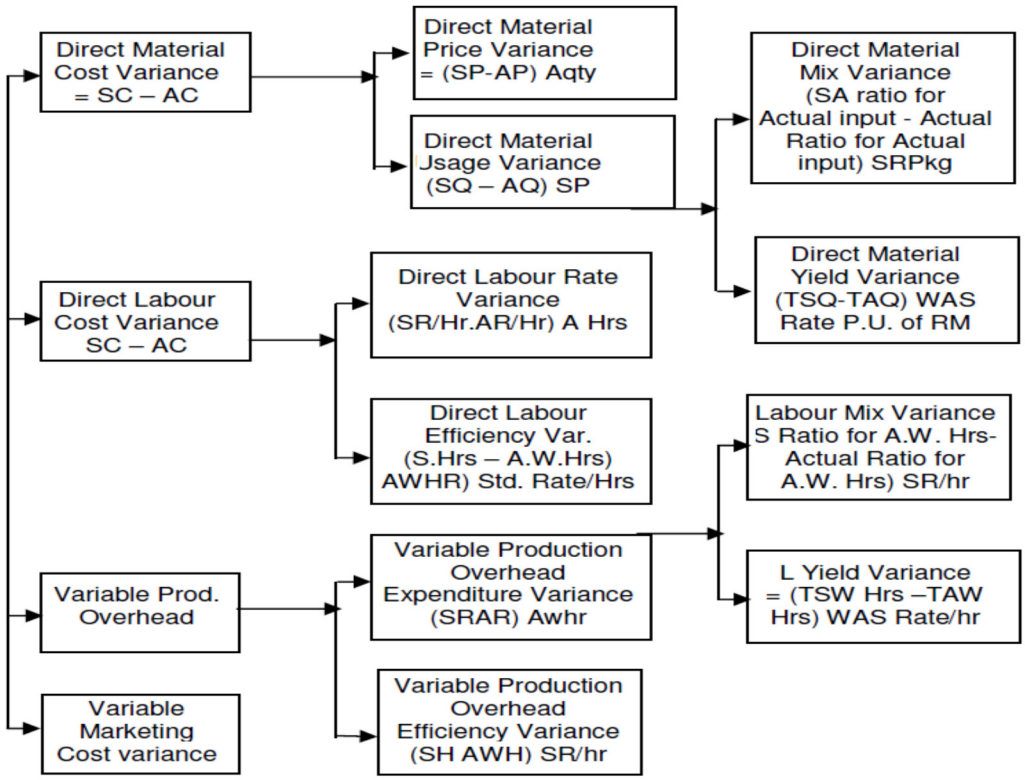
CHAPTER 10

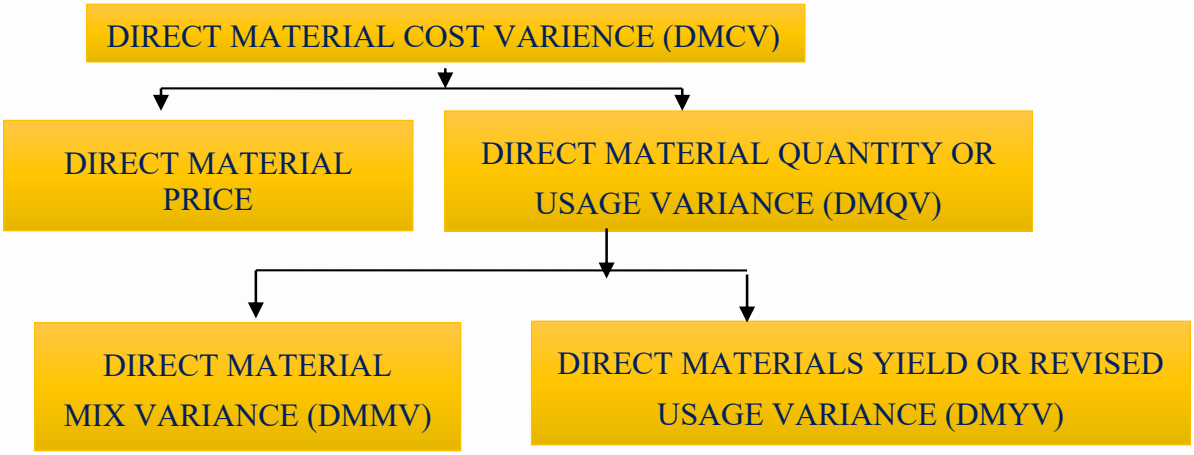
# STANDARD COSTING

**A Chart of Variances (Using Marginal Costing)**




1. WAB Cont. P.U. = Weight Average Budgeted Cont P.U.
2. SRP kg = Standard Rate Per Kg
3. AWH = Actual Working Hours

## DIRECT MATERIAL VARIANCES




### Formula:

1. **Direct materials cost variance (DMCV):**

$$\text{DMCV} = \left(\begin{matrix}\text{standard material cost}\\ \text{for actual output produced}\end{matrix}\right) - \left(\begin{matrix}\text{actual cost of}\\ \text{material used}\end{matrix}\right)$$

2. **Direct materials price variance (DMPV)**

$$\text{DMPV} = \left(\begin{matrix}\text{standard}\\ \text{price}\end{matrix} - \begin{matrix}\text{actual}\\ \text{price}\end{matrix}\right) \times \text{Actual quantity}$$

3. **Direct materials usage/quantity/volume**

$$\text{Variance (DMQV): DMQV} = \left(\begin{matrix}\text{standard quantity}\\ \text{for actual output}\end{matrix} - \begin{matrix}\text{actual}\\ \text{quantity}\end{matrix}\right) \times \begin{matrix}\text{standard}\\ \text{price}\end{matrix}$$

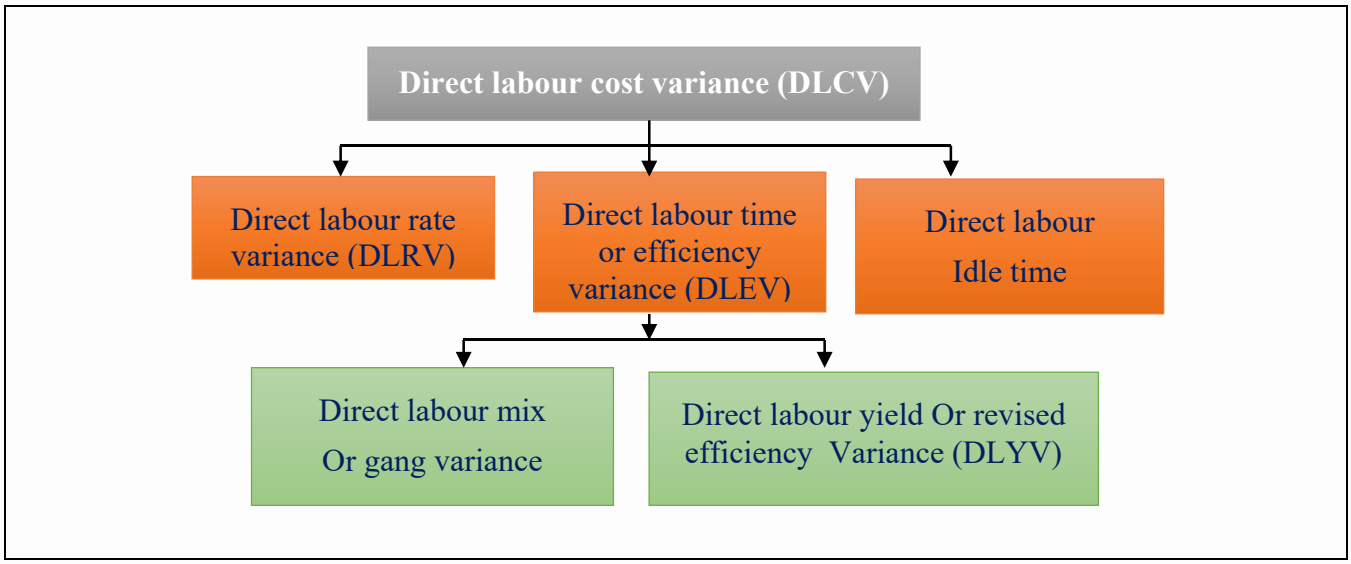
4. **Direct materials mix variance (DMMV)**

$$\text{DMMV} = \left(\begin{matrix}\text{Standard ratio for}\\ \text{total actual mix}\end{matrix} - \begin{matrix}\text{Actual ratio for}\\ \text{Actual mix}\end{matrix}\right) \times \begin{matrix}\text{Standard}\\ \text{price}\end{matrix}$$

5. **Direct materials yield variance/revised usage Variance (DMYV)**

**DMYV = (standard ratio for total standard mix – standard ratio for total actual mix) X Standard Price**

## DIRECT LABOUR VARIANCE




1. **Direct labor cost variance (DLCV)**

$$DLCV = \left[\begin{matrix}standard\ labour\ cost\ for \\ Actual\ out\text{-}put\ produced\end{matrix} - \begin{matrix}actual\ cost\ of \\ labour\ paid\ for\end{matrix}\right]$$

2. **Direct labour rate variance (DLRV)**

$$DLRV = \left(\begin{matrix}standard \\ rate\end{matrix} - \begin{matrix}actual \\ rate\end{matrix}\right) X \begin{matrix}actual\ hour \\ paid\ for\end{matrix}$$

3. **Direct labour efficiency variance (DLEV)**

$$DLEV = \left(\begin{matrix}standard\ hour \\ for\ actual\ output\end{matrix} - \begin{matrix}actual\ hour \\ worked\end{matrix}\right) X \begin{matrix}standard \\ rate\end{matrix}$$

4. **Idle time variance (ITV)**

ITV = (abnormal idle time x standard rate)

5. **Direct labour mix variance (DLMV)**

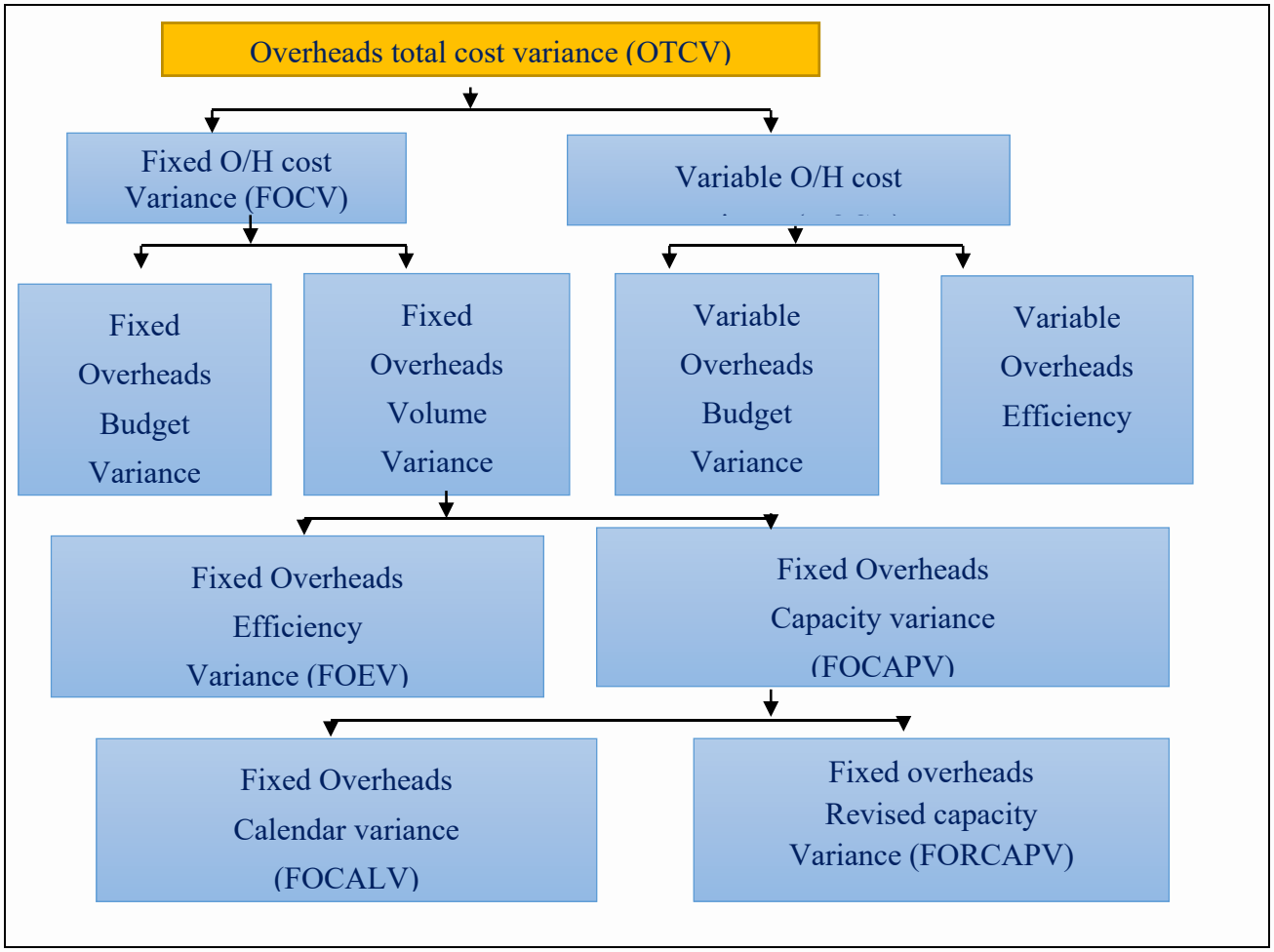
$$\text{Gang Variance: } DLMV = \left(\begin{matrix}Standard \\ Ratio\ for\ actual \\ hour\ worked\end{matrix} - \begin{matrix}Actual\ Ratio\ for\ actual \\ hour \\ worked\end{matrix}\right) X \begin{matrix}standard \\ rate\end{matrix}$$

6. **Direct labour yield variance (DLYC)**

$$DLYV = \left(\begin{matrix}actual \\ output\end{matrix} - \begin{matrix}standard\ output \\ for\ actual\ mix\end{matrix}\right) x \begin{matrix}standard\ cost \\ per\ unit\ of\ output\end{matrix}$$

OR

$$\left(\begin{matrix}Standard\ ratio\ for \\ total\ standard\ labour\ mix\end{matrix} - \begin{matrix}Standard\ ratio\ for \\ Actual\ Labour\ mix\end{matrix}\right) X \begin{matrix}Standard \\ Rate\ per\ hour\end{matrix}$$




**Overhead Total Cost Variance**

**Overhead total cost variance (OTCV)**

$$\text{OTCV} = \left(\begin{matrix}\textit{standard overheads}\\ \textit{cost for actual output}\end{matrix} - \begin{matrix}\textit{actual overheads}\\ \textit{cost incurred}\end{matrix}\right)$$

## VARIABLE OVERHEADS VARIANCES

1. **Variable overheads costs variance (VOCV)**

$$\text{VOCV} = \left(\begin{matrix}\textit{standard variable overheads}\\ \textit{cost for actual output}\end{matrix} - \begin{matrix}\textit{actual variable}\\ \textit{overheads}\end{matrix}\right)$$

$$\text{Or}\left(\begin{matrix}\textit{standard Hours}\\ \textit{for actual output}\end{matrix} \times \begin{matrix}\textit{standard}\\ \textit{rate}\end{matrix}\right) - \left(\begin{matrix}\textit{actual}\\ \textit{hours}\end{matrix} \times \begin{matrix}\textit{actual}\\ \textit{rate}\end{matrix}\right)$$

2. **Variable overheads expenditure/spending/budget Variance (VOBV)**

$$\text{VOEV} = \left(\begin{matrix}\textit{standard overheads}\\ \textit{absorption rate}\end{matrix} - \begin{matrix}\textit{actual}\\ \textit{rate}\end{matrix}\right) \times \begin{matrix}\textit{actual}\\ \textit{hours}\end{matrix}$$

3. **Variable overheads efficiency variance (VOEV)**

$$\text{VOEV} = \left(\begin{matrix}\textit{standard hours}\\ \textit{for actual output}\end{matrix} - \begin{matrix}\textit{actual}\\ \textit{hours}\end{matrix}\right) \times \begin{matrix}\textit{standard variable}\\ \textit{overheads rate}\end{matrix}$$

## FIXED OVERHEADS VARIANCE

1. **Fixed overheads cost variance (FOCV)**

$$\text{FOCV} = \left(\begin{matrix}\text{standard fixed overheads}\\ \text{cost for actual output}\end{matrix} - \begin{matrix}\text{actual fixed}\\ \text{overhead cost}\end{matrix}\right)$$

$$\text{Or } \left(\begin{matrix}\text{standard hours}\\ \text{for actual output}\end{matrix} \times \begin{matrix}\text{standard}\\ \text{rate}\end{matrix}\right) - \left(\begin{matrix}\text{actual}\\ \text{hours}\end{matrix} \times \begin{matrix}\text{actual}\\ \text{rate}\end{matrix}\right)$$

2. **Fixed overheads expenditure/budget variance**

**(FOBV):**

$$\text{FOBV} = \begin{matrix}\text{budgeted}\\ \text{overheads}\end{matrix} - \begin{matrix}\text{actual fixed}\\ \text{overheads}\end{matrix}$$

**OR**

**Recovered - Actual**

3. **Fixed overheads volume variance (FOVV):**

$$\text{FOVV} = \left(\begin{matrix}\text{standardhoursfor}\\ \text{actualoutput}\end{matrix} - \begin{matrix}\text{budget}\\ \text{hours}\end{matrix}\right)\text{Recovered -Budget}$$

4. **Fixed overheads efficiency variance (FOEV)**

$$\text{FOEV} = \left(\begin{matrix}\text{standardhourfor}\\ \text{actualoutput}\end{matrix} - \begin{matrix}\text{actual}\\ \text{hours}\end{matrix}\right)\text{ Standard Rate} \times \text{Recovery rate per hour}$$

5. **Fixed overheads capacity variance (FOCAPV):**

**FOCAPV = Standard Rate X Recovery rate per hour**

6. **Fixed overheads calendar variance (FOCALV)**

$$\left(\begin{matrix}\text{Actual}\\ \text{Days}\end{matrix} - \begin{matrix}\text{Budgeted}\\ \text{Days}\end{matrix}\right) \times \begin{matrix}\text{Standard rate}\\ \text{per day}\end{matrix}$$

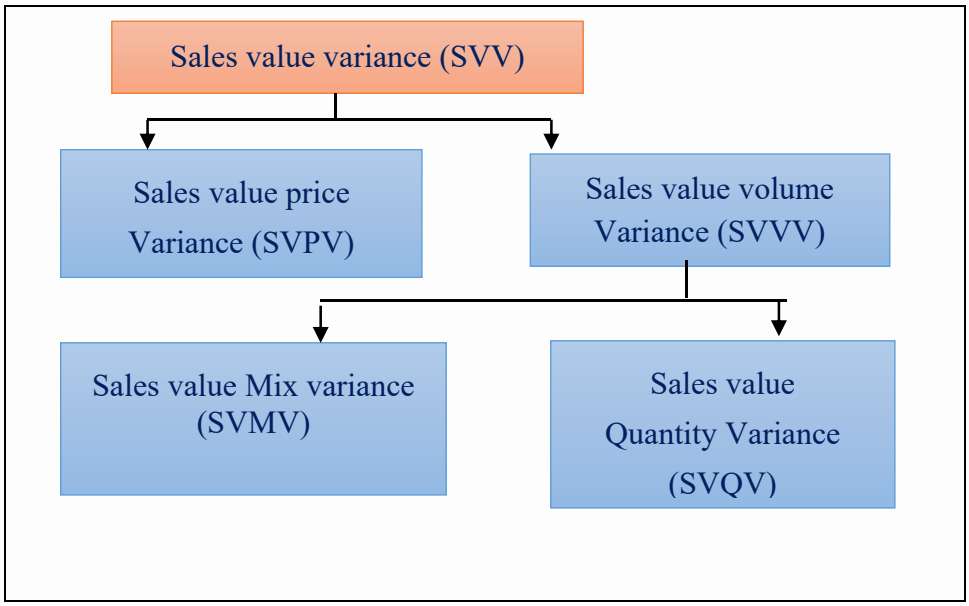
$$\text{Standard rate per day} = \frac{\text{Budgeted Overhead}}{\text{Budgeted Days}}$$

7. **Fixed overheads revised capacity variance**

**(FORCAPV)**

$$\text{FORCAPV} = \left(\begin{matrix}\text{actual}\\ \text{hours}\end{matrix} - \begin{matrix}\text{possible}\\ \text{hours}\end{matrix}\right)\text{Total Capacity Variance – Calendar Variance}$$

## SALES VALUE VARIANCES




### 1. Sales value variance (SVV)

$$SVV = \left(\begin{matrix}Actul\\SP\\p.u\end{matrix} \times \begin{matrix}actual\\sales\\quantity\end{matrix}\right) - \left(\begin{matrix}standard\\SP\\p.u\end{matrix} \times \begin{matrix}standard\\sales\\quantity\end{matrix}\right)$$

### 2. Sales value price variance (SVPV)

$$SVPV = \left(\begin{matrix}Stadnard\\SP\ per\ unit\end{matrix} - \begin{matrix}Actual\\SP\ per\ unit\end{matrix}\right)\left(\begin{matrix}\text{actual}\\\text{SP}\\\text{p.u}\end{matrix} - \begin{matrix}\text{standard}\\\text{SP}\\\text{p.u}\end{matrix}\right) \times \begin{matrix}actual\ sales\\quantity\end{matrix}$$

### 3. Sales value volume variance (SVVV)

$$SVVV = \left(\begin{matrix}Stadnard\\Sales\ quantity\end{matrix} - \begin{matrix}Actual\\Sales\ quantity\end{matrix}\right) \times$$

$$\begin{matrix}Standard\\SP\ per\ unit\end{matrix}\left(\begin{matrix}\text{actualsales}\\\text{quantity}\end{matrix} - \begin{matrix}\text{standardsales}\\\text{quantity}\end{matrix}\right) \text{x} \begin{matrix}\text{standard}\\\text{SP}\\\text{p.u}\end{matrix}$$

### 4. Sales value mix variance (SVMV)

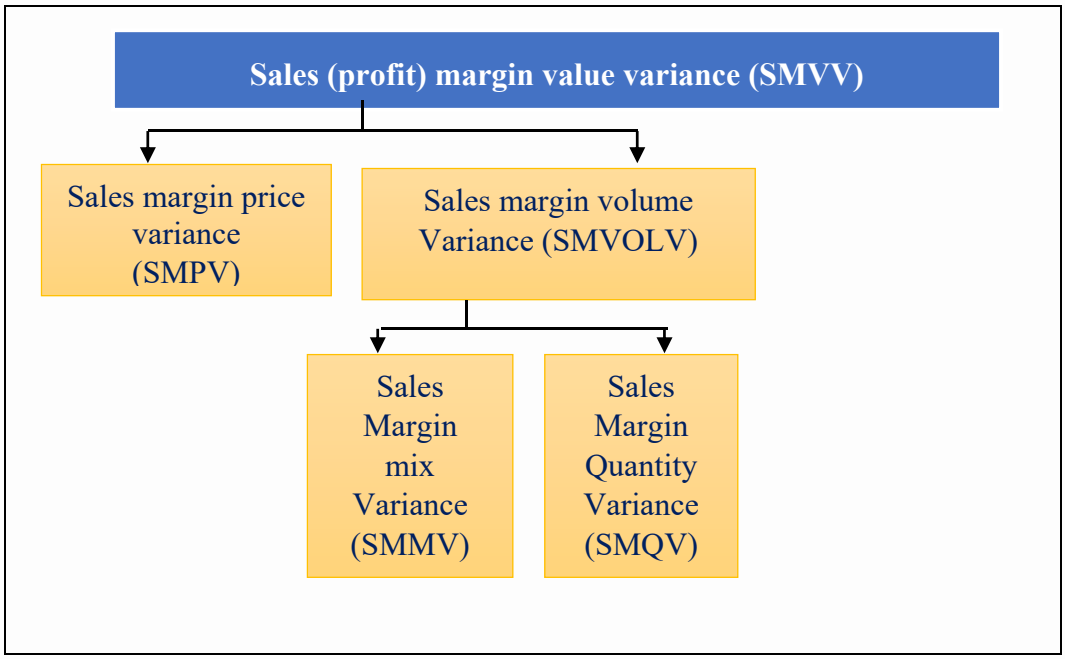
$$SVMV = \left(\begin{matrix}Standard\ Ratio\ for\\Actual\ Mix\end{matrix} - \begin{matrix}Actual\ Ratio\ for\\Actual\ Mix\end{matrix}\right) \times$$

$$\begin{matrix}Budgeted\\Selling\ Price\end{matrix}\left(\begin{matrix}\text{actualsales}\\\text{quantity}\end{matrix} - \begin{matrix}\text{revisedstandard}\\\text{salesquantity}\end{matrix}\right) \text{x} \begin{matrix}\text{standard}\\\text{SPp.u}\end{matrix}$$

### 5. Sales value quantity variance (SVQV)

$$SVQV = \left(\begin{matrix}Standard\ Ratio\ for\\Total\ Budgeted\ Qty\end{matrix} - \begin{matrix}Standard\ Ratio\ for\\total\ actual\ Qty\end{matrix}\right) \times \begin{matrix}Budgeted\\Selling\ Price\end{matrix}\left(\begin{matrix}\text{revised}\\\text{standardsales}\\\text{quantity}\end{matrix} - \begin{matrix}\text{standard}\\\text{sales}\\\text{quantity}\end{matrix}\right) \text{x} \begin{matrix}\text{standard}\\\text{SP}\\\text{p.u}\end{matrix}$$

## SALES MARGIN /PROFIT VARIANCES




1. **Sales margin value variance (SMVV):**

$$\text{SMVV} = \left(\begin{matrix}\textit{actual sales margin p.u}\end{matrix}\ \begin{matrix}\textit{actual sales quantity}\end{matrix}\right) - \left(\begin{matrix}\textit{standard sale margin p.u}\end{matrix} \times \begin{matrix}\textit{standard sales quantity}\end{matrix}\right)$$

2. **Sales margin price variance (SMPV)**

$$\text{SMPV} = \left(\begin{matrix}\text{actualsales}\\ \text{marginp.u}\end{matrix} - \begin{matrix}\text{standardsales}\\ \text{marginp.u}\end{matrix}\right) \text{X} \begin{matrix}\text{actualsales}\\ \text{quantity}\end{matrix}$$

3. **Sales margin volume variance (SMVOLV):**

$$\text{SMVOLV} = \left(\begin{matrix}\textit{Standard sales quantity}\end{matrix} - \begin{matrix}\textit{Actual Sales quantity}\end{matrix}\right) \times \begin{matrix}\textit{Standard sales margin per unit}\end{matrix} \left(\begin{matrix}\text{actualsales}\\ \text{quantity}\end{matrix} - \begin{matrix}\text{standard}\\ \text{salequantity}\end{matrix}\right) \text{X} \begin{matrix}\text{standardsales}\\ \text{marginp.u}\end{matrix}$$

4. **Sales margin mix variance (SMMV):**

$$\text{SMMV} = \left(\begin{matrix}\textit{Standard Ratio for actual mix}\end{matrix} - \begin{matrix}\textit{Actual Ratio for actual mix}\end{matrix}\right) \times$$

$$\begin{matrix}\textit{Budgeted margin per unit}\end{matrix} \left(\begin{matrix}\text{StandardRatiofor}\\ \text{actualmix}\end{matrix} - \begin{matrix}\text{Actualratiofor}\\ \text{actualmix}\end{matrix}\right) \text{X} \begin{matrix}\text{Budgeted}\\ \text{Sellingprice}\end{matrix} \left(\begin{matrix}\text{actualsales}\\ \text{quantity}\end{matrix} - \begin{matrix}\text{revisedstandard}\\ \text{salequantity}\end{matrix}\right) \text{X} \begin{matrix}\text{standardsales}\\ \text{marginp.u}\end{matrix}$$

5. **Sales margin quantity variance (SMQV):**

$$\text{SMQV} = \left(\begin{matrix}\textit{Standard Ratio for total budgeted qty}\end{matrix} - \begin{matrix}\textit{Stadnard Ratio for actual qty}\end{matrix}\right) \times$$

$$\begin{matrix}\textit{Budgeted margin per unit}\end{matrix} \left(\begin{matrix}\text{StandardRatiofor}\\ \text{totalbudgetedQty}\end{matrix} - \begin{matrix}\text{StandardRatiofor}\\ \text{totalactualqty}\end{matrix}\right) \text{X} \begin{matrix}\text{Budgeted}\\ \text{Sellingprice}\end{matrix} \left(\begin{matrix}\text{revisedstandard}\\ \text{salesquantity}\end{matrix} - \begin{matrix}\text{standard}\\ \text{salequantity}\end{matrix}\right) \text{X} \begin{matrix}\text{standardsales}\\ \text{marginp.u}\end{matrix}$$

**(i) * Budgeted Margin per unit = Budgeted Selling price-Budgeted Cost per unit**

**(ii) Material Variance**

**(iii) Details Explanation**

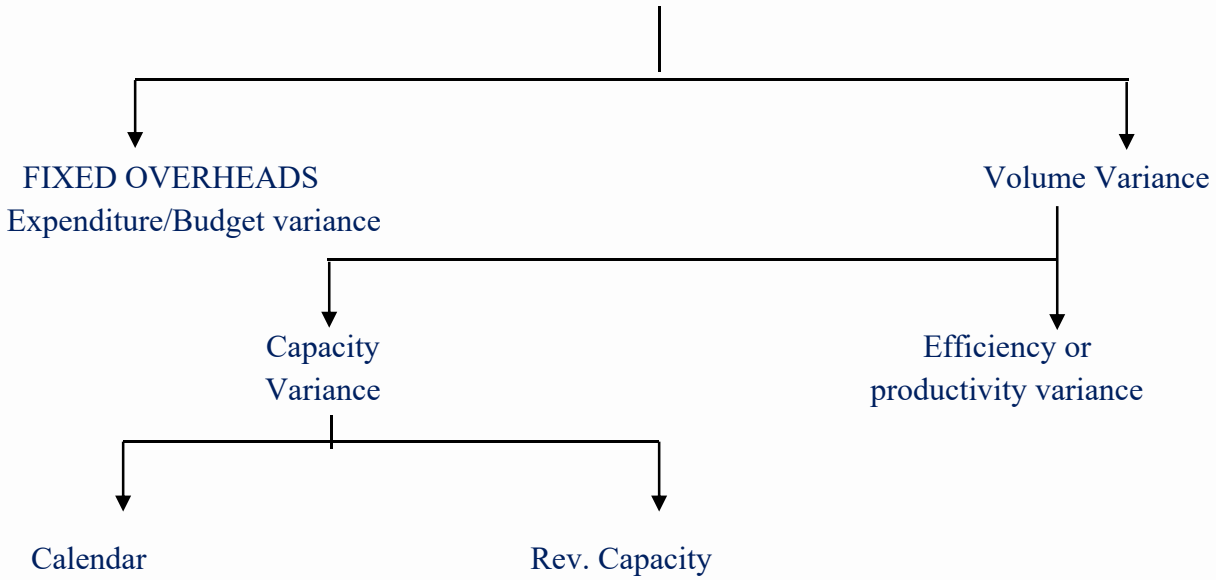
**Setting the standards:** As we saw the actual results are to be compared with the standards and for this purpose, we must have comparable standards.

The material cost is a variable cost item and the amount of cost that one incurs entirely depends on the

quantity of output. Thus, if the standard material cost per unit is Rs. 5 and if the actual output is 100 units, then standard cost is Rs. 500. In other words, in the case of material cost, the standards are always for the actual output. If the production manager has produced, say 1,000 units, then we should find out the cost that he should have incurred for 1,000 units and this cost should be compared with the actual cost to get the variance.

**1. Fixed Factory Overheads Variances Based on Absorption Costing:** The following is the chart of the fixed factory overheads cost variances under absorption costing:

**TOTAL FIXED OVERHEADS COST VARIANCE**




**(i) Check**

Total Cost Variance = Expenditure Variance + Volume Variance

Volume Variance = Calendar Variance + Capacity Variance + idle item variance + Efficiency Variance.

**(i) Setting standards:** Unlike the raw material cost, this cost does not depend on the output. Rather it depends on the period cost. Obviously therefore, the standards or, say budgets are always for a period, Very soon we shall see that for calculating variances we sometimes compare days, hours, expenditure and output figures for the given period and therefore we should know budgets as regards these items.

**(ii) Basic explanation about fixed overheads variances:** For setting the selling Price of a product, we generally and profit margin to the total cost. The total cost is the sum total of variable cost and fixed cost. Variable cost per unit is reasonably simple to get because it depends on the output. However the fixed cost has nothing to do with the output and the total cost remains constant irrespective of the quantity of the product that we produce. Then, how do we get the fixed cost per unit.

**(iii) For this we have a system of recovering the overheads.** Well before the budget period commences we make an estimate as regards fixed overheads to be incurred and the quantity of the product to be produced. Though there is no nexus between the cost and the output, after all the output that we are going to have, must be the charge of overhead cost that we are going to incur.

Thus we lay down nexus between the two and divide the budgeted overhead by the expected output and we get overhead per unit.

**(iv)** Hence, we get the Fixed Overheads rate per unit every time we produce a unit we charge the overheads at this predetermined rate. If everything goes as per our expectation, then we notice at the end of the period that overhead amount charged to the output is exactly equal to the overheads cost incurred and thus there is no variance. In other words, the overheads cost variance comes into being if the overheads charged or, say recovered are not some as overheads incurred.

**(ii) Calculation of Variances**

(v) Fixed Overheads Cost Variances: This variance comes into being if there's some difference between overheads recovered (obviously on the basis of actual output) and overheads cost incurred. Thus this variance is under or over absorption of overheads.

Consider the following example:

| | **Budget** Rs. | **Actual** | | | |
|---|---|---|---|---|---|
| | **Budget** Rs.# | **A** Rs.# | **B** Rs.# | **C** Rs.# | **D** Rs.# |
| Fixed overheads | 1,00,000 | 1,00,000 | 90,000 | 1,10,000 | 96,000 |
| Output (units) | 25,000 | 24,000 | 25,000 | 24,000 | 24,000 |
| Absorption rate per unit | Rs. 4 | | | | |

In situation A, the amount recovered is Rs. 96,000 (24,000 × 4) whereas amount spent is Rs. 1,00,000. The amount spent is more, which means there is under-recovery of overheads and the variance comes into being. Here where's fixed overheads have remained constant the output has changed.

In situation B, the amount recovered is Rs. 1,00,000 whereas amount spent is Rs. 90,000. There is over-recovery of overheads and the variance comes into being. Here, output has remained the same whereas the overheads have changed.

In situation C, the amount recovered is Rs. 96,000 where as the amount spent is Rs. 1,10,000. Again there is under recovery of overheads. This time overheads and output both have changed but not proportionately.

In situation D, though overheads are and output both have changed, there is still no variance because the amount spent (Rs. 96,000) and the amount recovered (24,000 × 4) are same. This should suggest that the total overheads cost variance comes into being, if either only overheads change, output remaining constant, or only output changes, overheads remaining constant or both of them change, but not in the due proportion. Under absorption implies that the actual fixed overheads cost per unit is more than the standard cost whereas over- absorption implies that the actual fixed overheads cost per unit is less than the standard cost. Absence of under/over absorption implies that the actual fixed overheads cost per unit is same as standard cost. Accordingly, under absorption is an adverse variance whereas over absorption is a favourable variance.

In other words, if output and overheads, both remain constant or both of them change but just in due proportion, then there is no overheads cost variance at all.

To conclude, one should compare the amount of overheads recovered with the amount of overheads spent

and the difference is the variance. Over recovery signifies the favourable variance whereas under recovery signifies the adverse variance.

**Fixed Overheads Expenditure Variance:** Just compare budgeted overheads with the actual amount spent and the difference is the variance.

**Fixed Overheads Volume Variance:** We just compare the volume or the output figures and the difference is to be multiplied by the recovery rate per unit. If the actual output is more than the budgeted output, the variance is favourable (because higher output reduces the overheads cost per unit) and if the actual output is less, the variance is adverse.

The analysis of volume variance is required to know the precise factors responsible for change in the output. The output depends on so many factors like number of working days, number of hours in working days, unproductive (idle) time and efficiency level.

Consider the following budget:

| | |
|---|---|
| No. of days | 250 |
| Hours per day | 500 |
| Hours per unit | 5 |
| Total hours p.a. | 1,25,000 |
| Total output p.a. | 25,000 |

Now if, instead of working for 250 days, the workers work for 251 days, then other factors remaining constant hours would increase by 500 and the output would, increase by 100. The variance that comes into being because of increasing number of days is called calendar variance. We should compare the number of days as per budget with actual number of days and the difference should be multiplied by the recovery rate per day. If the actual number of days is more than the variance is favourable because the more the days; the more the hours and the more the output.

Now, days remaining constant, if the workers work for more or less than 500 hours per day, then again the output would change. The variance that comes into being because of change in such capacity utilisation is known as capacity variance. We find out the number of hours that should have been paid for in actual number of days and we compare this with the actual number of hours paid for .The difference is multiplied by the recovery rate per hour. If the actual number of hours is more, then, the resultant variance is favourable because the more the hours, the more the output.

Sometimes in the problem, the student is not given information about number of days. In such cases the calendar variance cannot be calculated. Even the capacity variance, in the manner shown above, cannot be calculated. In such cases we compare budgeted hours with actual hours paid for. The differences are to be multiplies by the recovery rate per hour. This comparison takes care of calendar and capacity both. Therefore, if the information about days is not given then we calculate this variance and call it capacity variance. If the information about days is given then we calculate calendar variance and capacity variance in a normal way but we use this variance (direct comparison of hour) as crosscheck. This variance has to be equal to calendar variance plus capacity variance.

The idle time variance is calculated by multiplying idle hours by recovery rate per hour.

The efficiency variance can be calculated in one of the two possible ways, as shown below:

(i) We find out the number of units that should have been produced in actual number of hours (net,

excluding idle time). We compare this with the actual output and the difference is to be multiplied by the recovery rate per unit.

**OR**

(ii) We find out the number of hours that should have been taken for the actual production and we compare this with actual number of hours (net excluding idle time) taken. The difference is to be multiplied by the recovery rate per hour.

**2. Variable Factory Overhead Variances:** The following is the chart showing variable factory overheads variances:

**TOTAL VARIABLE OVERHEAD COST VARIANCE**

| Variable Overhead Spending/Budget OR Expenditure Variance | Variable Overhead Utilisation OR Efficiency Variance |
|---|---|

Total Variable Overheads Cost variance = Spending Variance + Utilisation Variance Detailed Explanation

(i) **Setting the Standards:** This cost, being variable in nature, depends on the actual output and therefore, like materials cost and labour cost, the standard are always for actual output.

(ii) **Calculation of Variances**

**Total Variable Overhead Cost Variance:** This is the difference between total standard variable cost and total actual variable cost.

**Variable Overhead Spending Variance:** This is just like labour rate variance. Thus we multiply the rate difference by the actual labour hours paid for variance.

**Variable Overhead Utilisation Variance:** This is just like labour time variance. Thus we multiply the labour hour difference by the standard variable overhead rate per hour.

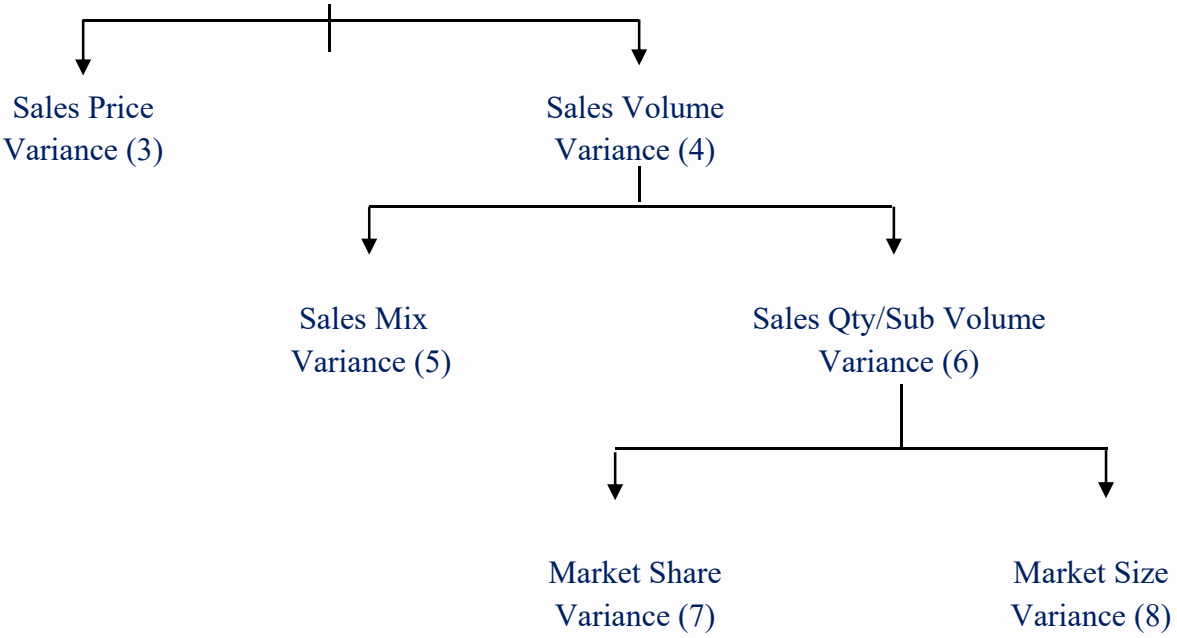
Here the actual no. of hours to be used should be gross no. of hours if the variable overheads cost is incurred during the idle time, if it is not incurred during the idle time, then we should use net no. of hours

**Note:** Though the analysis of variable Overheads Cost Variance, as explained above, is possible, normally people calculate only the total variable overheads cost variance. The other variances are not calculated the normally. There are some obvious reasons for this. The spending variances is rarely controllable. (Example increase in the electricity rate). The utilisation variance comes into being if workers take more or less time and this factor is looked into when we calculate labour time variance. There is no point, in real life situation, in repeating the investigations. Thus once workers take more time, variable overhead utilisation also increases. Therefore, the people are not interested in analysing the total variable overheads cost variance.

It may also be noted that labour hours are common for labour cost variances and variable overheads cost variance.

**3. Sales Variances:** The chart is as shown below:

## TOTAL SALES VALUE VARIANCES (i)




**Notes:**

**(1)** **Budget for Comparison:** The sales targets are always for a period. The budget to be compared with the actual result has to be for the same period for which the actual results are given. Thus, whenever the budget is for the same period for which the actual results are given, the given budget itself is comparable with the actual and no revision is required. On the other hand, if the budget is not for the same period for which the actual results are given, the given budget has to be revised to make it represent the same period for which the actual results are given. Since we are talking about revenue and not the expenses, it is obvious that if actual quaintly or price is more than the budget, then it gives us favourable variance.

**(2)** **Total sales value variance:** This is the difference between the budgeted sales and the actual sales.

**(3)** **Sales Price Variance:** This is just like material usage variance and we get it by multiply in the sales price difference by actual quantity sold.

**(4)** **Volume Variance:** This is just like material usage variance and we get it by multiplying the sales quantity difference of each product by standard selling price.

**(5)** **Sales Mix Variance:** This is very usual mix variance. Accordingly we apply standard ratio to the actual total quantity sold and we develop standard sales mix. We compare this with the actual sales mix and the difference is to be multiplied by standard selling price of such product.

**(6)** **Sales Qty./Sub-Volume Variance:** This is just like material yield variance based on input and we get it by multiplying the total sales quantity difference by the standard average selling price per unit.

**(7)** **Market Share Variance:** This is the change in total sales quantity due to change in market share. We multiply the actual market size by standard market share percentage to get standard sales quantity figure. We compare this with actual sales quantity and multiply the difference by standard average sales price per unit.

**(8)** **Market Size Variance:** This is the change in total sales quantity due to change in market size, multiplied by standard average sales per unit. We multiply the market size difference by standard market share percentage to get the change in total sales quantity.

## Profit Variances

The chart is as shown on the last page of notes on this chapter:

**Notes:**

**(i)** Like sales the profit targets are also for a period and whenever the given budget is not for the same period for which the actual results are given, the given budget has to be revised. Here also the actual profit being more would be a favourable variance.

**(ii)** **Total Profit Variance:** This is the difference between total budgeted profit and actual profit.

**(iii)** **Profit Variance Due to Change in Sales:** This part of the chart is very similar to sales value variance chart. The only difference being the sales quantity difference is to be multiplied by standard sales price in sales value chart whereas the same quantity difference is to be multiplied by standard profit per unit in this part of the chart. The quantity variances in the two charts would be different only because of the difference between standard sales price and standard profit. The sales price variance in both charts is the same.

**(iv)** **Profit Variance Due to Change in S.P.:** This is usual price variance which we get by multiplying actual sales quantity by the sales price difference.

**(v)** **Profit Variance Due to Change in Sales Volume:** We get this variance by multiplying the sales quantity difference of each product by the standard profit per unit.

**(vi)** **Profit Variance Due to Change in Sales Mix:** This is usual mix variance and we get it by multiplying standard profit by the mix difference.

**(vii)** This is usual quantity variance and we get it by multiplying the total sales quantity difference by standard average profit per unit.

**(a)/(b):**These variance are same as those in the sales chart, the only difference being we multiply the quantity difference by standard average net profit per unit.

**(viii)** **Profit Variance Due to Change in Cost:** If the total standard cost and actual cost per unit are given without break up into material cost, labour cost, etc., then we calculate only the total variance in the same way as we calculate sales price variance. Thus we get it by multiplying the cost difference by the actual quantity processed per unit.

If the break-up of cost is given then all variances in respect of each cost item are to be calculated by following usual principles applicable to a particular cost item.

**(ix)** **Change in Material Cost:** These are usual material cost variance and we compare the standards for actual output with the actual and get normal Materials Cost Variances.

**(x)** **Change in Labour Cost:** We follow usual principles applicable to labour cost variances and get the normal variances.

**(xi)** **Change in Variable Cost:** We follow usual principles applicable to variable overheads and get the normal variances.

**(xii)** **Change in Fixed Overheads Cost:** We follow usual principles applicable to fixed overheads cost

variance and get the normal variances.

**(xiii)** **Change in Administration & Fixed S&D overhead:** (under financial accounting): As regards fixed expenses, we calculate only one variance, which is Fixed Overhead expenditure variance. We calculate the sum by comparing budgeted fixed overheads with actual Fixed Overhead. It should be noted that whereas fixed production overheads cost variance is to be analysed into expenditure and volume variance under absorption costing, the admn and S&D fixed cost variance is only in respect of expenditure and there is nothing like volume variance here.

Under marginal costing there would be only expenditure variance for all types of fixed overheads.

If there is a variable S&D overhead given then we develop the standards for actual quantity sold and the Standard S&D variable cost would be compared with actual S&D cost to get total variable S&D cost variance.

## PRACTICAL QUESTION

**Question 1:** ABC Ltd which has adopted standard costing furnishes the following information:

| | |
|---|---|
| **Standard:** | |
| Output | 7 unit |
| Material | 10Kgs. |
| Price of Materials | Rs. 10 per kg |
| **Actual:** | |
| Output | 21,000 unit |
| Material Used | 28,000 Kgs. |
| Cost of Materials | Rs. 2,52,000 |

**Calculate:**

(a) Material Usage Variance:

(b) Material Price Variance:

(c) Material Cost variance.

**Answer: Rs.48,000 (F) , Rs.20,000(F), Rs. 28,000(F).**

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**Question 2:** XYZ Ltd. Presents the following information for November, 2008:

Budgeted production of Product P = 200 units

Standard consumption of Raw materials = 2 Kg per unit of P.

Standard Price of Material A = Rs. 6 per Kg.

Actually, 250 units of P were produced and material A was purchased at Rs. 8 per Kg and consumed at 1.8 kg per unit of P. Calculate the material cost variances, Price & Usage Variance.

**Answer: Rs.600 (A), Rs. 900(A), Rs. 300 (F).**

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**Question 3:** The standard and actual figures of product 'Z' are as under:

| | Standard | Actual |
|---|---|---|
| Material quantity | 50 units | 45 units |
| Material price per unit | Rs. 1.00 | Rs. 0.80 |

CALCULATE material cost variances.

**Solution:-**

The variances may be calculated as under:

(a) Standard cost = Std. Qty × Std. price = 50 units × Rs. 1.00 = Rs.50

(b) Actual cost = Actual qty. × Actual price = 45 units × Rs. 0.80 = Rs. 36

**Variances:**

(i) Price variance = Actual qty (Std. price – Actual price)

= 45 units (Rs. 1.00 – Rs. 0.80) = Rs. 9 (F)

(ii) Usage variance = Std. price (Std. qty – Actual qty.)

=Rs. 1 (50 units – 45 units) = Rs. 5 (F)

(iii) Material cost variance = Standard cost – Actual cost

(iv) (Total variance) = Rs. 50 – Rs. 36 = Rs. 14 (F)

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**Question 4:** ABC Ltd. is engaged in producing a 'standard mix' using 30 kgs of chemical X and 70 kg of Chemical Y. The standard loss of production is 10%. The standard price of X is Rs. 5 per kg and of Y is Rs.10 per kg The actual mixture and yield were as follows:

X : 80 kgs @ Rs. 6 per kg and

Y :170 kgs @ Rs. 12 per kg

Actual yield 180 kgs.

Calculate Material Prices, & Usage Variances.

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**Question 5:** Following details relating to product X during the month of April, 2009 are available:

Standard Cost per unit of X.

Materials :50 Kg @ Rs. 40/Kg.

Actual Production: 100 units

Actual Material cost: Rs. 42/Kg.

Material Price variance : Rs. 9,800 (Adverse)

Material Usage variance : Rs. 4,000 (Favorable)

Calculate the actual quantity of material used during the month April, 2009.

**Answer: Rs. 5,800 (A) , 4,900 kg.**

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**Question 6:** J.K. Ltd manufactures NXE by mixing three raw materials. For every batch of 100Kg of NXE 125 Kg of raw materials are used. In April, 2012 , 60 batches were prepared to produce an output of 5,600 Kg. of NXE. The standard and actual particulars for April, 2012 are as follows:

| Raw Materials | Standard | | Actual | | Quantity of Raw Materials Purchased |
|---|---|---|---|---|---|
| | Mix | Price per Kg. | Mix | Price per Kg. | |
| | (%) | (Rs.) | (%) | (Rs.) | (Kg.) |
| A | 50 | 20 | 60 | 31 | 5,000 |
| B | 30 | 10 | 20 | 8 | 2,000 |
| C | 20 | 5 | 20 | 6 | 1,200 |

Calculate all Variances.

**Answer:** 3000A, 14500A.

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**Question 7:-** NXE Manufacturing Concern furnishes the following information:

| **Standard:** | **Material for 70 kg finished products** | **100 kg.** |
|---|---|---|
| | Price of material | Rs. 1 per kg. |
| **Actual:** | **Output** | **2,10,000 kg.** |
| | Material used | 2,80,000 kg. |
| | Cost of Materials | Rs. 2,52,000 |

**CALCULATE:** (a) Material usage variance, (b) Material price variance, (c) Material cost variance.

**Solution:-**

Standard Quantity of input for actual output (SQ) =2,10,000KG $X\frac{100\ KG}{70\ Kg}$

= 3, 00,000 kg.

Actual Price (AP) = (Rs.2,52,000 ÷ 2, 80,000 kg) = Rs. 0.90 per kg.

(a) Material Usage Variance = (SQ – AQ) × SP

= (3,00,000 – 2,80,000) × 1

= Rs. 20,000 (F)

(b) Material Price Variance = (SP – AP) × AQ

= (1 – 0.90) × 2,80,000= Rs. 28, 000 (F)

(c) Material Cost Variance = (SQ × SP) – (AQ × AP)

= (3, 00,000 × 1) – (2, 80,000 × 0.90)

= Rs. 48, 000 (F)

Check MCV = = MPV + MUV

Rs. 48, 000 (F) = Rs. 28, 000 (F) + Rs.20, 000 (F)

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**Question 8:** The standard cost of a certain chemical mixture is as under:

40% of Material A @ Rs.30 per kg

60% of Material B @ Rs.40 per kg

A standard loss of 10% of input is expected in production. The following actual cost data is given for the period.

350 kg Material – A at a cost of Rs.25

400 kg Material – B at a cost of Rs.45

Actual weight produced is 620 kg.

You are required to calculate the following variances raw material wise and indicate whether they are favorable (F) or adverse (A):

(i) Cost variance
(ii) Price variance
(iii) Mix variance
(iv) Yield variance

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**Question 9:** Jigyasa Pharmaceutical 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:

| Material | Quantity(in Kgs) | Rate per Kg. (in Rs.) |
|---|---|---|
| **Vita –X** | 5 | 110 |
| **Proto-D** | 3 | 320 |
| **Mine-L** | 3 | 450 |

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:

| Material | Quantity (in Kgs) | Rate per Kg. (in Rs.) |
|---|---|---|
| **Vita-X** | 6 | 115 |
| **Proto-D** | 2.5 | 330 |
| **Mine-L** | 2 | 405 |

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

1: Material Cost variance.
2: Material Price Variance
3: Material usage variance
4: Material Mix variance
5: Material Yield Variance

**Answer: Material Cost variance: Rs.2,82,500(F) Material Price Variance: Rs.27,500 (F), Material Usage Variance: Rs.2,55,000 (F), Material Mix variance: Rs.1,89,420 (F), Material Yield Variance: Rs.65,580 (F)**

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**Question 10:** The standard mix to produce one unit of product is as follows:

| | |
|---|---|
| Material X 60 units @ Rs. 15 per unit | = 900 |
| Material Y 80 units @ Rs. 20 per unit | = 1,600 |
| Material Z 100 units @ Rs. 25 per unit | = 2,500 |
| 240 units | 5,000 |

During the month of April, 10 units were actually produced and consumption was as follows:

| | |
|---|---|
| Material X 640 units @ Rs. 17.50 per unit | 11,200 |
| Material Y 950 units @ Rs. 18.00 per unit | 17,100 |
| Material Z 870 units @ Rs. 27.50 per unit | 23,925 |
| 2460 units | 52,225 |

Calculate all material variances.

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**Question 11:** Following are the details of the product Phomex for the month of April 2013:

| | |
|---|---|
| Standard Quantity of material required per unit | 5 Kg |
| Actual output | 1000 units |
| Actual Cost of materials used | Rs. 7.14,000 |
| Material Price variance | Rs.51,000 (Fav) |

Actual price per Kg of material is found to be less than standard price per Kg of material by Rs.10.

**You are required to calculates:**

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

(ii) Material Usage Variance.

(iii) Material Cost Variance.

**Answer: Material Price variance: 5100 Kg, Actual Price = Rs. 140/Kg, Material Usage Variance 15000A, Material Cost Variance 36000A)**

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**Question 12:-** The standard cost of a chemical mixture is as follows:

40% material A at Rs. 20 per kg. 60% material B at Rs. 30 per kg.

A standard loss of 10% of input is expected in production. The cost records for a period showed the following usage:

90 kg material A at a cost of Rs. 18 per kg.

110 kg material B at a cost of Rs. 34 per kg.

The quantity produced was 182 kg. of good product.

CALCULATE all material variances.

**Solution:-**

**Basic Calculation**

| Material | Standard for 180 kg. output | | | Actual for 182 kg. output | | |
|---|---|---|---|---|---|---|
| | Qty. Kg. | Rate (Rs.) | Amount (Rs.) | Qty Kg. | Rate (Rs.) | Amount (Rs.) |
| A | 80 | 20 | 1,600 | 90 | 18 | 1,620 |
| B | 120 | 30 | 3,600 | 110 | 34 | 3,740 |
| Total | 200 | | 5,200 | 200 | | 5,360 |
| Less: Loss | 20 | – | – | 18 | – | – |
| | 180 | | 5,200 | 182 | | 5,360 |

Std. cost of actual output= Rs.5,200 $\times\frac{182}{180}$ =Rs.5,257.78

Calculation of Variances

1. Material Cost Variance = (Std. cost of actual output – Actual cost)

   = (5,257.78 – 5,360)= Rs. 102.22 (A)

2. Material Price Variance = (SP – AP) × AQ Material A = (20 – 18) × 90 = Rs. 180.00 (F) Material B = (30 – 34)) × 110 = Rs.440.00 (A)

   MPV = Rs. 260.00 (A)

3. Material Usage Variance = (Std. Quantity for actual output – Actual Quantity) × Std. Price

Material A = $\left(80\ X\ \frac{182}{180} - 90\right)$X20 = Rs. 182.22 (A)

Material B = $\left(120\ X\frac{182}{180} - 110\right)$= Rs. 340.00 (F)

MUV = Rs.157.78 (F)

Check

**MCV Rs.102.22 (A)**

**MPV Rs.260 (A)** **MUV Rs.157.78 (F)**

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**Question 13:** A group of workers usually consists of 10 men, 5 women and 5 boys in a factory. They are paid at standard hourly rate of Rs. 1, Rs. 2 and Rs. 3 respectively. In a normal working week of 40 hours the group is expected to produce 1,000 units of output.

In a certain week, the group consist of 13 men, 4 women and 3 boys. Actual wages were paid at the rate of Rs. 3, Rs. 4 and Rs. 5 respectively. Two hours were lost due to abnormal idle time and 960 units of output were produced. Calculate All labour variances. **(ICWA 2011)**

**Answer:**

**MEN 1040A**
**LRV - Women**
**LEV- Women 80F =204F**
**Boys 240A**

**MEN 110A**
**320A = 1600A**
**LCV = 1456A**
**Boys 234 F**

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**Question14: The following represents the budgeted data for "A" Job to be finished in 40 days:—**

| | Standard | | Actual | |
|---|---|---|---|---|
| **Category or Workers** | **No. of laborers** | **Daily wage rate per laborer** | **No. of laborers** | **Daily wage rate per laborer** |
| Grade X | 50 | 200 | 80 | 300 |
| Grade Y | 60 | 300 | 90 | 400 |

That job is actually completed in 45 days. Calculate the various labour variances.

❖ ❖ ❖

**Question 15:-** The standard and actual figures of a firm are as under

| | |
|---|---|
| Standard time for the job | 1,000 hours |
| Standard rate per hour | Rs. 50 |
| Actual time taken | 900 hours |
| Actual wages paid | Rs. 36,000 |

**Solution:-**

| | | |
|---|---|---|
| (a) | Std. labour cost | (Rs.) |
| | (1,000 hours × Rs.50) | 50,000 |
| (b) | Actual wages paid | 36,000 |
| (c) | Actual rate per hour: Rs. 36,000/900 hours = Rs.40 | |

**Variances**

(i) Labour Rate variance = Actual time (Std. rate – Actual rate)
= 900 hours (Rs.50 – Rs.40) = Rs.9,000 (F)

(ii) Efficiency variance = Std. rate per hr. (Std. time – Actual time)
= Rs.50 (1,000 hrs. – 900 hrs.) = Rs.5,000 (F)

(iii) Total labour cost variance = Std. labour cost – Actual labour cost
= {(Rs.50 × 1,000 hours) – Rs.36,000}
= (Rs.50,000 – Rs.36,000) = Rs.14,000 (F)

**Question 16: Calculation of labour cost, rate, efficiency, mix and yield variance)**

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

| | Skilled workers | Semi-skilled workers | Unskilled workers |
|---|---|---|---|
| Standard no. of workers in the gang | 32 | 12 | 6 |
| Actual no. of workers employed | 28 | 18 | 4 |
| Standard wage rate per hour | 3 | 2 | 1 |
| Actual wage rate per hour | 4 | 3 | 2 |

During the 40 hours working week, the gang produced 1,800 standard labour hours of work.

**Calculate:**

(a) Labour Cost Variance

(b) Labour Rate Variance

(c) Labour Efficiency Variance

(d) Labour Mix Variance

(e) Labour Yield Variance

**Answer: (2424A, 2000A, 424A, 80F, 384 F)**

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**Question 17:-** The standard labour employment and the actual labour engaged in a week for a job are as under:

| | Skilled workers | Semi-skilled workers | Unskilled workers |
|---|---|---|---|
| Standard no. of workers in the gang | 32 | 12 | 6 |
| Actual no. of workers employed | 28 | 18 | 4 |
| Standard wage rate per hour | 3 | 2 | 1 |
| Actual wage rate per hour | 4 | 3 | 2 |

During the 40 hours working week, the gang produced 1,800 standard labour hours of work.

**CALCULATE :**

(a) Labour Cost Variance (b) Labour Rate Variance

(c) Labour Efficiency Variance (d) Labour Mix Variance

(e) Labour Yield Variance

**Solution:-**

**Workings:**

1. Standard hours (SH) for actual hours produced are calculated as below:

Skilled $=\frac{1,800}{2,000} X$ 1280=1,152 hrs.

Semi-skilled= $\frac{1,800}{2000}$X 480 =432 hrs.

Unskilled = $\frac{1,800}{2000}$X 240 = 215 hrs.

2. Actual hours (AH) paid are calculated as below:

| Category | No. of Worker | Hours in a week | Total Hours |
|---|---|---|---|
| Skilled | 28 | 40 | 1,120 |
| Semi-skilled | 18 | 40 | 720 |
| Unskilled | 4 | 40 | 160 |
| | | | 2,000 |

For 40 hours week total Revised standard hours (RSH) will be calculated as below:

| Category | No. of Worker | Hours in a week | Total Hours |
|---|---|---|---|
| Skilled | 32 | 40 | 1,280 |
| Semi-skilled | 12 | 40 | 480 |
| Unskilled | 6 | 40 | 240 |
| | | | 2,000 |

| Category of workers | SH × SR | AH × SR | AH × AR | RSH × SR |
|---|---|---|---|---|
| Skilled | 1,152 × 3 = 3,456 | 1,120 × 3 = 3,360 | 1,120 × 4 = 4,480 | 1,280 × 3 = 3,840 |
| Semi-skilled | 432 × 2 = 864 | 720 × 2 = 1,440 | 720 × 3 = 2,160 | 480 × 2 = 960 |
| Unskilled | 216 × 1 = 216 | 160 × 1 = 160 | 160 × 2 = 320 | 240 × 1 = 240 |
| Total | Rs. 4,536 | Rs. 4,960 | Rs. 6,960 | Rs. 5,040 |

(i) Labour Cost Variance = Std. Cost for hours worked – Actual cost paid

= (SH × SR) – (AH × AR)

= Rs.4,536 – 6,960 = Rs.2,424 (A)

(ii) Labour Rate Variance = AH (SR – AR) or (AH × SR) – (AH × AR)

Skilled = 3,360 – 4,480 = Rs.1,120 (A)

Semi-skilled = 1,440 – 2,160 = Rs.720 (A)

Unskilled = 160 - 320 = Rs.160 (A) 2,000 (A)

(iii) Labour Efficiency Variance = SR (SH – AH) or (SR × SH) – (SR × AH) Skilled = 3,456 – 3,360 = Rs.96 (F)

Semi-skilled = 864 – 1,440 = Rs.576 (A)

Unskilled = 216 - 160 = Rs.56 (F) Rs.424 (A)

(iv) Labour Mix Variance = SR (RSH – AH) or (SR × RSH) – (SR × AH) Skilled = 3,840 – 3,360 = Rs.480 (F)

Semi-skilled = 960 – 1,440 = Rs.480 (A)
Unskilled = 240 - 160 = Rs. 80 (F) Rs.80 (F)

(v) Labour Yield Variance = SR (SH – RSH) or (SR × SH – SR × RSH)

Skilled = 3,456 - 3,840 = Rs.384 (A)
Semi-skilled = 864 - 960 = Rs.96 (A)
Unskilled = 216 - 240 = Rs. 24 (A) Rs.504 (A)

Check

(i) LCV = LRV + LEV

(ii) Rs.2,424 (A) LEV Rs.424 (A) = Rs.2,000 (A) + Rs.424 (A)
= LMV + LYV
= Rs.80 (F) + Rs.504 (A)

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**Question 18:** From the following information of G Ltd., CALCULATE (i) Variable Overhead Cost Variance; (ii) Variable Overhead Expenditure Variance and (iii) Variable Overhead Efficiency Variance:

| | |
|---|---|
| Budgeted production | 6,000 units |
| Budgeted variable overhead | Rs. 1,20,000 |
| Standard time for one unit of output | 2 hours |
| Actual production | 5,900 units |
| Actual overhead incurred | Rs. 1,22,000 |
| Actual hours worked | 11,600 hours |

**Solution:-**

**Workings:**

1:- Standard cost per unit $= \frac{Rs.1,20,0000}{6,000\ units}$ = Rs. 20

2:- Standard cost per hour = $\frac{Rs.1,20,000}{6,000\ units\ X\ 2\ hours}$ =Rs. 10

(i) Variable Overhead Cost Variance:

= Std. Overhead for actual production – Actual overhead incurred

= Rs.20 × 5,900 units – Rs.1,22,000 = Rs.4,000 (A)

(ii) Variable Overhead Expenditure Variance:

= Std. overhead for Actual hours – Actual Overhead

= Rs.10 ×11,600 hours - Rs.1,22,000 = Rs.6,000 (A)

(iii) Variable Overhead Efficiency Variance:

= Std. rate per hour × (Std. hours for actual production – Actual hours)

= Rs.10 (2 hours × 5,900 units – 11,600 hours) = Rs.2,000 (F)

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**Question 19:-** The cost detail of J&G Ltd. for the month of September, 20X8 is as follows:

| | Budgeted | Actual |
|---|---|---|
| Fixed overhead | Rs.15,00,000 | Rs.15,60,000 |
| Units of production | 7,500 | 7,800 |
| Standard time for one unit | 2 hours | - |
| Actual hours worked | - | 16,000 hours |

**Required:**

CALCULATE (i) Fixed Overhead Cost Variance (ii) Fixed Overhead Expenditure Variance (iii) Fixed Overhead Volume Variance (iv) Fixed Overhead Efficiency Variance and (v) Fixed Overhead Capacity Variance.

**Solution:-** (i) Fixed Overhead Cost Variance:

= Overhead absorbed for actual production – Actual overhead incurred

$$=\left(\frac{Rs.15,00,000}{7,500} X 7,800\right) - Rs.15,00,000 = Rs.60,000(F)$$

(ii) Fixed Overhead Efficiency Variance:

= Std. Rate (Std. hours for actual production - Actual hours)

$$=\frac{Rs.15,00,000}{7,500\ X\ 2}$$ X { 2 hours X7,800 hours)-16,000 hours)

= Rs.100 (15,600 -16,000) = Rs.40,000 (A)

(iii) Fixed Overhead Capacity Variance:

= Std. Rate (Actual hours - Budgeted hours)

$$=\frac{Rs.15,00,000}{7,500\ X\ 2}$$ × (16,000 hours -15,000 hours}

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**Question 20:** The following standards have been set to manufacture a product:

| Direct Material | (Rs.) |
|---|---|
| 2 units of A @ Rs. 4 per unit | 8.00 |
| 3 units of B @ Rs.3 per unit | 9.00 |
| 15 units of C @ Rs.1 per unit | 15.00 |
| | 32.00 |
| Direct Labour: 3 hrs @ Rs.8 per hour | 24.00 |
| Total standard prime cost | 56.00 |

**The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows:**

12,500 units of A at Rs.4.40 per unit

18,000 units of B at Rs.2.80 per unit

88,500 units of C at Rs.1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours, the company paid at Rs.12 per hour while for the remaining, the wages were paid at standard rate.

Calculate materials price variance and usage variance and labour rate and efficiency variances.

**Answer: MPV: 19100A, M usage V = 500A, LRV = 10,000 A, Leffv = 4000 F.**

❖ ❖ ❖

**Question 21:** The following information is available from the cost records of Vatika & Co. for the month of August 2013:

Material Purchase 24,000Kg Rs. 1,05,600

Material Consumed 22,800 Kg

Actual wages paid for 5,940 hours Rs. 29,700.

Unit produced 2,160 units.

Standard rates and prices are:

Direct material rate is Rs.4.00 per unit

Direct labour rate is Rs. 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.

**Answer: Material Variance: Rs. 13,920 (A), Material Price Variance: Rs. 9,600 (A), Material Usage Variance: Rs.4,800 (A), Labour Variance: Rs.8,100 (A) , Labour Rate Variance: Rs.5,940 (A), Labour Efficiency Variance: Rs. 2,160 (A)**

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**Question 22:** The overhead expense budget for a factory producing to a capacity of 200 units per month is as follows:

| Description of overhead | Fixed cost per unit in Rs. | Variable cost per unit in Rs. | Total cost per unit in Rs. |
|---|---|---|---|
| Power and fuel | 1,000 | 500 | 1,500 |
| Repair and maintenance | 500 | 250 | 750 |
| Printing and stationary | 500 | 250 | 750 |
| Other overheads | 1,000 | 500 | 1,500 |
| | Rs. 3,000 | Rs. 1,500 | 4,500 |

The factory has actually produced only 100 units in a particular month. Details of overheads actually incurred have been provided by the accounts department and are as follows:

| Description of overhead | Actual cost |
|---|---|
| Power and fuel | Rs. 4,00,000 |
| Repair and maintenance | Rs. 2,00,000 |
| Printing and stationary | Rs. 1,75,000 |
| Other overheads | Rs. 3,75,000 |

You are required to CALCULATE the Overhead volume variance and the overhead expense variances.

**Solution:-**

**Overheads volume variance (in case of fixed overhead):**

Standard fixed overheads per unit (SR) : Rs.3,000 (Given)

Actual production : 100 units

Standard production (capacity) : 200 units

Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted Overhead

= (Rs.3,000 × 100 units) – (Rs.3,000 × 200 units)

= Rs.3,00,000 - Rs.6,00,000 = Rs.3,00,000 (Adverse)

**Overhead expense variances**

For variable overhead:

= AQ (SR – AR)

= 100 units (Rs.1,500 - Rs.1,500)

= Nil For fixed overhead:

= Budgeted Overhead – Actual Overhead

= (Rs.3,000 × 200 units) – (Total overhead – Variable overhead)

= (Rs.3,000 × 200 units) – (Rs.11,50,000 - Rs.1,500 ×100 units)

= Rs.6,00,000 – (Rs.11,50,000 - Rs.1,50,000)

= Rs.6,00,000 – Rs.10,00,000 = Rs.4,00,000 (Adverse)

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## Variable Overheads Variances

**Question 23:** 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:

| | (Rs.) |
|---|---|
| Direct materials 10Kg @ Rs. 45 per Kg | 450 |
| Direct labor 8 huors @ Rs. 50 per hour | 400 |

| | |
|---|---|
| Varible Overhead 8 hours @ Rs. 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:

| | (Rs.) |
|---|---|
| Direct Materials 8,900Kg @ Rs. 46 per Kg | 4,09,400 |
| Direct Labour 7,000 hors @ Rs. 52 per hour | 3,64,000 |
| Variable Overhead incurred | 72,500 |
| Fixed Overhead incurred | 1,92,000 |

**You are required to Calculate:**

1. Material Usage Variance
2. Material Price Variance
3. Material Cost Variance
4. Labour Efficiency variance
5. Labor rate Variance
6. Labor Cost Variance
7. Variable Overhead Cost Variance
8. Fixed Overhead Cost variance.

**Answer: Material usage Variance: Rs.4,500 (F), Material Price Variance: Rs. 8,900(A), Material Cost Variance: Rs.4,400 (A), Labour Efficiency Variance: Rs.10,000(F), Labour Rate Variance: Rs.14,000 (A), Labour Cost Variance: Rs.4,000(A), Variable Cost Variance: Rs. 500(A), Fixed Overhead Cost Variance: Rs.12,000 (A)**

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**Question 24: (Calculation of Fixed overhead cost, expenditure and volume variance)**

Following information is available from the records of a factory:

| | Budget | Actual |
|---|---|---|
| Fixed overhead for June, 2012 | Rs.10,000 | Rs.12,000 |
| Production in June, 2012 (units) | 2,000 | 2,100 |
| Standard time per unit (hours) | 10 | - |
| Actual hours worked in June | – | 21,000 |

**Compute:**

(i) Fixed overhead cost variance,
(ii) Expenditure variance,
(iii) Volume Variance

**Answer: 1500 A, 2000 A, 500F.**

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**Question 25:** The following information was obtained from the records of a manufacturing unit using standard costing system.

| | Standard | Actual |
|---|---|---|
| Production | 4,000 units | 3,800 units |
| Working days | 20 | 21 |
| Machine hours | 8,000 hours | 7,800 hours |
| Fixed Overhead | Rs. 4,00,000 | Rs. 3,90,000 |
| Variable Overhead | Rs.1,20,000 | Rs.1,20,000 |

You are required to CALCULATE the following overhead variance:

(a) Variable overhead variances

(b) Fixed overhead variances

**Solution:-**

**(a) Variable Overhead Variances**

(i) Variable Overhead Variance:

= Std. overhead for actual production – Actual overhead

$=\left(\frac{1,20,000}{4000\ units}\ X\ 3,800\ units\right)$- Rs. 1,20,000

= Rs.1,14,000 – Rs.1,20,000 = Rs.6,000 (A)

(ii) Variable Overhead Expenditure Variance:

= Std. overhead for actual hours – Actual overhead

$=\left(\frac{Rs.1,20,000\ X\ 7,800\ hours}{8000\ hours}\right)$ –Rs. 1.20,000

= Rs.15 × 7,800 hours - Rs.1,20,000 = Rs.3,000 (A)

(iii) Variable Overhead Efficiency Variance:

= Std. Rate per hour (Std. hours for actual production – Actual hours)

$=\frac{Rs.1,20,000}{8,000\ hours}X\left(\frac{8000\ hours}{4000\ units}X3,800\ units\right)-7,800\ hours$

= Rs.15 × (7,600 hours – 7,800 hours) = Rs.3,000 (A)

**(b) Fixed Overhead Variance:**

(i) Fixed Overhead Variance:

= Absorbed overhead – Actual overhead

= {(SR × SH) – (AR × AH)}

$=\left(\frac{Rs.4,00,000}{Rs.4000\ units}X3,800\ units\right)=Rs.3,90,000$

= Rs.3,80,000 - Rs.3,90,000 = 10,000 (A)

(ii) Fixed Overhead Expenditure Variance:

= Budgeted Overhead – Actual Overhead

= Rs.4,00,000 - Rs.3,90,000 = Rs.10,000 (F)

(iii) Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted Overhead

$= \left(\frac{Rs.4,00,000}{4000\ units}\ X\ 3,800\ units\right)$ –Rs. 4,00,000

= Rs.3,80,000 - Rs.4,00,000 = Rs.20,000 (A)

(iv) Fixed Overhead Efficiency Variance:

= SR × (Std. hours for actual production – Actual hours)

= Rs.50 × {(2 hours × 3,800 units) – 7,800 hours}

= Rs.3,80,000 - Rs.3,90,000 = Rs.10,000 (A)

(v) Fixed Overhead Capacity Variance:

= SR × (Actual hours – Revised budgeted hours)

$= \mathbf{Rs.50\ X}\left(\mathbf{7800\ hours} - \frac{8,000}{20\ days}\ \mathbf{X\ 21\ days}\right)$

= Rs.50 × (7,800 hours – 8,400 hours) = Rs.30,000 (A)

(vi) Fixed Overhead Calendar Variance:

= Rate per day (Budgeted days – Actual days)

$= \frac{Rs.4,00,000}{20\ days}$ X(20 days – 21 days) = 20,000 (F)

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**Question 26:-** For making 10 kg. of CEMCO, the standard material requirements is:

| Material | Quantity | Rate per kg. (Rs.) |
|---|---|---|
| A | 8 kg | 6.00 |
| B | 4 kg | 4.00 |

During April, 1,000 kg of CEMCO were produced. The actual consumption of materials is as under:

| Material | Quantity (Kg.) | Rate per kg. (Rs.) |
|---|---|---|
| A | 750 | 7.00 |
| B | 500 | 5.00 |

**CALCULATE** (A) Material Cost Variance; (b) Material Price Variance; (c) Material usage Variance.

**Solution:-**

**Basic Calculations**

| | Standard for 1,000 kg. | | | Actual for 1,000 kg. | | |
|---|---|---|---|---|---|---|
| | Qty. | Rate | Amount | Qty. | Rate | Amount Kg. |
| A | 800* | 6 | 4,800 | 750 | 7 | 5,250 |
| B | 400* | 4 | 1,600 | 500 | 5 | 2,500 |
| Total | 1,200 | | 6,400 | 1,250 | | 7,750 |

(* A- 8÷10 ×1000 = 800 B- 4÷10 × 1000 = 400)

**Calculation of Variances:**

(a) Material Cost Variance = Std. cost for actual output – Actual cost
MCV = 6,400 – 7,750 = Rs.1, 350 (A)

(b) Material Price Variance = (SP – AP) ×
AQ A = (6 – 7) × 750 = Rs. 750 (A)
B = (4 – 5) × 500 = Rs. 500
(A) MPV =
Rs.1,250 (A)

(c) Material Usages Variance = (SQ – AQ) × SP A =
(800 – 750) × 6= Rs. 300 (F)
B = (400 – 500) × 4= Rs. 400 (A)
MUV = Rs. 100 (A)

Check

MCV = MPV + MUV

1,350 (A)= 1,250 (A) + 100 (A)

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**Question 27:** The following information has been provided by a company:

| | |
|---|---|
| Number of units produced and sold | 6,000 |
| Standard labour rate per hour | Rs.8 |
| Standard hours required for 6,000 units | - |
| Actual hours required | 17,094 hours |
| Labour efficiency | 105.3% |
| Labour rate variance | Rs.68,376 (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) Actual labour rate per hour:**

Labour rate Variance = AH (SR – AR)

= 17,094 (Rs.8 – AR) = 68,376 (A) = - 68,376

= Rs. 8 – AR = - 4

Or, AR = Rs. 12

**(ii) Standard hour required for 6,000 units:**

$$\text{Labour Efficiency} = \frac{SH}{AH} \times 100 = 105.3$$

$$= SH = \frac{AH \times 105.30}{100} = \frac{17,094 \text{ hours} \times 105.3}{100}$$

= 17,999.982 or, SH = 18,000 hours

**(iii) Labour Efficiency Variance** = SR (SH – AH)

= Rs. 8(18,000 – 17,094)

= 8 × 906 = Rs. 7,248 (F)

**(iv) Standard Labour Cost per Unit** $= \frac{18,000 \text{ hours} \times ₹8}{6,000 \text{ units}} = \text{Rs.}24$

**(v) Actual Labour Cost per Unit** $= \frac{17,094 \text{ hours} \times ₹12}{6,000 \text{ units}} = 34.19$

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**Question 28:-** The Following standards have been set to manufacture a product:

| **Direct Material:** | |
|---|---|
| 2 units of A @ Rs. 4 per unit | 8.00 |
| 3 units of B @ Rs.3 per unit | 9.00 |
| 15 units of C @ Rs.1 per unit | 15.00 |
| | **32.00** |
| Direct Labour: 3 hours @ Rs.8 per hour | 24.00 |
| Total standard prime cost | 56.00 |

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows:

12,500 units of A at Rs.4.40 per unit

18,000 units of B at Rs.2.80 per unit

88,500 units of C at Rs.1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours, the company paid at Rs.12 per hour while for the remaining, the wages were paid at standard rate.

**CALCULATE** (i) Materials price variance & Usage variance and (ii) Labour rate & Efficiency variances.

**Solution:-** For Material Cost Variances

| | SQ × SP | AQ × AP | AQ × SP |
|---|---|---|---|
| A | 12,000 × 4 = 48,000 | 12,500 × 4.40 = 55,000 | 12,500 × 4 = 50,000 |
| B | 18,000 × 3 = 54,000 | 18,000 × 2.80 = 50,400 | 18,000 × 3 = 54,000 |
| C | 90,000 × 1 = 90,000 | 88,500 × 1.20 = 1,06,200 | 88,500 × 1 = 88,500 |
| **Total** | **Rs. 1,92,000** | **= Rs.2,11,600** | **=Rs.1,92,500** |

**Variances:**

Material Price Variance = Actual quantity (Std. price – Actual price) Or, = (AQ × SP) – (AQ × AP)

Or, = Rs. 1,92,500 – Rs.2,11,600

= Rs. 19,100 (A)

Material Usage Variance = Standard Price (Std. Quantity – Actual Quantity) Or, = (SP × SQ) – (SP × AQ)

Or,

= Rs. 1,92,000 – Rs. 1,92,500 = Rs. 500 (A)

**For Labour Cost Variance :**

| | SH × SR | AH × AR | AH × SR |
|---|---|---|---|
| Labour | (6,000 × 3) × Rs. 8 = 1,44,000 | 2,500 × 12 = 30,000<br>15,000 × 8 = 1,20,000 | 17,500 × 8 = 1,40,000 |
| **Total** | Rs. 1,44,000 | Rs. 1,50,000 | Rs. 1,40,000 |

**Variances:**

Labour Rate Variance: Actual Hours (Std. Rate – Actual Rate) Or, = (AH × SR) – (AH × AR)

Or,= Rs. 1,40,000 – Rs. 1,50,000

= Rs.10,000 (A)

Labour Efficiency Variance: Actual Hours (Std. Rate – Actual Rate)

Or, = (SR × SH) – (SR X AH)

Or, = Rs.1,44,000 – Rs.1,40,000

= Rs.4,000 (F)

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**Question 29: QS Limited has furnished the following information:**

| | |
|---|---|
| Standard Overhead absorption rate per unit | Rs.20 |
| Standard rate per hour | Rs.4 |
| Budgeted Production | 12000 units |
| Actual Production | 15560 units |
| Actual working hours | 74000 |

Actual overheads amounted to Rs. 2,95,000 out of which Rs. 62,500 are fixed. Overheads are based on the following flexible budget:

| Production(units) | Total Overheads (Rs.) |
|---|---|
| 8,000 | 1,80,000 |
| 10,000 | 2,10,000 |
| 14,000 | 2,70,000 |

Calculate following overhead variances on the basis of hours:

1: Variable overhead efficiency variance.

2: Variable overhead expenditure variance.

3: Fixed overhead efficiency variance.

4: Fixed overhead capacity variance

**Solution:**

**Workings:**

**(a) Variable Overhead rate per unit**

$$= \frac{\text{Difference of overhead at two level}}{\text{Difference in Production units}} = \frac{\text{Rs. 2,10,000 - Rs. 1,80,000}}{\text{10,000 units – 8,000 units}} = \text{Rs. 15}$$

(b) **Fixed Overhead** = Rs. 1,80,000 – ( 8,000 units X Rs. 15) = Rs. 60,000.

(c) **Standard hours per unit of production** $= \frac{\text{Std. overhead absorption Rate}}{\text{Std. Rate per hour}}$

$$= \frac{\text{Rs. 20}}{\text{Rs. 4}} = 5 \text{ hours}$$

(d) **Standard Variable overhead Rate per hour** $= \frac{\text{Variable Overheads per unit}}{\text{Std. hour per unit}}$

$$= \frac{\text{Rs. 15}}{\text{5 hours}} = \text{Rs. 3}$$

(e) **Standard Fixed Overhead Rate per hour** = Rs. 4 - Rs.3 = Rs.1

(f) **Actual variable Overhead** = Rs. 2,95,000 - Rs. 62,500 = Rs. 2,32,500

(g) **Actual Variable Overhead Rate per hour** = $\frac{\text{Rs. 2,32,500}}{}$

74,000 hours = Rs. 3.1419

(h) **Budgeted hours** = 12,000 units X 5 hours = 60,000 hours

(i) Standard hours for Actual Production = 15,560 units X 5 hours = 77,800 hours.

**(1) Variable Overhead Efficiency Variance:**

= Std Rate per hour (Std Hors –Actual Hours)

= Rs. 3 ( 77,800 hours – 74,000 hours)

= Rs. 11,400 (F)

**(2) Variable Overhead Expenditure Variance:**

= Actual Hours (Std Rate –Actual Rate)

= 74,000 hours ( Rs. 3 - Rs. 3.1419)

= Rs. 10,500 (A)

**(3) Fixed Overhead Efficiency Variance:**

= Std Rate per hour (Std Hours –Actual Hours)

= Rs. 1 ( 77,800 hours – 74,000 hours)

= Rs. 3,800 (F)

**(4) Fixed Overhead Capacity Variance:**

= Std. Rate per hour (Actual Hours –Budgeted Hours)

= Rs. 1 ( 74,000 hours – 60,000 hours)

= Rs. 74,000 - Rs. 60,000 = Rs. 14,000 (F)

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**Question 30:- Shyamali Ltd. had prepared the following estimation for the month of April:**

| | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|
| Material-A | 800 kg. | 45.00 | 36,000 |
| Material-B | 600 kg. | 30.00 | 18,000 |
| Skilled labour | 1,000 hours | 37.50 | 37,500 |
| Unskilled labour | 800 hours | 22.00 | 17,600 |

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:

| | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|
| Material-A | 900 kg. | 43.00 | 38,700 |
| Material-B | 650 kg. | 32.50 | 21,125 |
| Skilled labour | 1,200 hours | 35.50 | 42,600 |
| Unskilled labour | 860 hours | 23.00 | 19,780 |

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:**

| Material | SQ (WN-1) | SP (Rs.) | SQ × SP (Rs.) | RSQ (WN-2) | RSQ × SP (Rs.) | AQ | AQ × SP (Rs.) | AP (Rs.) | AQ × AP (Rs.) |
|---|---|---|---|---|---|---|---|---|---|
| A | 940 kg. | 45.00 | 42,300 | 886 kg. | 39,870 | 900 kg. | 40,500 | 43.00 | 38,700 |
| B | 705 kg. | 30.00 | 21,150 | 664 kg. | 19,920 | 650 kg. | 19,500 | 32.50 | 21,125 |
| | 1645 kg | | 63,450 | 1550 kg | 59,790 | 1550 kg | 60,000 | | 59,825 |

**WN-1: Standard Quantity (SQ):**

Material A- $\left(\frac{800\ Kg}{0.9\ X\ 1{,}400\ Kg}\ X\ 1{,}480\ Kg.\right) = 939.68\ or\ 940\ Kg.$

Material B- $\left(\frac{600\ Kg}{0.9\ X\ 1{,}400\ Kg}\ X\ 1{,}480\ Kg.\right) = 704.76\ or\ 705\ Kg.$

**WN- 2: Revised Standard Quantity (RSQ ):**

Material A- $\left(\frac{800\ Kg}{1{,}400\ Kg}\ X\ 1{,}550\ Kg.\right) = 885.74\ or\ 886\ Kg.$

Material B- $\left(\frac{600\ Kg}{1{,}400\ Kg}\ X\ 1{,}550\ Kg.\right) = 664.28\ or\ 664\ Kg.$

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

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

(c) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}

= {59,790 – 60,000} = 210 (A)

(d) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}

= {63,450 – 59,790} = 3,660 (F)

**Labour Variances :-**

| Labour | SH (WN-3) | SR (Rs.) | SH × SR (Rs.) | RSH (WN4) | RSH × SR (Rs.) | AH | AH × SR (Rs.) | AR (Rs.) | AH × AR (Rs.) |
|---|---|---|---|---|---|---|---|---|---|
| Skilled | 1,116 hrs | 37.50 | 41,850 | 1144 | 42,900 | 1,200 | 45,000 | 35.50 | 42,600 |
| Unskilled | 893 hrs | 22.00 | 19,646 | 916 | 20,152 | 860 | 18,920 | 23.00 | 19,780 |
| | 2,009 hrs | | 61,496 | 2,060 | 63,052 | 2,060 | 63,920 | | 62,380 |

**WN- 3: Standard Hours (SH):**

Skilled Labour -$\left(\frac{0.95X\ 1{,}000\ hr}{0.90\ X\ 1400\ Kg} X 1{,}480\ Kg.\right)$ =1,115.87 or 1,116 hrs

Unskilled Labour -$\left(\frac{0.95X\ 800\ hr}{0.90\ X\ 1400\ Kg} X 1{,}480\ Kg.\right)$ =892.69 or 893 hrs

**WN- 4: Revised Standard Hours (RSH):-**

Skilled labour- $\left(\frac{1{,}000\ hr}{1{,}800\ hr} X\ 2{,}060\ hr\right)$ =1,144.44 or 1,144 hrs

Unskilled labour- $\left(\frac{800\ hr}{1{,}800\ hr} X\ 2{,}060\ hr\right)$ =915.56 or 916 hrs

| | |
|---|---|
| (e ) Labour Cost Variance (Skilled + Unskilled) | = {(SH × SR) – (AH × AR)} |
| | = {61,496 – 62,380} = 884 (A) |
| (f) Labour Efficiency Variance (Skilled + Unskilled) | = {(SH × SR) – (AH × SR)} |
| | = {61,496 – 63,920} = 2,424 (A) |
| (g ) Labour Yield Variance (Skilled + Unskilled) | = {(SH × SR) – (RSH × SR)} |
| | = {61,496 – 63,052} = 1,556 (A) |

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**Question 31:-** XYZ Ltd. produces a product X by using two raw materials A and B. The following standards have been set for the production:

| Material | Standard Mix | Standard Price (Rs.) |
|---|---|---|
| A | 40% | 40 per kg. |
| B | 60% | 30 per kg. |

The standard loss in processing is 15%.

During July, 2018 the company produced 2,000 kg. of finished output.

The positions of stock and purchases for the month of July, 2018 are as under:

| Material | Stock on 1st July 2018 | Stock on 31st July 2018 | Purchases during July 2018 | |
|---|---|---|---|---|
| | | | Quantity | Amount (Rs.) |
| A | 40 kg. | 10 kg. | 900 kg. | 42.50 |
| B | 50 kg. | 60 kg. | 1,400 kg. | 25.00 |

Calculate the following variances:

(i) Material Price Variance; (ii) Material Usage Variance;

(iii) Material Mix Variance; (iv) Material Yield Variance;

(v) Total Material Cost Variance.

The company follows FIFO method of stock valuation.

**Solution:-**

**Workings:**

**1. Calculation of Actual Materials Consumed:**

| Particulars | Material A (kg.) | Material B (kg.) |
|---|---|---|
| **Opening stock** | 40 | 50 |
| **Add: Purchases** | 900 | 1,400 |
| **Less: Closing Stock** | (10) | (60) |
| **Material Consumed** | 930 | 1,390 |

(i) Material Price Variance:

Actual Quantity (Std. Price – Actual Price) = AQ × SP – AQ × AP Material A= (930 kg × Rs.40) - {(40 kg × Rs.40) + (890 kg × Rs.42.50)}
= Rs.37,200 – (Rs.1,600 + Rs.37,825) = Rs.2,225 (A)

Material B = (1,390 kg × Rs.30) - {(50 kg × Rs.30) + (1,340 kg × Rs.25)}

= Rs.41,700 – (Rs.1,500 + Rs.33,500) = Rs.6,700 (F)

(ii) Material Usage Variance = Std. Price (Std. Quantity - Actual Quantity)

2. Material A = $Rs.\,40\{[\frac{40\%\ of\ 2{,}000}{0.85} - 930Kg\}$

= Rs.40 (941.18 kg. – 930 kg) = Rs.447 (F)

Material B = $Rs.\,30\{[\frac{60\%\ of\ 2{,}000}{0.85} - 1{,}390Kg\}$

= Rs.30 (1,411.76 kg. – 1,390 kg) = Rs.653 (F)

(iii) Material Mix Variance = Std. Price (Revised Std. Quantity – Actual Quantity) Material A
= Rs.40 {(40% of 2,320) - 930 kg} = Rs.80 (A)
Material B= Rs.30 { (60% of 2,320) - 1,390 kg} = Rs.60 (F)

(iv)) Material Yield Variance = Std. Price (Std. Quantity – Revised Std. Quantity)

Material A = Rs. 40 $\{(\frac{40\%\ of\ 2{,}000}{0.85}) - (40\%\ of\ 2{,}320)\}$

= Rs.40 { 941.18 kg. – 928 kg.} = 527 (F)

Material B = Rs. 30 $\{(\frac{60\%\ of\ 2,000}{0.85}) - (60\%\ of\ 2,320)\}$

= Rs.30 {1,411.76 kg. – 1,392 kg.} = 593 (F)

(v) Total Material Cost Variance = Std. Price × Std Qty. – Actual Price × Actual Qty.

Material A = [{Rs.40 × ( $\frac{40\%\ of\ 2,000}{0.85}$ )} – {(40 kg × Rs.40) + (890 kg × Rs.42.50)}]

= {Rs.40 × 941.18 kg.} – {Rs.1,600 + Rs.37,825}

= Rs.37,647 – Rs.39,425 = Rs.1,778 (A)

Material B = [{Rs.30 × ( $\frac{60\%\ of\ 2,000}{0.85}$ )} - {(50 kg × Rs.30) + (1,340 kg × Rs.25)}]

= {Rs.30 × 1,411.76 kg.} – {Rs.1,500 + Rs.33,500}

= Rs.42,353 – Rs.35,000 = Rs.7,353 (F)

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**Question 32:-** JVG Ltd. produces a product and operates a standard costing system and value material and finished goods inventories at standard cost. The information related with the product is as follows:

| Particulars | Cost per unit (Rs.) |
|---|---|
| Direct materials (30 kg at Rs.350 per kg) | 10,500 |
| Direct labour (5 hours at Rs.80 per hour) | 400 |

The actual information for the month just ended is as follows:

a) The budgeted and actual production for the month of September 2019 is 1,000 units.

b) Direct materials –5,000 kg at the beginning of the month. The closing balance of direct materials for the month was 10,000 kg. Purchases during the month were made at Rs. 365 per kg. The actual utilization of direct materials was 7,200 kg more than the budgeted quantity.

c) Direct labour – 5,300 hours were utilised at a cost of Rs. 4,34,600.

**Required:-**

CALCULATE (i) Direct material price and usage variances (ii) Direct labour rate and efficiency variances.

**Solution:-**

**Working:**

**Quantity of material purchased and used.**

| | |
|---|---|
| No. of units produced | 1,000 units |
| Std. input per unit | 30kg. |
| Std. quantity (Kg.) | 30,000 kg. |

| | |
|---|---|
| Add: Excess usage | 7,200 kg. |
| Actual Quantity | 37,200 kg. |
| Add: Closing Stock | 10,000 kg. |
| Less: Opening stock | 5,000 kg. |
| Quantity of Material purchased | 42,200 kg. |

**(i) Direct Material Price Variance:**

= Actual Quantity purchased (Std. Price – Actual Price)

= 42,200 kg.(Rs.350 – Rs.365) = 6,33,000 (Adverse)

Direct Material Usage Variance:

= Std. Price (Std. Quantity – Actual Quantity)

= Rs.350 (30,000 kg. – 37,200 kg.) = Rs.25,20,000 (Adverse)

**(ii) Direct Labour Rate Variance:**

= Actual hours (Std. Rate – Actual Rate)

= 5,300 hours (Rs.80 – Rs.82) = Rs.10,600 (Adverse) Direct Labour Efficiency Variance:
= Std. Rate (Std. hours – Actual hours)

= Rs.80 (1,000 units × 5 hours – 5,300 hours) = Rs.24,000 (Adverse)

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**Question 33:- S.V. Ltd. has furnished the following data:**

| | Budget | Actual, July (20X2) |
|---|---|---|
| No. of working days | 25 | 27 |
| Production in units | 20,000 | 22,000 |
| Fixed overheads | Rs. 30,000 | Rs. 31,000 |

Budgeted fixed overhead rate is Rs.1.00 per hour. In July, 20X2, the actual hours worked were 31,500.

**CALCULATE the following variances:**

(i) Volume variance.

(ii) Expenditure variance.

(iii)Total overhead variance.

**Solution:-**

**For Fixed Overhead Variances**

| | |
|---|---|
| Actual Fixed Overhead incurred | Rs. 31,000 |
| Budgeted fixed Overhead for the period | Rs. 30,000 |
| Standard fixed overhead for production (Standard output for actual time X Standard Fixed Over heas per unit ) ( *30,000/ 20,000 units) X 22,000 | Rs. 33,000 |

**Computation of Variances:**

| (i) Fixed overhead expenditure Varaince | |
|---|---|
| = Budgeted fixed overhead – Actual fixed overhead<br>=Rs. 30,000 – RS. 31,000 | = Rs. 1,000 (A) |
| (ii) Fixed overhead volume variance: | |
| =Standard fixed overhead– Budgeted fixed overhead<br>= Rs.33,000 – Rs. 30,000 | = Rs. 3,000 (F) |
| (iii) Fixed overhead variance: | |
| = Standard fixed overhead – Actual fixed overhead<br>= Rs.33,000 – Rs. 31,000 | = Rs. 2,000 (F) |

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**Question 34:**

| | Budget | Actual |
|---|---|---|
| Hours | 20,000 | 18,000 |
| Output (units) | 10,000 | 8,000 |
| Fixed Overhead (Rs.) | 20,000 | 30,000 |

Calculate the fixed overhead variables.

**Answer: (4000A, 10000A, FOCV = 14000 A)**

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**Question 35: You are given the following data:**

| | Budgeted | Actual |
|---|---|---|
| Fixed overhead for July (Rs.) | 40,000 | 60,000 |
| Units of production in July | 5,000 | 4,500 |
| Standard time for one unit | 10 hours | |
| Actual hours worked | 40,000 Hours | |

Calculate all variances relating to fixed overheads.

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**Question 36(i) : In June 2013 the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were** Rs. **142,000.**

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overhead are budgeted at Rs. 1,44,000 per month. The standard time required to manufacture one unit of product is 4 hours.

**Compute:**

1. Total fixed overheads variance.

2. Expense variance
3. Efficiency variance.
4. Revised capacity variances.
5. Volume variance.

**Answer: Fo exp 200F, F Volume 16680A, FOCV : 14680A.**

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**Question 36(ii) : The following are the information regarding overheads of a company:**

(a) Overheads cost variance = Rs. 2,800 (A)
(b) Overheads volume variance = Rs.2,000 (A)
(c) Budgeted overheads = Rs.12,000
(d) Actual Overhead recovery rate = Rs.8 per hour
(e) Budgeted hours for the period = 2,400 hours

You are required to compute the following:

(i) Overheads expenditure variance.
(ii) Actual incurred overheads.
(iii) Actual hours for actual production.
(iv) Overheads capacity variance.
(v) Overheads efficiency variance.
(vi) Standard hours for actual production.

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**Question 37:** If the activity ratio and capacity ratio of a company is 104% and 96% respectively, find out its efficiency ratio.

**Answer: Efficiency Ratio: 108.33%.**

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**Question 38:** 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 |

**Answer: 96%, 78.12%.**

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**Question 39:** Calculate efficiency and activity ratio from the following data:

| |
|---|
| Capacity Ratio = 75% |
| Budgeted output = 6,000 units |
| Actual output = 5,000 units |
| Standard Time per unit = 4 hours |

**Answer: Efficiency Ratio = 111.11%, Activity Ratio: 83.33%**

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**Q40: The following Information is available from the cost records of a company for Feb, 2007**

| | |
|---|---|
| Material Purchased: 20,000 pieces | Rs. 88,000 |
| Material Consumed : 19,000 pieces | |
| Actual wages paid for 4,950 hours | Rs. 24,750 |
| Fixed Factory Overheads Incurred | Rs. 44,000 |
| Fixed Factory Overheads Budgeted | Rs. 40,000 |

Units Produced 1,800

**Standard Rates and Prices are:**

Direct Material Rates Rs. 4 per piece

Standard Input 10 pieces per unit.

Direct Labour and requirement 2.5 hours per unit.

Overhead Rs. 8 per labour hour.

**Required:-**

**(a) Show the Standard Cost Card.**

**(b) Compute all material, Labour and Overheads variances for February, 2007.**

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**Question 41:** Compute the missing data indicated by the question marks from the following:

| Particulars | S | T |
|---|---|---|
| Standard price/unit | Rs. 12 | 15 |
| Actual price/unit | Rs. 15 | 20 |
| Standard input (Kgs) | 50 | ? |
| Actual input (Kgs) | ? | 70 |
| Material Cost Variance | ? | ? |
| Material Price Variance | ? | ? |
| Material Uses Variance | ? | Rs. 300 Adv. |

Material mix variance for both materials together was Rs.45 adverse.

**Answer: MPV of S = Rs. 120 (A), MPV of T = Rs. 350 (A), MUV of S = Rs. 120 (F), MCV of T = Nil, MCV of B Rs. 650 (A)**

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**Question 42:** SJ Ltd has furnished the following information:

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

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

Actual hours 74,000

Overheads are based on the following flexible budget

| **Production (units)** | 8,000 | 10,000 | 14,000 |
|---|---|---|---|
| **Total Overheads** (Rs.) | 1,80,000 | 2,10,000 | 2,70,000 |

You are required to calculate the following overhead variances (on hours 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

= Difference in total overheads at two levels/ Difference in out-put at two level

= (2,70,000 – 2,10,000 ) / (14,000 – 10,000 ) = 60,000 / 4,000 = Rs. 15 per unit

(b) Fixed overhead = 2,70,000 – (14000 X 15) = Rs. 60,000

(c) Standard Fixed Overhead Rate per hour = 4-3 = 1

(d) Standard Hour Per unit = Standard hours rate per unit/Standard overhead rate per hour = 20/4 = 5 hours.

(e) Actual variable overhead = 2,95,000 – 62,500 = 2,32,000

(f) Actual variable Overhead Per hour = 2,32,500/ 74,000 = 3,14,19.

(g) Budgeted hours = 15,000 X 5 = 75,000 hours

(h) Standard variable overhead rate per hours

= Variable overhead/budgeted hours = 15,000 X 15 / 75,000 = Rs. 3.00 per hours

(i) Standard Hours for Actual Production = 15,560 X 5 = 77,800 hours

**(i) Variable Overhead efficiency and expenditure variance:**

Variable overhead efficiency variance = Standard Rate per hour (STd Hour – Actual Hour)

3 ( 77,800 – 74,000 ) = 11,400 (F)

Variable overhead expenditure variance =Actual Hours (Std Rate per Hour-Actual Rate per Hour)

= 74,000 ( 3-3-1419) = 10,500 (A)

**(ii) Fixed Overhead efficiency and Expenditure variance:**

Fixed Overhead efficiency variance =Std Rate per hour (Std Hours –Actual Hours)

= 1 (77,800 – 74,000) = 3800(F)

Fixed Overheads Capacity variance = Std. Rate per Hour (Actual Hours –Budgeted Hours)

= 1 (74,000 – 75,000)

= 74,000 – 75,000 = 1000 A

Standard Fixed overhead rate per hour is calculated with the help of budgeted hours and the Fixed overhead efficiency and expenditure variance is calculated as follows:

Standard Fixed overhead rate per hour

=Fixed overheads/budgeted hours = 60,000 / 75,000 = Rs. 0.80 per hour

**(iii) Fixed Overhead efficiency and capacity variance**

Fixed overhead efficiency variance * = Std Rate per hour (Std hours –Actual hours)

= Rs. 0.80 ( 15,560 X 5 – 74,000) = Rs. 3,040 (F)

Fixed Overhead capacity variance * = Std Rate per hour (Actual hour s-Budgeted hours)

= Rs. 0.80 (74,000 – 15,000 X 5) = Rs. 800 (A)

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**Question 43:-** Gama Ltd. has furnished the following Standard Cost data per unit of production:

Material 10Kg @ Rs. 10 per Kg.

Labour 6 hour s@ Rs. 5.50 per hour

Variable Overhead 6 hours @ RS. 10 per hour

Fixed Overhead Rs. 4,50,000 per month (Based on a normal volume of 30,000 labour hours)

The actual cost data for the month: Material used 50,000 kilogram at the cost of Rs. 5,25,000.

Labour Paid Rs. 1,55,000 for 31,000 hours worked.

Variable Overheads Rs. 2,93,000

Fixed Overheads Rs. 4,70,000

Actual Production 4,800 units.

**Calculate:**

(i) Material Cost Variance

(ii) Labour Cost variable

(iii) Fixed Overheads Cost variance

(iv) Variable Overheads Cost variance

**Answer:-** Budgeted Fixed Overhead Rate: Rs. 15 per hour. Material Cost Variance: Rs. 45,000(A), Labour Cost Variance: Rs. 3,400 (F), Fixed Overhead Cost variance; Rs/ 38,000 (A). Variable Overhead Cost Variance: Rs. 5,000(A).

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**Question 44:-The Spark Company manufactures Product X/**

**A Standard Cost system is in use. The Standard Costs per unit is as:-**

| | | |
|---|---|---|
| Raw materials | 10 Kg @ Rs. 40/ | Rs. 400 |
| Direct Labour | 36 hour @ Rs. 10/- hour | Rs. 360 |
| Variable Overhead | 36 hour @ Rs. 20/- hour | Rs. 720 |
| | | **Rs. 1480** |
| **Budgeted Hours** | 24,000 hours | |

**Production For May 2013 amounted to 2000 unit. The relevant data are as follows:**

| | |
|---|---|
| Raw material used | 12,000 Kg |
| Cost of raw material used | Rs. 6,00,000 |
| Direct Labour Cost | Rs. 9,60,000 |
| Variable Overhead | Rs. 20,00,000 |
| Actual hours worked | 80,000 |

The management has notes that actual costs different from Standard Costs.

**Required:-**

Prepare a statement which will contain a detailed explanation of the different between the actual costs and standard Costs.

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**Question 45:-** KPR Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost center. The Standard Costs card of a product is as under:

| Standard | | Unit Cost (Rs.) |
|---|---|---|
| Direct material | 5 Kg @ Rs. 4.20 | 21.00 |
| Direct Labour | 3 hours @ Rs. 3.00 | 9.00 |
| Factory Overhead | Rs. 1.20 per labour hour | 3.60 |
| | Total manufacturing Cost | 33.60 |

The Production schedule for the month of June,2013 required completion of 40,000 units. However 40,900 units were completed during the month without operating and closing work-in-process inventories.

Purchases during the month of June 2013, 2,25,000 Kg of material at the rate of Rs. 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 | Rs. 3,87,840 |
| Total Factory overhead cost incurred | Rs. 1,00,000 |
| Sales | 40,000 units |

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

**Required:**

1. Calculate material variances based on consumption of material.
2. Calculate labour variances and the total variance for factory overhead.
3. Prepare Income Statement for June,2013 showing actual gross margin.
4. An incentive Scheme is in operation in the company where by employees are paid a bonus of 50% of direct labour hour saved at Standard direct labour hour rate. Calculate the Bonus amount.

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