

## Cost Control And Cost Reduction

### Cost Control

#### Definition

: Cost Control is the process of monitoring and regulating the expenditure of funds is known as cost control. In other words, it means to regulate/control the operating costs in a business firm.

#### Features of Cost control

Cost control process involves setting targets and standards, ascertaining the actual performance, comparing the actual performance with standard, investigating the variances and taking corrective action. It aims at achieving the standard. It is a preventive function. In cost control, costs are optimized before they are incurred. It is generally applicable to items which have standards. It contains guidelines and directive management such as, how to do a thing.

#### Aspects Of Cost Control

##### 1) Planning

: Initially a plan or set of targets is established in the form of budgets and standards.

##### 2) Communication

: The next step is to communicate the plan to those whose responsibility is to implement the plan.

##### 3) Motivation

: Motivation is defined as the process that initiates, guides and maintains goal-oriented behaviors.

##### 4) Appraisal and Reporting

: comparison has to be made with the predetermined targets and actual performance. Deficiencies are noted and discussion is started to overcome deficiencies.

##### 5) Decision-making

: Finally, corrective actions and remedial measures are taken or the set of targets are revised, depending upon the administration's understanding of the problem.

Main Areas of cost control

Materials, Labor, Overheads, Sales, Energy,

Advantages cost control

It helps the firm to improve its profitability and competitiveness. It helps the firm in reducing its costs and thus reduce its prices. It is indispensable for achieving greater productivity. If the price of the product is stable and reasonable, it can maintain higher sales and thus employment of work force.

Disadvantages of cost control

Reduces the flexibility and process improvement in a company. Restriction on innovation. Requirement of skillful personnel to set standards.

General techniques of Cost cutting

Use Skype to make domestic and international phone calls. Establish presence on social media sites such as Facebook and Twitter instead of newspaper, magazine, mail. Use electronic communication, cut down on print and paper communication. Outsource computer maintenance. Lease equipments. Share office or building space with another business.

Techniques of cost control

Budgetary control, Standard costing, Inventory control, Ratio analysis, Variance analysis

Ratio Analysis

Definition

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A 'Ratio' is defined as an arithmetical/quantitative/numerical relationship between two numbers. Ratio analysis is a very important and age old technique of financial analysis.

A tool used by individuals to conduct a quantitative analysis of information in a company's financial statements.

#### Features of Ratio Analysis

It is mainly used as an external standard, that is, for comparing performance with the other organization in the industry. Statistical yardstick that provides a measure of the relationship between two figures. It may be expressed in percentage terms as a proportion or as a rate.-

Some of the most commonly used ratios for cost comparison are as follows

: Sales / total assets  
Production costs / cost of sales  
Administration costs / cost of sales  
Sales / inventory

#### Variance analysis

##### Definition

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##### Variance

is defined as the difference between the expected amount and the actual amount of costs or revenues.

##### Variance analysis

is the investigation of the difference between actual and planned behavior. For example, if you budget, for sales to be Rs.10,000/- and actual sales are Rs.8,000/-, variance analysis yields a difference of Rs.2,000/-.

##### Causes for Variance

If variance exist, their causes have to be determined for taking the corrective actions. There are many causes for variations which are listed below:

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Changes in productivity can alter the cost levels.

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Change in product design will alter the cost levels.

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Investment in new capital and replacement of old equipments can have immediate effects on both operating costs and overhead costs.

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Changes in hours of working time will have its influence on costs.

# Unit - 4

## MODULE - 6

# Absorption Costing and Marginal Costing

Topics to be enlightened...

- Introduction
- Meaning and Definition of Marginal Costing
- Absorption Costing
- Difference between Marginal Costing vs. Absorption Costing
- Reconciliation of Absorption and Marginal Costing
- Pro-forma of Marginal Costing and Absorption Costing
- Principles of Marginal Costing
- Features of Marginal Costing
- Advantages of Marginal Costing
- Disadvantages of Marginal Costing
- Limitation of Absorption Costing
- Contribution
- Process of Marginal Costing
- Fixed and Variable Cost
- Break-even Point and Break-even Chart (Utility and Limitations)
- Profit-Volume Ratio
- Margin of Safety
- Key Factor or Limiting Factor
- Cost Indifference Point
- Cost-Volume Profit Analysis (CVP Analysis)
- Formula
- Practical Problems

## Introduction:

The costs that vary with a decision should only be included in the decision analysis. For many decisions that involve relatively small variations from existing practice and/or are for relatively limited periods of time, fixed costs are not relevant to the decision. This is because either fixed costs tend to be impossible to alter in the short term or managers are reluctant to alter them in the short term. This is a technique where only the variable costs are considered while computing the cost of a product.

The perception of marginal cost has been borrowed from economic theory. In economics, marginal cost is an incremental cost; it is considered as the addition to the total cost, which results from the production of one more unit of output. According to the perception of marginal cost, it requires a thorough understanding of various classes of costs and their relation with the change in the level of activity.

Thus, Marginal Costing is a costing method in which only variable costs are accumulated and cost per unit is ascertained only on the basis of variable costs. Prime Costs and Variable Factory Overheads are used to determine the value of stock lying with the enterprise.

For decision-making, it is more important to the management for taking further steps for the improvement of the business. It can be called direct costing, differential costing, incremental costing and comparative costing.

## Meaning and Definition:

Marginal costing distinguishes between fixed costs and variable costs as conventionally classified.

*The marginal cost of a product* –is its variable cost. This normally includes direct labour, direct material, direct expenses and the variable part of overheads.

According to CIMA Terminology, Marginal Costing is defined as the  
“Ascertainment of marginal costs and the effect on profit of changes in volume or type of output by differentiating between Fixed Costs and Variable Costs.”

*Marginal Costing* can be formally defined as,

‘The accounting system in which variable costs are charged to cost units and the fixed costs of the period are written-off in full against the aggregate contribution. Its special value is in decision making’.

The theory of marginal costing as set out in a report on Marginal Costing published by CIMA, London is as follows:

In relation to a given volume of output, additional output can normally be obtained at less than proportionate cost because within limits, the aggregate of certain items of cost will tend to remain fixed and only the aggregate of the remainder will tend to rise proportionately with an increase in output. Conversely, a decrease in the volume of output will normally be accompanied by less than proportionate fall in the aggregate cost.

The theory of marginal costing may, therefore, be understood in the following two steps:

1. If the volume of output increases, the cost per unit in normal circumstances reduces. Conversely, if an output reduces, the cost per

unit increases. If a factory produces 100 units at a total cost of Rs. 5,000 and if by increasing the output by one unit the cost goes up to Rs. 5,030, the marginal cost of additional output will be Rs. 30.

2. If an increase in output is more than one, the total increase in the cost divided by the total increase in output will give the average marginal cost per unit. If, for example, the output is increased to 1020 units from 1000 units and the total cost to produce these units is Rs. 1,045, the average marginal cost per unit is Rs. 2.25. It can be described as follows:

$$\frac{\text{Additional cost}}{\text{Additional units}} = \frac{\text{Rs. 45}}{20} = \text{Rs. 2.25}$$

The ascertainment of marginal cost is based on the classification and segregation of cost into fixed and variable cost. In order to understand the marginal costing technique, it is essential to understand the meaning of marginal cost.

*Marginal cost* means the cost of the marginal or last unit produced. It is also defined as the cost of one more or one less unit produced besides existing level of production. In this connection, a unit may mean a single commodity, a dozen, gross or any other measure of goods.

For example, if a manufacturing firm produces X unit at a cost of Rs. 500 and X+1 units at a cost of Rs. 540, the cost of an additional unit will be Rs. 40 which is a marginal cost. Similarly, if the production of X-1 units comes down to Rs. 460, the cost of marginal unit will be Rs. 40 (500–460).

The marginal cost varies directly with the volume of production and marginal cost per unit remains the same. It consists of prime cost, i.e. cost of direct



materials, direct labor and all variable overheads. It does not contain any element of fixed cost which is kept separate under marginal cost technique.

*Marginal costing* may be defined as the technique of presenting cost data wherein variable costs and fixed costs are shown separately for managerial decision-making. It should be clearly understood that marginal costing is not a method of costing like process costing or job costing. Rather, it is simply a method or technique of the analysis of cost information for the guidance of management which tries to find out an effect on profit due to changes in the volume of output.

There are different phrases being used for this technique of costing. In the UK, marginal costing is a popular phrase whereas in the USA, it is known as direct costing and is used in place of marginal costing. Variable costing is another name for marginal costing.

Marginal costing technique has given birth to a very useful concept of contribution where contribution is given by sales revenue less variable cost (marginal cost)

Contribution may be defined as the profit before the recovery of fixed costs. Thus, contribution goes toward the recovery of fixed cost and profit, and is equal to fixed cost plus profit ( $C = F + P$ ).

In case a firm neither makes profit nor suffers loss, contribution will be just equal to fixed cost ( $C = F$ ). This is known as break even point.

The concept of contribution is very useful in marginal costing. It has a fixed relation with sales. The proportion of contribution to sales is known as P/V ratio which remains the same under given conditions of production and sales.

## Absorption Costing:

Absorption Costing is a conventional technique of ascertaining cost. It is the practice of charging all costs, both variable and fixed to operations, processes or products and is also known as 'Full Costing Technique.'

In this technique of costing, cost is made up of direct costs plus overhead costs absorbed on some suitable basis. Here, cost per unit remains the same only when the level of output remains the same for some duration. None the less, the level of output cannot remain the same forever and so does the cost per unit because the fixed cost remains the same despite the changes in the level of output. The change in the cost per unit with a change in the level of output in Absorption Costing Technique poses a problem to the management in taking managerial decisions. Absorption Costing is useful if there is only one product; when there is no inventory and overhead recovery rate is based on normal capacity instead of actual level of activity. Two distinguishing features of Absorption Costing are that fixed factory expenses are included in unit cost as well as inventory value.

## Difference between Marginal Costing and Absorption Costing:

The difference between marginal costing and absorption costing is as below:

1. In the marginal costing only variable cost is considered for product costing and inventory valuation, whereas in the absorption costing both fixed cost and variable cost are considered for product costing and inventory valuation.

2. In the marginal costing, there is a different treatment of fixed overhead. Fixed cost is considered as period cost and by Profit/Volume ratio (P/V ratio), profitability of different products is judged. On the other hand, in absorption costing system, the fixed cost is charged to cost of production. A reasonable share of fixed cost is to be borne by each product and thereby subjective apportionment of fixed overheads influences the profitability of product.
3. In the marginal costing, the presentation of data is so oriented that the total contribution and contribution from each product gets highlighted. In absorption costing, the presentation of cost data is on conventional pattern. After deducting fixed overhead, the net profit of each product is determined.
4. In the marginal costing, the unit cost of production does not get affected by the difference in the magnitude of opening stock and closing stock. Whereas, in the absorption costing, due to the impact of the related fixed overheads, the unit cost of production gets affected by the difference in the magnitude of opening stock and closing stock.
5. In the marginal costing, classification of expenses is based on nature, i.e. Fixed and Variable whereas, in Absorption Costing, classification of expenses is based on functions, i.e. Production, Administration and Selling & Distribution.
6. In the marginal costing, fixed overhead Expenditure Variance is to be computed for Variance Reporting. There is no Volume Variance since Fixed Overheads are not absorbed. On the other hand under the Absorption Costing, in Variance Reporting, FOH Expenditure and Volume variances can be computed. Volume Variances can also be sub-classified into Capacity, Efficiency and Calendar variances.

## Effects of Opening and Closing Stock on Profit:

When income statements under absorption costing and marginal costing are compared, the under mentioned points should be considered:

1. The results under both the methods will be the same in situations where sales and production coincide, i.e., there is neither opening stock nor closing stock.
2. Profit shown under absorption costing will be more than the profit shown under marginal costing when closing stock is more than the opening stock. The reason for this is that in absorption costing, a portion of fixed overhead, instead of being charged to the current period, is charged to the closing stock and carried over to the next period.
3. Profit shown under absorption costing will be lower than the profit shown under marginal costing when closing stock is less than the opening stock. The reason for this is that, in the absorption costing, a portion of fixed cost related to previous year is calculated in the current period.

## Reconciliation of results of Absorption Costing and Marginal Costing:

When comparison of the results of absorption costing and marginal costing is undertaken, the adjustment for under absorbed and / or over absorbed overheads becomes necessary. In absorption costing, on the basis of normal level of activity, the fixed overhead rate is predetermined. A situation of under-absorption and/or over-absorption arises when there is a difference between actual level of activity and normal level of activity.

(i) Under-absorbed fixed overhead = Excess of normal level of activity over actual level of activity  $\times$  Fixed overhead rate per unit.

If there is under-absorption, the profit in absorption costing, before comparison with profit as per marginal costing, should be reduced with under-absorbed fixed overheads. Alternatively, by adding the under-absorbed fixed overhead to the cost of production, the same objective can be achieved.

(ii) Over absorbed Fixed overhead = Excess of actual level of activity over normal level of activity  $\times$  Fixed overhead rate per unit.

If there is an over absorption, then while comparisons the profit calculated under absorption costing with the profit calculated under marginal costing, along with over-absorbed fixed overheads, the profit under absorption costing will eventually look higher. Alternatively, by reducing the over-absorbed fixed overhead from the cost of production, the same objective can be achieved.

# Pro-forma of Marginal Costing and Absorption Costing:

## ***MARGINAL COSTING PRO-FORMA***

Particulars	Rs.	Rs.
Sales Revenue		Xxxxx
Less: Marginal Cost of Sales		
Opening Stock (Valued @ marginal cost)	xxxx	
Add: Production Cost (Valued @ marginal cost)	xxxx	
Total Production Cost	xxxx	
Less: Closing Stock (Valued @ marginal cost)	(xxx)	
Marginal Cost of Production	xxxx	
Add: Selling, Admin & Distribution Cost	xxxx	
<b>Marginal Cost of Sales</b>		<b>(xxxx)</b>
<b>Contribution</b>		<b>Xxxxx</b>
Less: Fixed Cost		(xxxx)
<b>Marginal Costing Profit</b>		<b>Xxxxx</b>

## ***ABSORPTION COSTING PRO-FORMA***

<b>Particulars</b>	<b>Rs.</b>	<b>Rs.</b>
Sales Revenue		xxxxxx
Less: Absorption Cost of Sales		
Opening Stock (Valued @ absorption cost)	xxxx	
Add: Production Cost (Valued @ absorption cost)	xxxx	
Total Production Cost	xxxx	
Less: Closing Stock (Valued @ absorption cost)	<u>(xxx)</u>	
Absorption Cost of Production	xxxx	
Add: Selling, Admin & Distribution Cost	xxxx	
Absorption Cost of Sales		(xxxx)
<b>Un-Adjusted Profit</b>		<b>xxxxxx</b>
Fixed Production O/H absorbed	xxxx	
Fixed Production O/H incurred	(xxxx)	
(Under)/Over Absorption		xxxxxx
<b>Adjusted Profit</b>		<b>xxxxxx</b>

### **Reconciliation Statement for Marginal Costing and Absorption Costing Profit**

<b>Particulars</b>	<b>Rs.</b>
Marginal Costing Profit	---
ADD:	---
(Closing stock – opening Stock) x OAR	
= Absorption Costing Profit	---

Where OAR  
( overhead absorption rate) =

Budgeted fixed production overhead  
Budgeted levels of activities

## Limitations of Absorption Costing:

The following are the contentions against absorption costing:

1. It is observed that in the absorption costing, a portion of fixed cost is carried over to the subsequent accounting period as part of the closing stock. This is an unsound practice because costs pertaining to a period should not be allowed to be vitiated by the inclusion of costs pertaining to the previous period and vice versa.
2. Further, absorption costing is dependent on the levels of output which may vary from period to period, and consequently cost per unit changes due to the existence of fixed overhead. Unless the fixed overhead rate is based on normal capacity, such changed costs are not helpful for the purposes of comparison and control.

The cost to produce an extra unit is a variable production cost. It is realistic to the value of closing stock items as this is a directly attributable cost. The size of the total contribution varies directly with sales volume at a constant rate per unit. For the decision-making purpose of the management, better information about expected profit is obtained from the use of variable costs and contribution approach in the accounting system.

## Principles of Marginal Costing:

The principles of marginal costing are as follows:

- a) For any given period of time, fixed costs will be the same for any volume of sales and production (provided that the level of activity is within the 'relevant range'). Therefore, on selling an extra item of product or service, the following will happen:



- a. Revenue will increase by the sales value of the item sold,
  - b. Costs will increase by the variable cost per unit,
  - c. Profit will increase by the amount of contribution earned from the extra item,
- b) Similarly, if the volume of sales falls by one item, the profit will fall by the amount of contribution earned from the item.
- c) Profit measurement should therefore be based on an analysis of total contribution. Since fixed costs relate to a period of time, and do not change with increases or decreases in sales volume, it is misleading to charge units of sale with a share of fixed costs.
- d) When a unit of product is made, the extra costs incurred in its manufacturing are the variable production costs. Fixed costs are unaffected, and no extra fixed costs are incurred when output is increased.

## Features of Marginal Costing:

The main features of marginal costing are as follows:

**(1) Cost Classification:**

The marginal costing technique makes a sharp distinction between variable costs and fixed costs. It is the variable cost on the basis of which production and sales policies are designed by a firm following the marginal costing technique.

**(2) Stock/Inventory Valuation:**

Under the marginal costing, inventory/stock for profit measurement is valued at the marginal cost. It is in sharp contrast to the total unit cost in costing method.

**(3) Marginal Contribution:**

Marginal costing technique makes use of marginal contribution for marking various decisions. Marginal contribution is the difference between sales and marginal cost. It forms the basis for judging the profitability of different products or departments.

**(4) Selling Price Determination:**

Selling price of the product in the marginal costing method is determined based on the cost plus the contribution always. Here, the contribution, of course, means the difference between the sales and the variable cost.

**(5) Profitability:**

The profitability of the product/department is based on the contribution made available by each product/department.

**(6) Fixed Costs vs. Period Costs:**

Fixed costs are treated as period costs and are charged to the costing Profit and Loss Account of the period in which they are incurred.

## **Advantages of Marginal Costing:**

1. **Simple Method:** Marginal costing is simple to understand. It is calculated only on the basis of variable costs. By not charging fixed overhead to the cost of production, the effect of varying charges per unit is avoided.
2. **Overhead Simplification:** In the stock valuation, the marginal costing prevents the illogical carry-forward of some proportion of current years fixed overhead to the next year. It reduces the degree of over or under-recovery of overheads due to the separation of fixed overheads from production cost.

3. **Effective for Sales and Production Policy:** The effects of alternative sales or production policies can be more readily available and assessed, and decisions taken would yield the maximum return to the business.
4. It eliminates large balances left in overhead control accounts which indicate the difficulty of ascertaining an accurate overhead recovery rate.
5. Practical cost control is greatly facilitated. By avoiding arbitrary allocation of fixed overhead, efforts can be concentrated on maintaining a uniform and consistent marginal cost. To the management, it is useful at various levels.
6. It helps in the planning of short-term profit by breakeven and profitability analysis; both in terms of quantity and graphs. Comparative profitability and performance between two or more products and divisions can easily be assessed and brought to the notice of the management for decision making.

## Disadvantages of Marginal Costing:

1. The separation of costs into fixed and variable is difficult and sometimes gives misleading results.
2. Normal costing systems also apply overhead in the situation of normal operating volume and this shows that no advantage is gained by the marginal costing.
3. In the marginal costing, stocks and work-in-progress are understated. The exclusion of fixed costs from inventories affects the profit, and true and fair view of financial affairs of an organization may not be clearly visible.
4. Volume variance in the standard costing also discloses the effect of fluctuating output on fixed overhead. The marginal cost data becomes

unrealistic in case of highly fluctuating levels of production, e.g., in case of seasonal factories.

5. Application of fixed overhead depends on estimates and not on the actual and as such there may be under or over absorption of the same.
6. Control affected by means of the budgetary control is also accepted by many. In order to know the net profit, one should not be satisfied with the contribution and hence, fixed overhead is also a valuable item. A system which ignores fixed costs is less effective, for a major portion of fixed cost is not taken care of in the marginal costing.
7. In practice, sales price, fixed cost and variable cost per unit may vary. Thus, the assumptions underlying the theory of marginal costing sometimes becomes unrealistic. For the long term profit planning, absorption costing is the only answer.

## Contribution:

The term 'contribution' mentioned in the formal definition is the term given to the difference between Sales and Marginal cost. The analysis of marginal costing depends a lot on the idea of contribution. In this technique, the efforts are directed only to the increase of the total contribution. Contribution is a term which defines the surplus that remains after variable cost of sales is deducted from sales revenue as indicated below:

$$\begin{array}{rcl} \text{MARGINAL COST} = & & \text{VARIABLE COST} \\ & & \text{DIRECT LABOUR} \\ & & + \\ & & \text{DIRECT MATERIAL} \\ & & + \\ & & \text{DIRECT EXPENSE} \\ & & + \\ & & \text{VARIABLE OVERHEADS} \\ \text{CONTRIBUTION} = & \text{SALES} - & \text{MARGINAL COST} \end{array}$$

The term marginal cost sometimes refers to the marginal cost per unit and sometimes to the total marginal costs of a department or batch or operation. The meaning is usually clear from the context.

A product whose selling price exceeds its variable cost is said to have:

- (a) Covering its variable cost and
- (b) Making a contribution,
  - (i) towards the firm's fixed cost and after these have been covered;
  - (ii) towards the firm's profit.

In normal circumstances, the selling price of the product contains some element of profit, but there may be some exceptional or adverse circumstances, when the products may have to be sold on cost to cost basis or even at loss. Therefore, the character of contributions will have the following composition under different circumstances:

❖ Selling Price containing Profit:

$$\text{Contribution} = \text{Fixed Cost} + \text{Profit}$$

❖ Selling Price at Cost:

$$\text{Contribution} = \text{Fixed Cost}$$

❖ Selling Price at Loss:

$$\text{Contribution} = \text{Fixed Cost} - \text{Loss}$$

It becomes easy to determine the missing one if any three of these four items is known to us. In the break-even analysis, some of the specific uses of contribution are:

- a. Break-even point determination;
- b. Profitability of products assessment;
- c. Different department's selling price determination;
- d. The optimum sales mix determination.

## Process of Marginal Costing:

Marginal costing requires the calculation of the difference between sales and marginal cost of sales. This difference is known as the contribution which provides both the fixed cost and the profit. Excess of contribution over the fixed cost is known as the net margin or profit. Here emphasis remains on increasing the total contribution.

### ❖ **Variable Cost:**

Variable is that part of total cost which in proportion with volume changes directly. With the change in volume of output, total variable cost changes. Increase in the total variable cost results from an increase in the output and reduction in the total variable cost results from a decrease in the output. However, irrespective of increase or decrease in volume of production, there will be no change in variable cost per unit of output. Costs of direct material, direct labour, direct expenses, etc. are included in variable cost. By dividing the total variable cost by the units produced, variable cost per unit is sought. The variable cost per unit is also referred to as the variable cost ratio. By dividing the change in cost by the change in activity, the variable cost can be obtained.

Variable costs are very sensitive in nature and a variety of factors can influence the same. Helping the management in controlling the variable cost is the main aim of 'marginal costing' because this is the area of cost which itself needs control by the management.

### ❖ **Fixed Cost:**

Cost which is incurred for a period and which tends to remain unaffected by fluctuations in the level of activity, output or turnover, within certain output

and turnover limits. Examples are rent, rates, salaries of executive and insurance, etc.

## Break-Even Point (BEP):

The break-even point is the level of activity or sales at which a company makes neither profit nor loss. Sales revenue exactly equals total costs at this level. Thus, the sales volume at which operations break-even is indicated by the break-even point. In terms of number of units sold or in terms of sales value, it can be expressed.

$$\text{Sales} - \text{Variable cost} = \text{Fixed cost} + \text{Profit}$$

Since at the break-even point, profit is nil, it follows that:

$$\text{Sales at break-even point} - \text{Variable cost} = \text{Fixed cost}$$

Thus, at the break-even point, contribution is just enough to provide for the fixed cost. Thus, enough contribution is necessary to be earned to cover fixed costs before any profit can be earned. If the level of actual sales is above the break-even point, profit will be earned by the company. On the other hand, if actual sales are below the break-even point, loss will be incurred by the company.

By any of the following formula, the break-even point (BEP) can be calculated:

<i>(a) BEP (in terms of units) =</i>	$\frac{\text{Fixed Cost}}{\text{Contribution per unit}}$
<i>(b) B/E (in terms of sales value) =</i>	$\frac{\text{Fixed Cost} \times \text{Sales}}{\text{Contribution}}$
<b>Or</b>	$\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

When graphical presentation of cost-volume-profit relationship is made, the break-even point will be the point at which the total cost line and total sales line intersect each other.

The break-even point is crucial for the management in that it can show the lowest level to which the given activity can drop down without actually jeopardizing the life of the firm. Occasionally, operating below the break-even point may not be necessarily fatal for a concern, however, it must operate above this level in the long run.

By comparing the actual activity level with BEP, one can ascertain whether or not the company is making any profit.

Activity Level		B.E.P.	Situation
	>		Profit
	=		No Profit – No Loss
			Loss

## Profit-Volume Ratio:

Profit Volume Ratio means contribution for every Rs. 100 Sales Value. It is always calculated on the percentage basis or at times it is compared with the Sales Value.

When the contribution from sales is expressed as a sales value percentage, it is known as profit-volume ratio (or P/V ratio). The relationship between the contribution and the sales is expressed by it. Sound 'financial health' of a company's product is indicated by better P/V ratio. The change in the profit



due to the change in volume is reflected by this ratio. If expressed on equal footing with the sales, it will show how large the contribution will appear. If size of the sales is Rs.100, then the P/V Ratio of 60% will mean that the contribution is Rs. 60.

One important characteristic of P/V ratio is that at all levels of output it remains constant because at various levels the variable cost as a proportion of the sales remains constant. When P/V ratio is considered in conjunction with the margin of safety, it becomes particularly useful. P/V ratio can be referred to by other terms such as: (a) marginal income ratio, (b) contribution to sales ratio, and (c) variable profit ratio.

P/V ratio may be expressed as:

<i>P/V ratio</i>	=	<i>Contribution / Sales</i>
		$\frac{\text{Sales} - \text{Variable cost}}{\text{Sales}}$
		$1 - \frac{\text{Variable cost}}{\text{Sales}}$
<b>Or, P/V ratio</b>	=	$\frac{\text{Fixed Cost} + \text{Profit}}{\text{Sales}}$
<b>Or, P/V Ratio</b>	=	$\frac{\text{Difference in Profits}}{\text{Difference in Sales}} \times 100$

It is also possible to express the ratio in terms of percentage by multiplying by 100. Thus a relationship between the contribution and the sales is established by the profit/volume ratio. Hence, it might be better to call it a *Contribution/Sales ratio (or C/S ratio)*, though the term Profit/Volume ratio (P/V ratio) is now widely used.

In addition to the above, it is possible to compute the ratio by comparing the change in the contribution with the change in the sales or the change in the

profit with the change in the sales. it is possible to compute the ratio. Because it is assumed that the fixed cost will remain the same at different levels of output, an increase in the contribution will mean an increase in the profit.

P/V ratio =	$\frac{\text{Change in contribution}}{\text{Change in Sales}}$
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## Margin of Safety:

Margin of safety means the difference between the total sales and the sales at the BEP. It is also known as the amount of the sales above the Break Even Sales. Margin of safety can be expressed in absolute terms and also in terms of percentage. The higher the margin of safety, the better the situation for an organization. A high margin of safety provides strength and stability to a concern.

To increase the margin of safety, the company should endeavour to keep its BEP at its lowest level and should try to maintain actual sales at the highest level. This may be possible either by controlling fixed costs; by resorting to a dynamic sales policy, or by reducing variable costs. Reproducing the profitable products after discontinuing the unprofitable ones, can also help increase the margin of safety.

Margin of Safety in terms of units as well as Rupees will be found as under;

<b>M.O.S. (Units) =</b>	<b>Sales (Units) – B.E.P. (Units)</b>
<b>M.O.S. (Rs.) =</b>	<b>Sales (Rs.) – B.E.P. (Rs.)</b>

## Key Factor or Limiting Factor:

There are always factors which, for the purpose of managerial control, do not lend themselves. For example, there are legal restrictions on the import of a material for some specific time and that the material is the chief element for the company's product, then the company cannot carry out its production as much as it wants. Production has to be planned after taking into consideration this limiting factor. However, its efforts will be directed towards the maximum utilization of available sources. Thus, limiting factor is a factor, by which, at a given point of time, the volume of output of an organization gets influenced.

The key factor is the factor whose influence, for the purpose of ensuring the maximum utilization of resources, must be ascertained first. Profit can be maximized by gearing up the process of production in the light of influences of the key factors. Managerial action is constrained and the output of the company is limited by the key factor. Although sale is the usual limiting factor, any of the following factors could also be a limiting factor:

- (a) Material
- (b) Labour
- (c) Power
- (d) Capacity of the plant
- (e) Actions of government

When a decision has to be taken as regards the relative profitability of different products and a key factor in operation, the contribution for each product is divided by the key factors.

As regards products or projects, the choice rests with the management as to how will it secure more contribution of the key factors per unit. Thus, if the key factor is sales, then consideration should be given to the contribution to the sales ratio. If labour shortage is faced by the management, then consideration should be given to the contribution per labour hour. Suppose sales of product X & Y are Rs. 200 & Rs. 220 and the variable cost of sales are Rs. 60 and Rs. 46. The labour hours (key factor) required for these products are 4 hours and 6 hours respectively. The contribution will be: Product X,  $200 - 60 = \text{Rs.}140/\text{unit}$  or  $\text{Rs.}35/\text{hour}$ ; Product Y,  $220 - 46 = \text{Rs.}174/\text{unit}$  or  $\text{Rs.}29/\text{hour}$ . In this case, P/V ratio of product Y (79%) is better than P/V ratio of product X (70%) and producing product Y will be the normal conclusion. Here, the key factor is time. Contribution per hour is better in product X than in product Y. Thereby, the product X is more profitable than the product Y during labour shortage.

## Cost Indifference Point:

It is the point at which the total costs for two alternatives are the same. In other words, it is the point at which the total cost lines under two alternatives intersect each other. The Cost Indifference Point is calculated as under:

$$\frac{\text{Difference in Fixed Costs}}{\text{Difference in variable cost per unit}}$$
 Cost Indifference Point is used to choose between two alternative processes for achieving the same objective. The choice depends on the estimated activity level.

The decision regarding the choice of process based on the Cost Indifference Point is considered as follows:

Activity Level		Indifference Point	Product should be manufactured by a process having
	>		Lesser variable Cost & Higher Fixed Cost
	=		Indifferent
	<		Lesser Fixed Cost & Higher Variable Cost

## Cost-Volume-Profit Analysis (CVP Analysis):

Cost-Volume-Profit Analysis is the analysis of three variables viz. Cost, Volume and Profit, which explores the relationship existing amongst Costs, Revenue, Activity Levels and the resulting Profit.

There exists a very close relation among cost, volume and profit. As a simple fact, one knows that if the volume increases, the cost per unit will decrease and the profit per unit will increase. Thus, one can conclude that there is a direct relation between volume and profit but there exists an inverse relation between the volume and cost. This analysis of CVP may be applied for profit planning, cost control, evaluation of performance and decision making.

The main objectives of such analysis are:

- The CVP Analysis helps to forecast profit with more accuracy as it is essential to know the relation between profits and costs on the one hand and volume on the other.
- As one knows that the sales and the variable costs tend to vary with the variance in the volume of output, it is necessary for the business concern to budget the volume first for establishing budgets for sales and variable

costs. This is where CVP analysis becomes useful as it helps in setting up Flexible Budgets which indicate cost at various levels of activity.

- The CVP analysis also helps in evaluating the performance for the purpose of control in the post implementation stage in a business plan. It is very necessary to evaluate the effects of changes in volume on costs in order to review whatever results are achieved and the costs incurred.
- It is common knowledge that pricing plays a vital role in fixing up the volumes especially in a period of recession. So, the CVP analysis is also helpful in deciding the price policies as it shows the effect of different price structures on costs and profits.
- As the predetermined overhead rates are related to a selected volume of production, study of Cost-Volume relation is necessary in order to know the amount of the overhead costs which could be charged to product costs at various levels of operation.

However, in order to get the maximum results out of the CVP analysis, it is pivotal to understand the assumptions based on which the CVP analysis is based. The CVP analysis provides useful results only when certain assumptions are made, such as:

- Fixed Costs do not change.
- Profits are calculated on the variable costs basis.
- All variables per unit remain constant.
- There is a single product or a constant sales mix in case of multiple products.
- Costs can be accurately divided into fixed and variable components.
- The analysis applies only to short-term horizon.
- The analysis applies to a relevant range only.
- Total costs and total revenues are linear functions of output.

# Formulas:

➤ **Contribution:**

$$\text{Contribution} = \text{Sales} - \text{Variable Cost}$$

➤ **P/V Ratio:**

$$\text{P/V Ratio} = \text{Contribution/Sales} \times 100$$

➤ **Profit/Loss:**

Sales	Xx
Variable cost	(xx)
Contribution	Xxx
Fixed cost	(xxx)
Profit/(Loss)	xxxx/(xxxx)

➤ **Break-Even Point:**

$$\text{B.E.P. (Volume)} = \text{Fixed Cost/Contribution Per Unit}$$

$$\text{B.E.P. (Value)} = \text{Fixed Cost/P/V Ratio}$$

➤ **Margin of Safety:**

$$\text{Margin of Safety (Volume)} = \text{Sales (Units)} - \text{B.E.P. (Units)}$$

$$\text{Margin of Safety (Value)} = \text{Sales (Rs.)} - \text{B.E.P. (Rs.)}$$

➤ **Total Cost** = Variable Cost + Fixed Cost

➤ **Variable Cost** = Variable Cost Per Unit × Units

➤ **Indifference Production Level =**

### Difference between Fixed Cost/Difference between Variable Cost per Unit

Activity Level		Indifference Point	Product should be manufactured by a Machinery having
	>		Lesser Variable Cost & Higher Fixed Cost
	=		Indifferent
	<		Lesser Fixed Cost & Higher Variable Cost

Sales		Break Even Point	Profit or Loss
	>		Profit
	=		No Profit / No Loss
	<		Loss

#### ➤ **Shut Down Point:**

Shut Down Point (Sales) = Avoidable Fixed Cost/P/V Ratio

Avoidable Fixed Cost = Total Fixed Cost – Fixed Cost if operation is shut down

➤ **Profit/(Loss) = Margin of Safety (Value) × P/V Ratio**

➤ **Profit/(Loss) = Margin of Safety (Volume) × Contribution Per Unit**

➤ **Contribution Per Unit = Difference in Profit/Difference in Sales Units**

➤ **P/V Ratio = Difference in Profit/Difference in Sales × 100**



## **CHAPTER 28**

# **Standard Costing and Variance Analysis**

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### **Introduction**

The success of a business enterprise depends to a greater extent upon how efficiently and effectively it has controlled its cost. In a broader sense the cost figure may be ascertained and recorded in the form of Historical costing and Predetermined costing. The term Historical costing refers to ascertainment and recording of actual costs incurred after completion of production. .

One of the important objectives of cost accounting is effective cost ascertainment and cost control. Historical Costing is not an effective method of exercising cost control because it is not applied according to a planned course of action. And also it does not provide any yardstick that can be used for evaluating actual performance. Based on the limitations of historical costing it is essential to know before production begins what the cost should be so that exact reasons for failure to achieve the target can be identified and the responsibility be fixed. For such an approach to the identification of reasons to evaluate the performance, suitable measures may be suggested and taken to correct the deficiencies.

### **MEANING OF STANDARD COST AND STANDARD COSTING**

#### **Standard Cost**

The word “Standard” means a “Yardstick” or “Bench Mark.” The term “Standard Costs” refers to Pre-determined costs. Brown and Howard define Standard Cost as a Pre-determined Cost which determines what each product or service should cost under given circumstances. This definition states that standard costs represent planned cost of a product.

Standard Cost as defined by the Institute of Cost and Management Accountant, London “is the Pre-determined Cost based on technical estimate for materials, labour and overhead for a selected period of time and for a prescribed set of working conditions.”

#### **Standard Costing**

Standard Costing is a concept of accounting for determination of standard for each element of costs. These predetermined costs are compared with actual costs to find out the deviations known as “Variances.” Identification and analysis of causes for such variances and remedial measures should be taken in order to overcome the reasons for Variances.

Chartered Institute of Management Accountants England defines Standard Costing as “the Preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence.”

From the above definition, the technique of Standard Costing may be summarized as follows :

- (1) Determination of appropriate standards for each element of cost.
- (2) Ascertainment of information about actuals and use of Standard Costs.
- (3) Comparison of actual costs with Standard Costs, the differences known as Variances.
- (4) Analysis of Variances to find out the causes of Variances.
- (5) Reporting to the responsible authority for taking remedial measures.

### **Difference between Estimated Costs and Standard Costs**

Although, Pre-determination is the essence of both Standard Costing and Estimated Costing, the two differ from each other in the following respects:

<i>Standard Costing</i>	<i>Estimated Costing</i>
<ol style="list-style-type: none"> <li>(1) It is used on the basis of scientific.</li> <li>(2) It emphasises “what the cost should be.”</li> <li>(3) It is used to evaluate actual performance and it serves as an effective tool of cost.</li> <li>(4) It is applied to any industry engaged in mass production.</li> <li>(5) It is a part of accounting system and standard costing variances are recorded in the books of accounts.</li> </ol>	<ol style="list-style-type: none"> <li>(1) It is used on the basis of statistical facts and figures.</li> <li>(2) It emphasises “what the cost will be.”</li> <li>(3) It is used to cost ascertainment for fixing sales price.</li> <li>(4) It is applicable to concern engaged in construction work.</li> <li>(5) It is not a part of accounting system because it is based on statistical facts and figures.</li> </ol>

**Compare and Contrast between Standard Costing and Budgetary Control :**

**Relationship :** The following are certain basic principles common to both Standard Costing and Budgetary Control :

- (1) Determination of standards for each element of costs in advance.
- (2) For both of them measurement of actual performance is targeted.
- (3) Comparison of actual costs with standard cost to find out deviations.
- (4) Analysis of variances to find out the causes.
- (5) Give the periodic report to take corrective measures.

**Differences :** Though Standard Costing and Budgetary Controls are aims at the maximum efficiencies and Marginal Cost, yet there are some basic differences between the two from the objectives of using the two costs.

<i>Budgetary Control</i>	<i>Standard Costing</i>
(1) Budgets are projections of financial accounts. (2) As a statement of both income and expenses it forms part of budgetary control. (3) Budgets are estimated costs. They are "what the cost will be." (4) Budget can be operated with standards. (5) In budgetary control variances are not revealed through the accounts. (6) Budgets are prepared on the basis of historical facts and figures.	(1) Standard Costing is a projection of cost accounts. (2) Standard costing is not used for the purpose of forecasting. (3) Standard Cost are the "Norms" or "what cost should be." (4) Standard Costing cannot be used without budgets (5) Under standard costing variances are revealed through different accounts. (6) Standard cost are planned and prepared on the basis of technical estimates.

### ***Advantages of Standard Costing***

The following are the important advantages of standard costing :

- (1) It guides the management to evaluate the production performance.
- (2) It helps the management in fixing standards.
- (3) Standard costing is useful in formulating production planning and price policies.
- (4) It guides as a measuring rod for determination of variances.
- (5) It facilitates eliminating inefficiencies by taking corrective measures.
- (6) It acts as an effective tool of cost control.
- (7) It helps the management in taking important decisions.
- (8) It facilitates the principle of "Management by Exception."
- (9) Effective cost reporting system is possible.

### ***Limitations of Standard Costing***

Besides all the benefits derived from this system, it has a number of limitations which are given below :

- (1) Standard costing is expensive and a small concern may not meet the cost.
- (2) Due to lack of technical aspects, it is difficult to establish standards.
- (3) Standard costing cannot be applied in the case of a concern where non-standardised products are produced.
- (4) Fixing of responsibility is difficult. Responsibility cannot be fixed in the case of uncontrollable variances.
- (5) Frequent revision is required while insufficient staff is incapable of operating this system.
- (6) Adverse psychological effects and frequent technological changes will not be suitable for standard costing system.

### ***Determination of Standard Costs***

The following preliminary steps must be taken before determination of standard cost :

- (1) Establishment of Cost Centres.

- (2) Classification and Codification of Accounts.
- (3) Types of Standards to be applied.
  - (a) Ideal Standard
  - (b) Basic Standard
  - (c) Current Standard
  - (d) Expected Standard
  - (e) Normal Standard
- (4) Organization for Standard Costing.
- (5) Setting of Standards.

**(1) Establishment of Cost Centres:** It is the first step required before setting of Standards. According to CIMA, London Cost Centre is "a location, person or item of equipment for which costs may be ascertained and used for the purpose of cost control." Cost centre is necessary for the determination of standard costs for each product and comparison of actual cost with the predetermined standards to ascertain the deviations to take corrective measures.

**(2) Classification and Codification of Accounts:** Classification of Accounts and Codification of different items of expenses and incomes help quick ascertainment and analysis of cost information.

**(3) Types of Standards to be Applied:** Determination of the type of standard to be used is one of the important steps before setting up of standard cost. The different types of standards are given below :

- (a) Ideal Standard
- (b) Basic Standard
- (c) Current Standard
- (d) Expected Standard
- (e) Normal Standard

**(a) Ideal Standard:** The term "Ideal Standard" refers to the standard which can be attained under the most favourable conditions possible. In other words, ideal standard is based on high degree of efficiency. It assumes that there is no wastage, no machine breakdown, no power failure, no labour ideal time in the production process. In practice it is difficult to attain this ideal standard.

**(b) Basic Standard:** This standard is otherwise known as Bogey Standard. Basic Standard which is established for use is unaltered over a long period of time. In other words this standard is fixed in relation to a base year and is not changed in response to changes in material costs, labour costs and other expenses as the case may be. The application of this standard has no practical importance from cost control and cost ascertainment point of view.

**(c) Current Standard:** The term "Current Standard" refers to "a standard established for use over a short period of time related to current conditions which reflects the performance that should be attained during the period." These standards are more suitable and realistic for control purposes.

(d) **Expected Standard:** Expected Standard may be defined as “the standard which may be anticipated to be attained during a future specified budget period.” These standards set targets which can be achieved in a normal situation. As such it is more realistic than the Ideal Standard.

(e) **Normal Standard:** This standard resents an average standard in past which, it is anticipated, can be attained over a future period of time, preferably long enough to cover one trade cycle. The usefulness of such standards is very limited for the purpose of cost control.

**(4) Organization for Standard Costing:** The success of the standard costing system depends upon the reliability of standards. Hence the responsibility for setting standard is vested with the Standard Committee. It consists of

- (a) Purchase Manager
- (b) Production Manager
- (c) Personnel Manager
- (d) Time and Motion Study Engineers
- (e) Marketing Manager and Cost Accountant

**(5) Setting of Standard:** The Standard Committee is responsible for setting standards for each element of costs as given below :

- I. Direct Material
- II. Direct Labour
- III. Overheads
  - (a) Fixed Overheads
  - (b) Variable Overheads

## **I. Standard for Direct Material Cost**

The following are the standard involved in direct materials cost:

- (i) Material Quantity or Usage Standard.
- (ii) Material Price Standard.

**(i) Material Usage Standard:** Material Usage Standard is prepared on the basis of material specifications and quality of materials required to manufacture a product. While setting of standards proper allowance should be provided for normal losses due to unavoidable occurrence of evaporation, breakage etc.

**(ii) Material Price Standard:** Material Price Standard is calculated by the Cost Accountant and the Purchase Manager for each type of materials. When this type of standard is used, it is essential to consider the important factors such as market conditions, forecasting relating to the trends of prices, discounts etc.

## **II. Standard for Direct Labour Cost**

The following standards are established:

- (i) Fixation of Standard Labour Time
- (ii) Fixation of Standard Rate

(i) **Fixation of Standard Labour Time:** Labour Standard time is fixed and it depends upon the nature of cost unit, nature of operations performed, Time and Motion Study etc. While determining the standard time normal ideal time is allowed for fatigue and other contingencies.

(ii) **Fixation of Standard Rates:** The standard rate fixed for each job will be determined on the basis of methods of wage payment such as Time Wage System, Piece Wage System, Differential Piece Rate System and Premium Plan etc.

### III. Setting Standards for Overheads

The following problems are involved while setting standards for overheads :

- (1) Determination of standard overhead cost
- (2) Estimating the production level of activity to be measured in terms of common base like machine hours, units of production and labour hours.

Setting of overhead standards is divided into fixed overhead, variable overhead and semi-variable overhead. The determination of overhead rate may be calculated as follows :

$$\begin{aligned}
 \text{(a) Standard Overhead Rate} &= \frac{\text{Standard overhead for the budget period}}{\text{Standard Production for the budget period}} \\
 \text{(b) Standard Variable Overhead Rate} &= \frac{\text{Standard overhead for the budget period}}{\text{Standard Production for the budget period}}
 \end{aligned}$$

**Standard Hour:** Usually production is expressed in terms of units, dozen, kgs, pound, litres etc. When productions are of different types, all products cannot be expressed in one unit. Under such circumstances, it is essential to have a common unit for all the products. Time factor is common to all the operation. ICMA, London, defines a Standard Time as a "hypothetical unit pre-established to represent the amount of work which should be performed in one hour at standard performance."

**Standard Cost Card:** After fixing the Standards for direct material, direct labour and overhead cost, they are recorded in a Standard Cost Card. This Standard cost is presented for each unit cost of a product. The total Standard Cost of manufacturing a product can be obtained by aggregating the different Standard Cost Cards of different processes. These Cost Cards are useful to the firm in production planning and pricing policies.

## VARIANCE ANALYSIS

Standard Costing guides as a measuring rod to the management for determination of "Variances" in order to evaluate the production performance. The term "Variances" may be defined as the difference between Standard Cost and actual cost for each element of cost incurred during a particular period. The term "Variance Analysis" may be defined as the process of analyzing variance by subdividing the total variance in such a way that management can assign responsibility for off-Standard Performance.

The variance may be favourable variance or unfavourable variance. When the actual performance is better than the Standard, it resents "Favourable Variance." Similarly, where actual performance is below the standard it is called as "Unfavourable Variance."

Variance analysis helps to fix the responsibility so that management can ascertain —

- (a) The amount of the variance
- (b) The reasons for the difference between the actual performance and budgeted performance

- (c) The person responsible for poor performance
- (d) Remedial actions to be taken

**Types of Variances :** Variances may be broadly classified into two categories (A) Cost Variance and (B) Sales Variance.

### (A) Cost Variance

Total Cost Variance is the difference between Standards Cost for the Actual Output and the Actual Total Cost incurred for manufacturing actual output. The Total Cost Variance Comprises the following :

- I. Direct Material Cost Variance (DMCV)
- II. Direct Labour Cost Variance (DLCV)
- III. Overhead Cost Variance (OCV)

### I. Direct Material Variances

Direct Material Variances are also termed as Material Cost Variances. The Material Cost Variance is the difference between the Standard cost of materials for the Actual Output and the Actual Cost of materials used for producing actual output. The Material Cost Variance is calculated as:

$$\begin{aligned}
 \text{Material Cost Variance} &= \text{Standard Cost} - \text{Actual Cost} \\
 \text{MCV} &= \text{SC} - \text{AC} \\
 \text{(or)} \\
 \text{MCV} &= \left\{ \begin{array}{cc} \text{Standard} & \text{Standard} \\ \text{Quantity} & \times \text{Price} \end{array} \right\} - \left\{ \begin{array}{cc} \text{Actual} & \text{Actual} \\ \text{Quantity} & \times \text{Price} \end{array} \right\} \\
 &= (\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})
 \end{aligned}$$

**Note :** If the actual costs is more than standard cost the variance will be unfavourable or adverse variance and, on the other hand, if the actual cost is less than standard cost the variance will be favourable variance. The material cost variance is further classified into :

- (1) Material Price Variance
- (2) Material Usage Variance
- (3) Material Mix Variance
- (4) Material Yield Variance

**(1) Material Price Variance (MPV) :** Material Price Variance is that portion of the Material Cost Variance which is due to the difference between the Standard Price specified and the Actual Price paid for purchase of materials. Material Price Variance may be calculated by

$$\begin{aligned}
 \text{Material Price Variance} &= \text{Actual Quantity} \times \left\{ \begin{array}{cc} \text{Standard} & \text{Actual} \\ \text{Price} & - \text{Price} \end{array} \right\} \\
 \text{MPV} &= \text{AQ} (\text{SP} - \text{AP})
 \end{aligned}$$

**Note :** If actual cost of materials used is more than the standard cost the variance is adverse, it represents negative (-) symbol. And on the other hand, if the variance is favourable it is to be represented by positive (+) symbol.

**(2) Material Usage Variance (MUV):** Material Usage Variance is that part of Material Cost Variance which refers to the difference between the standard cost of standard quantity of material for actual output and the Standard cost of the actual material used. Material Usage Variance is calculated as follows :

$$\begin{aligned}\text{Material Usage Variance} &= \text{Standard Price} \times \left\{ \text{Standard Quantity} - \text{Actual Quantity} \right\} \\ \text{MUV} &= \text{SP (SQ - AQ)}\end{aligned}$$

**Note :** This Variance will be favourable when standard cost of actual material is more than the Standard material cost for actual output, and Vice Versa.

**(3) Material Mix Variance (MMV) :** It is the portion of the material usage variance which is due to the difference between the Standard and the actual composition of mix. Material Mix Variance is calculated under two situations as follows :

(a) When actual weight of mix is equal to standard weight to mix

(b) When actual weight of mix is different from the standard mix .

**(a) When Actual Weight and Standard Weight of Mix are equal :**

(i) The formula is used to calculate the Variance :

$$\begin{aligned}\text{Material Mix Variance} &= \text{Standard Price} \left\{ \text{Standard Quantity} - \text{Actual Quantity} \right\} \\ \text{MMV} &= \text{SP (SQ - AQ)}\end{aligned}$$

(ii) In case standard quantity is revised due to shortage of a particular category of materials, the formula will be changed as follows :

$$\begin{aligned}\text{Material Mix Variance} &= \text{Standard Price} \left\{ \text{Revised Standard Quantity} - \text{Actual Quantity} \right\} \\ \text{MMV} &= \text{SP (RSQ - AQ)}\end{aligned}$$

**(b) When Actual Weight and Standard Weight of Mix are different :**

(i) The formula used to calculate the Variance is :

$$\text{Material Mix Variance} = \left\{ \frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Standard Mix}} \times \text{Standard Cost Standard Mix} \right\} - \left\{ \frac{\text{Standard Cost of Actual Mix}}{\text{Actual Mix}} \right\}$$

(ii) In case the standard is revised due to the shortage of a particular category of materials, the alternative formula will be as follows :

$$\text{Material Mix Variance} = \left\{ \frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Standard Mix}} \times \text{Standard Cost of Revised Standard Mix} \right\} - \left\{ \frac{\text{Standard Cost of Actual Mix}}{\text{Actual Mix}} \right\}$$

**(4) Materials Yield Variance (MYV):** It is the portion of Material Usage Variance. This variance arises due to spoilage, low quality of materials and defective production planning etc. Materials Yield



Variance may be defined as “the difference between the Standard Yield Specified and the Actual Yield Obtained.” This variance may be calculated as under :

$$\text{Material Yield Variance} = \frac{\text{Standard Rate}}{\text{Standard Yield}} \times \left\{ \frac{\text{Actual Yield} - \text{Standard Yield}}{\text{Standard Yield}} \right\}$$

Where :

Standard Rate is calculated as follows :

$$\text{Standard Rate} = \frac{\text{Standard Cost of Standard Mix}}{\text{Net Standard Output}}$$

### Verification :

The following equations may be used for verification of Material Cost Variances :

- (1) Material Cost Variance = Material Price Variance + Material Usage Variance
- (2) Material Usage Variance = Material Mix Variance – Material Yield Variance
- (3) Material Cost Variance = Material Mix Variance + Material Yield Variance

### Illustration: 1

Calculate Material Cost Variance from the following information :

Standard Price of material per kg = Rs. 4

Standard Usage of materials = 800 kgs

Actual Usage of materials = 920 kgs

Actual Price of materials per kg = Rs. 3

Actual Cost of materials Rs. 2,760

Standard cost of material for actual production Rs. 3,200

### Solution:

$$\begin{aligned} (1) \quad \text{Material Cost Variance} &= \left\{ \frac{\text{Standard Price}}{\text{Standard Quantity}} \times \frac{\text{Standard Quantity}}{\text{Standard Quantity}} \right\} - \left\{ \frac{\text{Actual Price}}{\text{Actual Quantity}} \times \frac{\text{Actual Quantity}}{\text{Actual Quantity}} \right\} \\ &= (4 \times 800) - (3 \times 920) \\ &= \text{Rs. } 3,200 - \text{Rs. } 2,760 = \text{Rs. } 440 \text{ (F)} \\ \\ (2) \quad \text{Material Price Variance} &= \frac{\text{Actual Quantity}}{\text{Actual Quantity}} \times \left\{ \frac{\text{Standard Price}}{\text{Standard Price}} - \frac{\text{Actual Price}}{\text{Actual Price}} \right\} \\ &= 920 (4 - 3) \\ &= 920 \times \text{Rs. } 1 = \text{Rs. } 920 \text{ (F)} \\ \\ (3) \quad \text{Material Usage Variance} &= \frac{\text{Standard Price}}{\text{Standard Price}} \times \left\{ \frac{\text{Standard Quantity}}{\text{Standard Quantity}} - \frac{\text{Actual Quantity}}{\text{Actual Quantity}} \right\} \\ &= 4 (800 - 920) \\ &= 4 \times 120 = \text{Rs. } 480 \text{ (A)} \end{aligned}$$

**Illustration: 2**

From the following particulars calculate:

- (a) Material Cost Variance
- (b) Material Price Variance
- (c) Material Usage Variance
- (d) Material Mix Variance

**The Standard Mix of Product is :**

- X 300 Units at Rs. 7.50 per unit
- Y 400 Units at Rs. 10 per unit
- Z 500 Units at Rs. 12.50 per unit

**The Actual Consumption was :**

- X 320 Units at Rs. 10 per unit
- Y 480 Units at Rs. 7.50 per unit
- Z 420 Units at Rs. 15 per unit

**Solution:**

**Standard Cost of Standard Materials :**

X	300	x 7.50	=	Rs. 2,250
Y	400	x 10	=	Rs. 4,000
Z	500	x 12.50	=	Rs. 6,250
	<u>1,200</u>			<u>Rs. 12,500</u>

**Actual Cost of Actual Materials :**

X	320	x 10	=	Rs. 3,200
Y	480	x 7.50	=	Rs. 3,600
Z	420	x 15	=	Rs. 6,300
	<u>1,220</u>			<u>Rs. 13,100</u>

**Revised Quantity :**

$$\begin{aligned}
 X &= \frac{1,220}{1,200} \times 300 = 305 \text{ units} \\
 Y &= \frac{1,220}{1,200} \times 400 = 406.66 \text{ units} \\
 Z &= \frac{1,220}{1,200} \times 500 = 508.33 \text{ units}
 \end{aligned}$$

**Calculation of Variance :**

(a) *Material Cost Variance*

$$\begin{aligned}
 &= \text{Standard Cost} - \text{Actual Cost} \\
 &= \text{Rs. 12500} - \text{Rs. 13100} = \text{Rs. 600 (A)}
 \end{aligned}$$

(b) *Material Price Variance*

$$= \text{Actual Quantity} \times \left\{ \begin{array}{cc} \text{Standard Price} & - & \text{Actual Price} \end{array} \right\}$$

		=	(or) AQ (SP – AP)
X	=	320 (7.50 – 10)	= Rs. 800 (A)
Y	=	480 (10 – 7.50)	= Rs. 1200 (F)
Z	=	420 (12.50 – 15)	= Rs. 1050 (A)
Material Price Variance		=	<u>Rs. 650 (A)</u>
(c) Material Usage Variance		=	Standard Price . x $\left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\}$
		=	SP (SQ – AQ)
X	=	7.50 (300 – 320)	= Rs. 150 (A)
Y	=	10 (400 – 480)	= Rs. 800 (A)
Z	=	12.50 (500 – 420)	= <u>Rs. 1000 (F)</u>
Material Mix Variance		=	<u>Rs. 50 (F)</u>
(d) Material Mix Variance		=	Standard Price x $\left\{ \begin{array}{l} \text{Revised Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\}$
		=	SP (RSQ – AQ)
X	=	7.50 (305 – 320)	= Rs. 112.50 (A)
Y	=	10 (407 – 480)	= Rs. 730 (A)
Z	=	12.50 (508 – 420)	= <u>Rs. 1100 (F)</u>
Material Mix Variance		=	<u>Rs. 257.50 (F)</u>

**Illustration: 3**

X Y Z products Company produces a gasoline additive Gas Gain. This product increases engine efficiency and improves gasoline mileage by creating a more complex burn in the combustion process.

Careful controls are required during the production process to ensure that the proper mix of input chemicals is achieved and that evaporation is controlled. If controls are not effective, there can be loss of output and efficiency.

The Standard cost of producing a 500 litre batch of Gas Gain is Rs.6075. The Standard Material Mix and related standard cost of each chemical used in a 500 litre batch as follows :

Chemicals	Mix Litres	Standard Purchase Price Rs.	Standard Cost Rs.
Echol	200	9	1800
Protex	100	19.125	1912.50
Benz	250	6.75	1687.50
CT – 40	50	13.50	675
Total	600		6075

The quantities of chemicals purchased and used during the current production period are shown below. A total of 140 batches of Gas Gain were manufactured during the current production period. X Y Z products company determines its costs and chemical usage variations at the end of each production period.

Chemical	Quantity used (in Litres)
Echol	26,600
Protex	12,880
Benz	37,800
CT – 40	7,140
Total	84,420

**Required :** Compute the total material usage variance and then breakdown this variance into mix and yield components.

**Solution:****A. Standard Cost of Standard Mix for actuals of 140 batches**

<i>Chemicals</i>	<i>Standard Mix</i>	<i>Standard Cost per unit Rs.</i>	<i>Standard Cost Rs.</i>
Echol	200 Litres x 140 = 28,000 Litres	9	2,52,000
Protex	100 Litres x 140 = 14,000 Litres	19.125	2,67,750
Benz	250 Litres x 140 = 35,000 Litres	6.75	2,36,250
CT – 40	50 Litres x 140 = 7,000 Litres	13.50	94,500
Total	84,000 Litres		Rs. 8,50,500

**B. Standard Cost of Actual Mix for Actual of 140 batches**

<i>Chemicals</i>	<i>Actual Quantity used</i>	<i>Standard Per unit (Liters)</i>	<i>Standard Cost of Actual Quantity</i>
Echol	26,600 Liters	Rs. 9	Rs. 2,39,400
Protex	12,880 Liters	Rs. 19.125	Rs. 2,46,330
Benz	37,800 Liters	Rs. 6.75	Rs. 2,55,150
CT – 40	7,140 Liters	Rs. 13.50	Rs. 96,390
Total	84,420 Liters		Rs. 8,37,270

**Material Usage Variance**

<i>Chemical</i>	<i>Standard Cost of Standard Mix for = Actual output of 140 Batches</i>	<i>( — )</i>	<i>Standard Cost of Actual Mix for Actual output</i>
Echol	Rs. 2,52,000	( — )	Rs. 2,39,400 = Rs. 12,600 (F)
Protex	Rs. 2,67,750	( — )	Rs. 2,46,330 = Rs. 21,420 (F)
Benz	Rs. 2,36,250	( — )	Rs. 2,55,150 = Rs. 18,900 (A)
CT – 40	Rs. 94,500	( — )	Rs. 96,390 = Rs. 1,890 (A)
Total	Rs. 8,50,500	( — )	Rs. 8,37,270 = Rs. 13,230 (F)

**Standard Cost of Standard Mix for Actual Input (84,420 Litres)**

<i>Chemical</i>	<i>Standard Mix in Actual Quantity</i>	<i>Standard Cost Per unit (Litres)</i>	<i>Standard Cost of Standard Mix in Actual Quantity</i>
Echol	= $\frac{200}{600}$ x 84,420 = 28,140 Litres	Rs. 9	Rs. 2,53,260
Protex	= $\frac{100}{600}$ x 84,420 = 14,070 Litres	Rs. 19.125	Rs. 2,69,088.75
Benz	= $\frac{250}{600}$ x 84,420 = 35,175 Litres	Rs. 6.75	Rs. 2,37,431.25

Echol	= $\frac{50}{600} \times 84,420$		
	= 7,035 Litres	Rs. 13.50	Rs. 94,972.50
Total	84,420 Litres		Rs. 8,54,752.50

**Material Mix Variance**

Chemical	Standard Cost of Standard Mix in = Actual input used	( — )	Standard Cost of Actual Mix in Actual input used (Rs.)
Echol	Rs. 2,53,260	( — )	Rs. 2,39,400 = Rs. 13,860 (F)
Protex	Rs. 2,69,088.55	( — )	Rs. 2,46,330 = Rs. 22,758.75 (F)
Benz	Rs. 2,37,431.25	( — )	Rs. 2,55,150 = Rs. 17,718.75 (A)
CT – 40	Rs. 94,972.50	( — )	Rs. 96,390 = Rs. 1,417.50 (A)
Total	Rs. 8,54,752.50		Rs. 8,37,270 = Rs. 17,482.50 (F)

**Material Yield Variance :**

$$\begin{aligned}
 &= \text{Standard Rate} \left\{ \begin{array}{l} \text{Actual} \\ \text{Output} \end{array} - \begin{array}{l} \text{Output Expected} \\ \text{from Actual input} \end{array} \right\} \\
 &= \frac{\text{Rs. 8,50,500}}{140 \text{ batches}} \left\{ 140 - \frac{84,420 \text{ Litres}}{600 \text{ Ltrs / batch}} \right\} \\
 &= \text{Rs. 6,075 (140 – 140.7 batches)} \\
 &= \text{Rs. 4,252.50 (A)}
 \end{aligned}$$

**II. Labour Variances**

Labour Variances can be classified into:

- Labour Cost Variance (LCV)
- Labour Rate Variance or Wage Rate Variance
- Labour Efficiency Variance
- Labour Idle Time Variance
- Labour Mix Variance
- Labour Revised Efficiency Variance
- Labour Yield Variance

(a) **Labour Cost Variance (LCV):** Labour Cost Variance is the difference between the Standard Cost of labour allowed for the actual output achieved and the actual wages paid. It is also termed as Direct Wage Variance or Wage Variance. Labour Cost Variance is calculated as follows:

$$\text{Labour Cost Variance} = \text{Standard Cost of Labour} - \text{Actual Cost of Labour}$$

(or)

$$\text{Labour Cost Variance} = \left\{ \begin{array}{l} \text{Standard} \\ \text{Rate} \end{array} \times \begin{array}{l} \text{Standard Time} \\ \text{for Actual Output} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual} \\ \text{Rate} \end{array} \times \begin{array}{l} \text{Actual} \\ \text{Time} \end{array} \right\}$$

**Note :** If actual labour cost is more than the standard labour cost, the variance represents negative and vice versa.

**(b) Labour Rate Variance:** It is that part of labour cost variance which is due to the difference between the standard rate specified and the actual rate paid. This variances arise from the following reasons :

- (a) Change in wage rate.
- (b) Faulty recruitment.
- (c) Payment of overtime.
- (d) Employment of casual workers etc.

It is expressed as follows :

$$\text{Labour Rate Variance} = \text{Actual Time} \left\{ \begin{array}{cc} \text{Standard} & \text{Actual} \\ \text{Rate} & - \text{Rate} \end{array} \right\}$$

**Note :** If the Standard rate is higher than the actual rate, the variance will be favourable and vice versa.

**(c) Labour Efficiency Variance:** Labour Efficiency Variance otherwise known as Labour Time Variance. It is that portion of the Labour Cost Variance which arises due to the difference between standard labour hours specified and the actual labour hours spent. The usual reasons for this variance are (a) poor supervision (b) poor working condition (c) increase in labour turnover (d) defective materials. It may be calculated as following:

**Note :** If actual time taken is more than the specified standard time, the variance represents unfavourable and vice versa.

**(d) Labour Idle Time Variance:** Labour Idle Time Variance arises due to abnormal situations like strikes, lockout, breakdown of machinery etc. In other words, idle time occurs due to the difference between the time for which workers are paid and that which they actually expend upon production. It is calculated as follows :

$$\text{Idle Time Variance} = \text{Idle Hours} \times \text{Standard Rate}$$

**(e) Labour Mix Variance:** It is otherwise known as Gang Composition Variance. This variance arises due to the differences between the actual gang composition than the standard gang composition. Labour Mix Variance is calculated in the same way of Materials Mix Variance. This variance is calculated in two ways :

- (i) When Standard Labour Mix is equal to Actual Labour Mix.
- (ii) When Standard Labour mix is different from Actual Labour Mix.
- (i) **When Standard and actual times of the labour mix are same :** The formula for its computation may be as follows :

$$\text{Labour Mix Variance} = \left\{ \begin{array}{cc} \text{Standard Cost of} & \text{Standard Cost of} \\ \text{Standard Labour Mix} & - \text{Actual Labour Mix} \end{array} \right\}$$

- (ii) **When Standard and actual times of the labour mix are different :** Changes in the composition of a gang may arise due to shortage of a particular grade of labour. It may be calculated as follows :

$$\text{Labour Mix Variance} = \left\{ \frac{\text{Revised Standard}}{\text{Time}} - \frac{\text{Actual}}{\text{Time}} \right\} \times \left\{ \frac{\text{Standard}}{\text{Rate}} \right\}$$

Where :

$$\text{Revised Standard Time} = \frac{\text{Total Actual Time}}{\text{Total Standard Time}} \times \text{Actual Time}$$

**(f) Labour Yield Variance:** This variance is calculated in the same way as Material Yield Variance. Labour Yield Variance arises due to the variation in labour cost on account of increase or decrease in yield or output as compared to relative standard. The formula for this purpose is as follows :

$$\text{Labour Yield Variance} = \frac{\text{Standard Labour Cost per unit of output}}{\text{Standard output for Actual Time}} \times \left\{ \frac{\text{Standard output}}{\text{for Actual Time}} - \frac{\text{Actual}}{\text{Output}} \right\}$$

**Note :** If actual output is more than Standard output for actual time, the variance is favourable and vice versa.

**Verification :** Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance

#### Illustration: 4

From the following particulars, calculate Labour Variance:

Standard hours = 200

Standard rate for actual production = Re. 1 per hour

Actual hour = 190

Actual Rate = Rs. 1.25 per hour

**Solution:**

$$\begin{aligned} (1) \text{ Labour Cost Variance} &= \left\{ \frac{\text{Standard}}{\text{Hours}} \times \frac{\text{Standard}}{\text{Rate}} \right\} - (\text{Actual hours} \times \text{Actual Rate}) \\ (\text{or}) &= (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR}) \\ &= (200 \times \text{Re.1}) - (190 \times \text{Rs. 1.25}) \\ &= \text{Rs. 200} - \text{Rs. 237.50} = \text{Rs. 37.50 (A)} \end{aligned}$$

$$\begin{aligned} (2) \text{ Labour Rate Variance} &= \left\{ \frac{\text{Standard}}{\text{Rate}} - \frac{\text{Actual}}{\text{Rate}} \right\} \times \text{Actual hours} \\ &= (\text{Re. 1} - \text{Rs. 1.25}) \times 190 \\ &= \text{Rs. 0.25} \times 190 = \text{Rs. 47.50 (A)} \end{aligned}$$

$$\begin{aligned} (3) \text{ Labour Efficiency Variance} &= \left\{ \frac{\text{Standard}}{\text{Hours}} - \frac{\text{Actual}}{\text{Hours}} \right\} \times \text{Standard Rate} \\ &= (200 - 190) \times \text{Re. 1} \\ &= 10 \times \text{Re. 1} = \text{Rs. 10 (F)} \end{aligned}$$

**Verification:**

$$\begin{aligned} \text{Labour Cost Variance} &= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} \\ \text{Rs. 37.50 (A)} &= \text{Rs. 47.50 (A)} + \text{Rs. 10 (F)} \\ \text{Rs. 37.50 (A)} &= \text{Rs. 37.50 (A)} \end{aligned}$$

**Illustration: 5**

The details regarding the composition and the weekly wage rates of labour force engaged on a job scheduled to be completed in 30 weeks are as follows :

Category of Workers	Standard		Actual	
	No. of workers	Weekly wage Rate per worker	No. of workers	Weekly wage Rate per worker
Skilled	75	60	70	70
Semi-Skilled	45	40	30	50
Unskilled	60	30	80	20

The work was actually completed in 32 weeks. Calculate the various labour variances.

**Solution:**

(1) Labour Cost Variance = Standard Labour Cost – Actual Labour Cost

**Calculation of Standard Labour Cost :****Category of Standard Workers :**

				Week			Rate Rs.			Amount Rs.	
Skilled	=	75	x	30	=	2,250	x	60	=	1,35,000	
Semi Skilled	=	45	x	30	=	1,350	x	40	=	54,000	
Unskilled	=	60	x	30	=	1,800	x	30	=	54,000	
						<u>5,400</u>				<u>2,43,000</u>	

**Calculation of Actual Labour Cost :**

		Actual Week					Rate Rs.		Amount Rs.
Skilled	=	75	x	32	= 2,240	x	70	=	1,56,800
Semi Skilled	=	30	x	32	= 960	x	50	=	48,000
Unskilled	=	80	x	32	= 2,560	x	20	=	51,200
					<u>5,760</u>				<u>2,56,000</u>

(1) Labour Cost Variance	=	Standard Labour - Actual Labour Cost	
	=	2,43,000 – 2,56,000 = Rs. 13,000 (A)	
(2) Labour Rate Variance	=	(Standard Rate – Actual Rate) x Actual Time	
Skilled	=	(Rs. 60 – Rs. 70) x 2,240	= Rs. 22,400 (A)
Semi Skilled	=	(Rs. 40 – Rs. 50) x 960	= Rs. 9,600 (A)
Unskilled	=	(Rs. 30 – Rs. 20) x 2,560	= Rs. 25,600 (F)
		Labour Rate Variance	= <u>Rs. 6,400 (A)</u>
(3) Labour Efficiency Variance	=	$\left\{ \begin{array}{l} \text{Standard} \\ \text{Time} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Time} \end{array} \right\} \times \text{Standard Rate}$	
Skilled	=	(2,250 – 2,240) x 60	= Rs. 600 (F)
Semi Skilled	=	(1,350 – 960) x 40	= Rs. 15,600 (F)
Unskilled	=	(1,800 – 2,560) x 30	= Rs. 22,800 (A)
		Labour Efficiency Variance	= <u>Rs. 6,600 (A)</u>



$$(4) \text{ Labour Mix Variance} = \left\{ \frac{\text{Revised Standard Time}}{\text{Total Standard Time}} - \frac{\text{Actual Time}}{\text{Total Standard Time}} \right\} \times \text{Standard Rate}$$

Where :

$$\begin{aligned} \text{Revised Standard Time} &= \frac{\text{Standard Time}}{\text{Total Standard Time}} \times \text{Actual Time} \\ \text{Skilled} &= \frac{2,250}{5,400} \times 5,760 = 2,400 \text{ hours} \\ \text{Semi Skilled} &= \frac{1,350}{5,400} \times 5,760 = 1,440 \text{ hours} \\ \text{Unskilled} &= \frac{1,800}{5,400} \times 5,760 = 1,920 \text{ hours} \end{aligned}$$

#### Labour Mix Variance

$$\begin{aligned} \text{Skilled} &= (2,400 - 2,240) \times 60 = \text{Rs. } 9,600 \text{ (F)} \\ \text{Semi Skilled} &= (1,440 - 960) \times 40 = \text{Rs. } 19,200 \text{ (F)} \\ \text{Unskilled} &= (1,920 - 2,560) \times 30 = \text{Rs. } 19,200 \text{ (A)} \\ \text{Labour Mix Variance} &= \text{Rs. } 9,600 \text{ (F)} \end{aligned}$$

$$(5) \text{ Labour Revised Efficiency Variance} = \left\{ \frac{\text{Standard Time}}{\text{Total Standard Time}} - \frac{\text{Revised Standard Time}}{\text{Total Standard Time}} \right\} \times \text{Standard Rate}$$

$$\begin{aligned} \text{Skilled} &= (2,250 - 2,400) \times \text{Rs. } 60 = \text{Rs. } 9,000 \text{ (A)} \\ \text{Semi Skilled} &= (2,350 - 1,440) \times \text{Rs. } 40 = \text{Rs. } 3,600 \text{ (A)} \\ \text{Unskilled} &= (1,800 - 1,920) \times \text{Rs. } 30 = \text{Rs. } 300 \text{ (A)} \\ \text{Labour Revised Efficiency Variance} &= \text{Rs. } 16,200 \text{ (A)} \end{aligned}$$

#### Verification :

$$\begin{aligned} (1) \text{ Labour Cost Variance} &= \frac{\text{Labour Rate Variance}}{\text{Variance}} + \frac{\text{Labour Efficiency Variance}}{\text{Variance}} \\ \text{Rs. } 13,000 \text{ (A)} &= \text{Rs. } 6,400 \text{ (A)} + \text{Rs. } 6,600 \text{ (A)} \\ \text{Rs. } 13,000 \text{ (A)} &= \text{Rs. } 13,000 \text{ (A)} \end{aligned}$$

$$\begin{aligned} (2) \text{ Labour Efficiency Variance} &= \frac{\text{Labour Mix Variance}}{\text{Variance}} + \frac{\text{Labour Revised Variance}}{\text{Variance}} \\ \text{Rs. } 6,600 \text{ (A)} &= \text{Rs. } 9,600 \text{ (F)} + \text{Rs. } 16,200 \text{ (A)} \\ \text{Rs. } 6,600 \text{ (A)} &= \text{Rs. } 6,600 \text{ (A)} \end{aligned}$$

### III. Overhead Variances

Overhead may be defined as the aggregate of indirect material cost, indirect labour cost and indirect expenses. Overhead Variances may arise due to the difference between standard cost of overhead for actual production and the actual overhead cost incurred. The Overhead Cost Variance may be calculated as follows :

$$\text{Overhead Cost Variance} = \left\{ \begin{array}{c} \text{Standard Overhead} \\ \text{Rate Per Unit} \end{array} - \begin{array}{c} \text{Actual Overhead} \\ \text{Cost} \end{array} \right\} \times \text{Actual Output}$$

(or)

$$\left\{ \begin{array}{c} \text{Standard Hours for} \\ \text{Actual Output} \end{array} \times \begin{array}{c} \text{Standard Overhead} \\ \text{Rate Per Hour} \end{array} \right\} - \text{Actual Overhead Cost}$$

**Essentials of Certain Terms :** For the purpose of measuring various Overhead Variances it is essential to know certain technical terms related to overheads are given below :

- (a) Standard Overhead Rate per unit =  $\frac{\text{Budgeted Overheads}}{\text{Budgeted Output}}$
- (b) Standard Overhead Rate per hour =  $\frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}}$
- (c) Standard Output for Actual Time =  $\frac{\text{Budgeted Output}}{\text{Budgeted Hours}} \times \text{Actual Hours}$
- (d) Standard Hours for Actual Output =  $\frac{\text{Budgeted Hours}}{\text{Budgeted Output}} \times \text{Actual Output}$
- (e) When Output is measured in Standard Hours
- $$\text{Recorded Overheads} = \frac{\text{Standard Rate}}{\text{Per Hour}} \times \text{Standard Hours for Actual Output}$$

**When Output is measured in Units:**

- Absorbed Overheads =  $\frac{\text{Standard Rate}}{\text{Per Unit}} \times \text{Budgeted Output In Units}$
- (f) Budgeted Overheads =  $\frac{\text{Standard Rate}}{\text{Per Unit}} \times \text{Budgeted Output In Units}$
- (or)
- =  $\frac{\text{Standard Rate}}{\text{Per Hour}} \times \text{Budgeted Hours}$
- (g) Actual Overheads =  $\frac{\text{Actual Rate}}{\text{Per unit}} \times \text{Actual Output in units}$
- (or)
- =  $\frac{\text{Actual Rate}}{\text{Per Hour}} \times \text{Actual Hours}$

$$\begin{aligned}
 \text{(h) Standard Overheads} &= \frac{\text{Standard Rate}}{\text{Per unit}} \times \frac{\text{Standard Output}}{\text{for Actual Time}} \\
 &\quad \text{(or)} \\
 &= \frac{\text{Standard Rate}}{\text{Per unit}} \times \text{Actual Hours}
 \end{aligned}$$

**Note :** The term Budgeted Overheads and Standard Overheads are not used in the same sense. It is assumed that the term Budgeted and Standard are used interchangeably. In other words, Budgeted Overheads are used for budgeted time or budgeted output and standard overheads are used for actual time or budgeted output in actual time.

### Classification of Overhead Variance

Overhead Variances can be classified as :

#### I. Variable Overhead Variances:

- (1) Variable Overhead Cost Variance
- (2) Variable Overhead Expenditure Variance
- (3) Variable Overhead Efficiency Variance

#### II. Fixed Overhead Variance:

- (a) Fixed Overhead Cost Variance
- (b) Fixed Overhead Expenditure Variance
- (c) Fixed Overhead Volume Variance
- (d) Fixed Overhead Capacity Variance
- (e) Fixed Overhead Efficiency Variance
- (f) Fixed Overhead Calendar Variance

#### I. Variable Overhead Variances:

**(1) Variable Overhead Cost Variance:** This is the difference between standard variable overhead for actual production and the actual variable overhead incurred. The formula is as follows :

$$\text{Variable Overhead Cost Variance} = \left\{ \frac{\text{Standard Variable Overhead}}{\text{For Actual Output}} \right\} - \left\{ \frac{\text{Actual Variable Overheads}}{\text{Overheads}} \right\}$$

**(2) Variable Overhead Expenditure Variance:** It is the difference between standard variable overheads allowed for actual hours worked and the actual variable overhead incurred. This variable may be calculated as follows :

$$\begin{aligned}
 \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Expenditure Variance} \end{array} \right\} &= \left\{ \frac{\text{Standard Variable Overhead}}{\text{Rate Per our}} - \frac{\text{Actual Variable Overheads Rate}}{\text{per hour}} \right\} \times \left\{ \frac{\text{Actual}}{\text{Time}} \right\} \\
 &\quad \text{(or)} \\
 &= \left\{ \frac{\text{Standard Variable Overheads}}{\text{Overheads}} - \frac{\text{Actual Variable Overheads}}{\text{Overheads}} \right\}
 \end{aligned}$$

**(3) Variable Overhead Efficiency Variance:** This variance arises due to the difference between variable overhead recovered from actual output produced and the standard variable overhead for actual hours worked. The formula is as follows :

$$\left. \begin{array}{l} \text{Variable Overhead} \\ \text{Efficiency Variance} \end{array} \right\} = \frac{\text{Standard Rate}}{\text{Per Hour}} \times \left\{ \begin{array}{l} \text{Standard Hours} \\ \text{for Actual Production} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Hours} \end{array} \right\}$$

**Verification :**

$$\begin{array}{l} \text{Variable Overhead} \\ \text{Cost Variance} \end{array} = \begin{array}{l} \text{Variable Overhead} \\ \text{Expenditure Variance} \end{array} + \begin{array}{l} \text{Variable Efficiency} \\ \text{Variance} \end{array}$$

**Illustration: 6**

From the following particulars, compute the Variable Overhead Variances :

	<i>Standard</i>	<i>Actual</i>
Output in Units	2,500 units	2,000 units
Labour Hours	5,000	6,000
Variable Overheads	Rs. 1,000	Rs. 1,500

**Solution:**

$$\begin{aligned} \left. \begin{array}{l} \text{Standard Variable} \\ \text{Overhead rate per hour} \end{array} \right\} &= \frac{\text{Budgeted Variable Overhead}}{\text{Budgeted Hours}} \\ &= \frac{1,000}{5,000} = 0.20 \text{ per hour} \\ \left. \begin{array}{l} \text{Standard Variable} \\ \text{Overhead rate per} \\ \text{Unit of output} \end{array} \right\} &= \frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} \\ &= \frac{1,000}{2,500} = \text{Rs. } 0.40 \text{ per hour} \end{aligned}$$

**Calculation of Variances:**

$$\begin{aligned} (1) \quad \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Cost Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Actual Variable} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Production} \end{array} \right\} \\ &= 1,500 - (2,000 \times 0.40) \\ &= \text{Rs. } 1,500 - \text{Rs. } 800 = \text{Rs. } 700 \text{ (A)} \\ (2) \quad \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Expenditure Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Actual Variable} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Hours Worked} \end{array} \right\} \\ &= 1,500 - (6,000 \times 0.20) \\ &= \text{Rs. } 1,500 - \text{Rs. } 1,200 = \text{Rs. } 300 \text{ (A)} \\ (3) \quad \left. \begin{array}{l} \text{Variable Overhead} \\ \text{Efficiency Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Hours} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Variable} \\ \text{Overhead for Actual} \\ \text{Output} \end{array} \right\} \\ &= (\text{Rs. } 6,000 \times 0.20) - (2,000 \times 0.40) \\ &= \text{Rs. } 1,200 - \text{Rs. } 800 = \text{Rs. } 400 \text{ (A)} \end{aligned}$$

**Verification:**

$$\left. \begin{array}{l} \text{Variable Overhead} \\ \text{Cost Variance} \end{array} \right\} = \begin{array}{l} \text{Variable Overhead} \\ \text{Expenditure Variance} \end{array} + \begin{array}{l} \text{Variable Overhead} \\ \text{Efficiency Variance} \end{array}$$

$$\begin{array}{l} \text{Rs. 700 (A) =} \\ \text{Rs. 700 (A) =} \end{array} \begin{array}{l} \text{Rs. 300 (A) + Rs. 400 (A)} \\ \text{Rs. 700 (A)} \end{array}$$

**II. Fixed Overhead Variance**

**(a) Fixed Overhead Cost Variance:** It is that portion of overhead cost variance which is due to over absorption or under absorption of overhead for the actual production. In other words, the variance is the difference between the standard fixed overheads allowed for the actual production and the actual fixed overheads incurred. The variance can be calculated as follows:

$$\begin{aligned} \text{Fixed Overhead Cost Variance} &= \left\{ \begin{array}{l} \text{Actual Fixed} \\ \text{Overhead} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overhead for Actual} \\ \text{Production} \end{array} \right\} \\ &\quad \text{(or)} \\ &= \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overhead Rate Per Hour} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual Fixed} \\ \text{Overheads} \end{array} \right\} \times \text{Actual Output} \end{aligned}$$

**(b) Fixed Overhead Expenditure Variance:** This is otherwise termed as “Budget Variance.” It is the difference between the budgeted fixed overheads and the actual fixed overheads incurred during the particular period. The formula for calculation of this Variance is

$$\text{Fixed Overhead Expenditure Variance} = \left\{ \begin{array}{l} \text{Budgeted Fixed} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Actual Fixed} \\ \text{Overheads} \end{array} \right\}$$

**(c) Fixed Overhead Volume Variance:** This Variance is the difference between the budgeted fixed overheads and the standard fixed overheads recovered on the actual production. The formula is as follows:

$$\text{Fixed Overhead Volume Variance} = \left\{ \begin{array}{l} \text{Budgeted Fixed} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overheads on} \\ \text{Actual Production} \end{array} \right\}$$

**Note :** If budgeted fixed overhead is greater than standard fixed overhead on actual production, the variance is unfavourable and vice versa.

**(d) Fixed Overhead Capacity Variance:** This is that portion of volume variance which is due to working at higher or lower capacity than the budgeted capacity. In other words, fixed overhead capacity variance arising due to a particular cause, i.e., unexpected holidays, breakdown of machinery, strikes, power failure etc. This is calculated as follows :

$$\begin{aligned} \left. \begin{array}{l} \text{Fixed Overhead} \\ \text{Capacity Variance} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Actual Hours} \\ \text{Worked} \end{array} - \begin{array}{l} \text{Budgeted} \\ \text{Hours} \end{array} \right\} \times \begin{array}{l} \text{Standard Fixed Overhead} \\ \text{Rate Per Hour} \end{array} \\ &\quad \text{(or)} \\ &= \left\{ \begin{array}{l} \text{Standard Fixed} \\ \text{Overheads} \end{array} \right\} - \left\{ \begin{array}{l} \text{Budgeted Fixed} \\ \text{Overheads} \end{array} \right\} \end{aligned}$$

**(e) Fixed Overhead Efficiency Variance:** It is that portion of the Volume Variance which shows the lower or higher output arising from the efficiency or inefficiency of the workers. This is an outcome of the performance of the workers and is calculated as :

$$\left. \begin{array}{l} \text{Fixed Overhead} \\ \text{Efficiency Variance} \end{array} \right\} = \frac{\text{Standard Fixed Overhead Rate}}{\text{Per Hour}} \times \left\{ \begin{array}{l} \text{Standard} \\ \text{Quantity} \end{array} - \begin{array}{l} \text{Actual} \\ \text{Quantity} \end{array} \right\}$$

**(f) Fixed Overhead Calendar Variance:** This is part of Capacity Variance which is due to the difference between the actual number of working days and the budgeted working days. Calendar Variance can be calculated as follows :

$$\left. \begin{array}{l} \text{Fixed Overhead} \\ \text{Calendar Variance} \end{array} \right\} = \frac{\text{Standard Rate}}{\text{Per hour / Per day}} \times \begin{array}{l} \text{Excess or Deficit hours} \\ \text{or days worked} \end{array}$$

**Note :** If the actual days worked are more than the budgeted working days, the variance is favourable and vice versa.

### Combined Overhead Variances

Analysis of overhead variance can be calculated by combined overhead variances methods. It may be:

- (a) Two Variance Method and
- (b) Three Variance Method

**(a) Two Variance Method :** If the Overhead Variances are analysed on the basis of both expenditure and volume is called as "Two Variance Analysis."

### Illustration: 7

From the following particulars calculate Fixed Overhead Variances :

	<i>Standard</i>	<i>Actual</i>
Output in Units	5,000	5,200
Labour Hours	20,000	20,100
Fixed Overhead	Rs. 10,000	Rs. 10,200

Standard time for one unit 4 hours.

### Solution:

#### Standard Hours for Actual Output

For 1 unit standard time 4 hours  
 For 5,200 units = 5,200 x 4 = 20,800 hours

#### Standard Overhead Rate per Hour

For 1 unit 4 hours  
 For 5,000 units = 5,000 x 4 = 20,000 hours  
 For 20,000 hours Fixed Overhead is Rs. 10,000

$$\text{For 1 hour} = \frac{10,000}{20,000} = \text{Re. } 0.50$$

**Standard Overhead Rate per Unit**

For 500 units Fixed Overhead is Rs. 10,000

$$\text{For 1 unit} = \frac{10,000}{5,000} = \text{Rs. 2 per unit}$$

**(1) Fixed Overhead Cost Variance:**

$$\begin{aligned} &= \frac{\text{Standard Hours for}}{\text{Actual Output}} \times \frac{\text{Standard Overhead}}{\text{Rate Per Hour}} - \text{Actual Overhead} \\ &= (20,800 \times \text{Rs. 0.50}) - \text{Rs. 10,400} \\ &= \text{Rs. 10,400} - 10,200 = \text{Rs. 200 (F)} \end{aligned}$$

**(2) Fixed Overhead Expenditure of Budget Variance:**

$$\begin{aligned} &= \text{Budgeted Fixed Overhead} - \text{Actual Fixed Overhead} \\ &= \text{Rs. 10,000} - \text{Rs. 10,200} = \text{Rs. 200 (A)} \end{aligned}$$

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

$$\begin{aligned} &= (\text{Budgeted Production} - \text{Actual Production}) \times \text{Standard Overhead Rate Per Unit} \\ &= (\text{Rs. 5,000} - 5,200) \times 2 = \text{Rs. 400 (F)} \end{aligned}$$

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

$$\begin{aligned} &= \left\{ \frac{\text{Standard Hours for}}{\text{Actual Production}} - \frac{\text{Actual}}{\text{Hours}} \right\} \times \text{Standard Overhead Rate Per Hour} \\ &= (20,800 - 10,200) \times \text{Rs. 0.50} \\ &= \text{Rs. 350 (F)} \end{aligned}$$

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

$$\begin{aligned} &= (\text{Budgeted Hours} - \text{Actual Hours}) \times \text{Standard Overhead Rate Per Hour} \\ &= (20,000 - 20,100) \times \text{Rs. 0.50} = \text{Rs. 50 (F)} \end{aligned}$$

**Verification:**

(1) Fixed Overhead Cost Variance	=	Expenditure Variance + Volume Variance
Rs. 200 (F)	=	Rs. 200 (A) + Rs. 400 (F)
Rs. 200 (F)	=	Rs. 200 (F)
(2) Fixed Overhead Volume Variance	=	Efficiency Variance + Capacity Variance
Rs. 400 (F)	=	Rs. 350 (F) + Rs. 50 (F)
Rs. 400 (F)	=	Rs. 400 (F)

**Illustration: 8**

Calculate Overhead Variances from the following information :

	Standard	Actual
Fixed Overheads	Rs. 4,000	Rs. 4,250
Variable Overheads	Rs. 6,000	Rs. 5,600
Output in Units	2,000	1,900

**Solution:**

$$\begin{aligned}
 \text{Fixed Overhead Rate Per Unit} &= \frac{\text{Budgeted Fixed Overheads}}{\text{Output in Units}} \\
 &= \frac{4,000}{2,000} = \text{Rs. 2} \\
 \\ 
 \text{Variable Overhead Rate Per Unit} &= \frac{\text{Budgeted Variable Overheads}}{\text{Output in Units}} \\
 &= \frac{6,000}{2,000} = \text{Rs. 3}
 \end{aligned}$$

**(1) Variable Overhead Variance:**

$$\begin{aligned}
 &= (\text{Actual Output} \times \text{Standard Variable Overhead Rate}) - \text{Actual Variable Overhead} \\
 &= (1,900 \times 3) - 5,600 \\
 &= 5,700 - 5,600 = \text{Rs. 100 (F)}
 \end{aligned}$$

**(2) Fixed Overhead Variance:**

$$\begin{aligned}
 &= (\text{Actual Output} \times \text{Standard Fixed Overhead Rate}) - \text{Actual Fixed Overhead} \\
 &= (1,900 \times 2) - 4,250 \\
 &= 3,800 - 4,250 = \text{Rs. 450 (A)}
 \end{aligned}$$

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

$$\begin{aligned}
 &= (\text{Actual Output} \times \text{Standard Rate}) - \text{Budgeted Fixed Overheads} \\
 &= (1,900 \times 2) - 4,000 \\
 &= 3,800 - 4,000 = \text{Rs. 200 (A)}
 \end{aligned}$$

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

$$\begin{aligned}
 &= \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads} \\
 &= \text{Rs. 4,000} - \text{Rs. 4,250} = \text{Rs. 250 (A)}
 \end{aligned}$$

**Illustration: 9**

A Company has normal capacity of 100 machines working 8 hours per day of 25 days in a month. The budgeted fixed overheads of a month are Rs. 1,50,000. The Standard time required to manufacture one unit of product is 4 hours. In a particular month, the company worked for 24 days of 750 machine hours per day and produced 4,500 units of the product. The actual fixed overheads incurred were Rs. 1,45,000. Compute :

- (a) Efficiency Variance
- (b) Capacity Variance
- (c) Calendar Variance
- (d) Expenditure Variance
- (e) Volume Variance
- (f) Total Fixed Overhead Variance



**Solution:**

Standard Hours Produced :

Units Produced	=	4,500 units
Hours Per Unit	=	4 hours
Total Standard Hours	=	4,500 x 4 = 18,000 units

**Calculation of Standard Rate:**

$$\begin{aligned}\text{Standard Rate} &= \frac{1,50,000}{100 \times 25 \times 8} \\ &= \frac{1,50,000}{20,000} = \text{Rs. 7.50 per hour}\end{aligned}$$

Actual hours worked 750 x 24 days = 18,000 hours

Budgeted hours in actual days = 24 x 8 x 100 = 19,200 hours

**Variance Analysis:**

(A) Charged to Production = 18,000 x 7.50 Rs. 1,35,000

(B) Standard Cost of Actual Hours = 18,000 x 7.50 = Rs. 1,35,000

(C) Standard Cost of Budgeted Hours in actual days = 19,200 x 7.50 = Rs. 1,44,000

(D) Budget = Rs. 1,50,000

(E) Actuals = Rs. 1,45,000

(1) Efficiency Variance (A – B)	=	Rs. 1,35,000 – Rs. 1,35,000	= Nil
(2) Capacity Variance (B – C)	=	Rs. 1,35,000 – Rs. 1,44,000	= Rs. 9,000 Adverse
(3) Calendar Variance (C – D)	=	Rs. 1,44,000 – Rs. 1,50,000	= Rs. 6,000 Adverse
(4) Volume Variance (A – D)	=	Rs. 1,35,000 – Rs. 1,50,000	= Rs. 15,000 Adverse
(5) Expense Variance (D – E)	=	Rs. 1,50,000 – Rs. 1,45,000	= Rs. 5,000 Favourable
(6) Total Variances (A – E)	=	Rs. 1,35,000 – Rs. 1,45,000	= Rs. 10,000 Adverse

**(B) Sales Variances**

The Variances so far analysed are related to the cost of goods sold. Quantum of profit is derived from the difference between the cost and sales revenue. Cost Variances influence the amount of profit favourably or adversely depending upon the cost from materials, labour and overheads. In addition, it is essential to analyse the difference between actual sales and the targeted sales because this difference will have a direct impact on the profit and sales. Therefore the analysis of sales variances is important to study profit variances.

**Sales Variances can be calculated by Two methods:**

- I. Sales Value Method.
- II. Sales Margin or Profit Method.

## I. Sales Value Method

The method of computing sales variance is used to denote variances arising due to change in sales price, sales volume or the sales value. The sales variances may be classified as follows :

- (a) Sales Value Variance
- (b) Sales Price Variance
- (c) Sales Volume Variance
- (d) Sales Mix Variance
- (e) Sales Quantity Variance

**(a) Sales Value Variance:** This Variance refers to the difference between budgeted sales and actual sales. It may be calculated as follows :

$$\text{Sales Value Variance} = \text{Actual Value of Sales} - \text{Budgeted Value of Sales}$$

**Note :** If the actual sales is more than the budgeted sales, the variance will be favourable and vice versa.

**(b) Sales Price Variance:** This is the portion of Sales Value Variance which is due to the difference between standard price of actual quantity and actual price of the actual quantity of sales. The formula is :

$$\text{Sales Price Variance} = \text{Actual Quantity} \times (\text{Standard Price} - \text{Actual Price})$$

**Note :** If the actual price is more than standard price the variance is favourable and vice versa.

**(c) Sales Volume Variance:** It is that part of Sales Value Variance which is due to the difference between the actual quantity or volume of sales and budgeted quantity or volume of sales. The variance is calculated as :

$$\text{Sales Volume Variance} = \left\{ \begin{array}{cc} \text{Actual Quantity} & - \text{Budgeted Quantity} \\ \text{of Sales} & \text{of Sales} \end{array} \right\} \times \text{Standard Price}$$

**Note :** If the actual quantity sold is more than the budgeted quantity or volume of sales, the variance is favourable and vice versa.

**(d) Sales Mix Variance:** It is that portion of Sales Volume Variance which is due to the difference between the standard proportion of sales and the actual composition or mix of quantities sold. In other words it is the difference of standard value of revised mix and standard value of actual mix. It is calculated as :

$$\text{Sales Mix Variance} = \left\{ \begin{array}{cc} \text{Standard Value} & - \text{Standard Value of} \\ \text{of Actual Mix} & \text{Revised Standard Mix} \end{array} \right\}$$

**(e) Sales Quantity Variance:** It is a sub variance of Sales Volume Variance. This is the difference between the revised standard quantity of sales and budgeted sales quantity. The formula for the calculation of this variance is :

$$\text{Sales Quantity Variance} = \left\{ \begin{array}{cc} \text{Revised Standard} & - \text{Budgeted Sales} \\ \text{Sales Quantity} & \text{Quantity} \end{array} \right\} \times \text{Standard Selling Price}$$

**Note :** If the Revised Standard Quantity is greater than the standard quantity, the variance is favourable and vice versa.

**Illustration: 10**

From the following information is given about standard and actual sales. You are required to calculate Sales Variances.

	<i>Standard Qty. Units</i>	<i>Sales Price</i>	<i>Actual Qty. Units</i>	<i>Sales Price</i>
X	250	2.50	250	2.50
Y	200	3	300	3.25
Z	150	3.50	200	3.75
	<u>600</u>		<u>750</u>	

**Solution:****(1) Sales Value Variance :**

	=	Actual Value of Sales – Standard Value of Sales
X	=	(250 x 2.50) – (250 x 2.50)
	=	Rs. 625 – Rs. 625 = Nil
Y	=	(300 x 3.25) – (200 x 3)
	=	Rs. 975 – Rs. 600 = Rs. 375 (F)
Z	=	(200 x 3.75) – (150 x 3.50)
	=	Rs. 750 – Rs. 525 = Rs. 225 (F)
Total Sales Value Variance	=	Rs. 375 (F) + Rs. 225 (F) = Rs. 600 (F)

**(2) Sales Price Variance :**

	=	Actual Quantity Sold x (Actual Price – Standard Quantity)
X	=	250 (2.50 – 2.50) = Nil
Y	=	300 (3.25 – 3) = Rs. 75 (F)
Z	=	200 (3.75 – 3.50) = Rs. 50 (F)
Total Sales Price Variance	=	Rs. 75 (F) + Rs. 50 (F) = Rs. 125 (F)

**(3) Sales Value Variance :**

	=	Standard Price x (Actual Quantity – Standard Quantity)
X	=	2.50 (250 – 250) = Nil
Y	=	3 (300 – 200) = Rs. 300 (F)
Z	=	3.50 (200 – 150) = Rs. 175 (F)
Total Sales Value Variance	=	R. 300 (F) + Rs. 175 (F) = Rs. 475 (F)

**(4) Sales Mix Variance :**

There is a difference between standard quantity and actual quantity so the standard will be revised in proportion to actual quantity of sales.

$$\begin{aligned}
 X &= \frac{250}{600} \times 750 = 312.50 \\
 Y &= \frac{200}{600} \times 750 = 250 \\
 Z &= \frac{150}{600} \times 750 = 187.50
 \end{aligned}$$

Sales Mix Variance = Standard Value of Actual Mix – Standard Value of Revised Standard Mix

**Standard Value of Actual Mix**

X	=	250 x 2.50 = 625
Y	=	200 x 3 = 600
Z	=	150 x 3.50 = 525
		<u>Rs. 1750</u>

**Standard Value of Revised Standard Mix**

X	=	312.50 x 2.50 = 781.25
Y	=	250 x 3 = 750.00
Z	=	187.50 x 3.50 = 656.25
		<u>Rs. 2187.50</u>

Sales Mix Variance = Rs. 1750 – Rs. 2187.50 = Rs. 437.50 (A)

**II. Sales Margin or Profit Method**

Under this method of variance analysis, variances may be computed to show the effect on profit. The sales variance according to this method can be classified as follows :

- (1) Sales Margin Value Variance
- (2) Sales Margin Volume or Quantity Variance
- (3) Sales Margin Price Variance
- (4) Sales Margin Mix Variance

**(1) Sales Margin Value Variance:** This is the difference between the actual value of sales margin and budgeted value of sales margin. It is calculated as follows :

Sales Margin Value Variance = Budgeted Profit – Actual Profit

$$= \left\{ \begin{array}{cc} \text{Budget Sales} & \text{Budgeted} \\ \text{Quantity} & \text{Profit per unit} \end{array} \right\} \times \left\{ \begin{array}{cc} \text{Actual} & \text{Actual} \\ \text{Quantity} & \text{Profit} \\ \text{Sold} & \text{Per unit} \end{array} \right\} - \left\{ \begin{array}{cc} \text{Actual} & \text{Actual} \\ \text{Quantity} & \text{Profit} \\ \text{Sold} & \text{Per unit} \end{array} \right\} \times \left\{ \begin{array}{cc} \text{Actual} & \text{Actual} \\ \text{Quantity} & \text{Profit} \\ \text{Sold} & \text{Per unit} \end{array} \right\}$$

**Note :** If the actual profit is more than budgeted profit the variance is favourable and vice versa.

**(2) Sales Margin Volume Variance:** It is that portion of Total Sales Margin Variance which is due to the difference between budgeted and actual quantity sold. The formula is as follows :

$$\text{Sales Margin Volume Variance} = \left\{ \begin{array}{cc} \text{Standard} & \text{Actual} \\ \text{Quantity} & \text{Quantity} \end{array} \right\} - \left\{ \begin{array}{cc} \text{Standard} & \text{Actual} \\ \text{Quantity} & \text{Quantity} \end{array} \right\} \times \text{Standard Profit}$$

**Note :** If the actual quantity is more than standard quantity, the variance is favourable and vice versa.

**(3) Sales Margin Price Variance:** This variance is the difference between the standard price of the quantity of the sales effected and the actual price of those sales. It is calculated as follows :

Sales Margin Price Variance = Standard Profit – Actual Profit

$$= \left\{ \begin{array}{cc} \text{Budgeted Profit} & \text{Actual Profit} \\ \text{Per Unit} & \text{Per Unit} \end{array} \right\} - \left\{ \begin{array}{cc} \text{Budgeted Profit} & \text{Actual Profit} \\ \text{Per Unit} & \text{Per Unit} \end{array} \right\} \times \text{Actual Quantity Sold}$$

**Note :** If the actual profit is greater than the standard profit, the variance is favourable and vice versa.

**(4) Sales Margin Mix Variance :** This is that portion of the Sales Margin Volume or Quantity Variance which is due to the difference between the actual and budgeted quantities of each product of which the sales mixture is composed valuing the difference of quantities at standard margin. Thus, this variance arises only where more than one product is sold. It is calculated as follows:

$$\text{Sales Margin Mix Variance} = \left\{ \frac{\text{Revised Standard}}{\text{Quantity}} - \frac{\text{Actual}}{\text{Quantity}} \right\} \times \text{Standard Profit Per Unit}$$

**Note :** If the actual quantity is greater than the revised standard quantity, the variance is favourable and vice versa.

### Illustration: 11

From the following details, calculate Sales Margin Variances:

Product	Budgeted		Actual	
	Quantity Units	Sales Price	Quantity Units	Sales Price
Product X	300	46	400	50
Product Y	500	28	450	26

The cost per unit of product X and Y was Rs. 45 and Rs. 20 respectively.

### Solution:

#### (1) Total Sales Margin Value Variance:

$$= \text{Actual Profit} - \text{Budgeted Profit}$$

(or)

$$= \left\{ \frac{\text{Actual}}{\text{Quantity}} \times \frac{\text{Actual Profit}}{\text{Per Unit}} \right\} - \left\{ \frac{\text{Budgeted}}{\text{Quantity}} \times \frac{\text{Budgeted Profit per Unit}}{\text{Per Unit}} \right\}$$

Actual Profit Per Unit	=	Actual Sales Price – Actual Cost
Product X	=	50 – 45 = Rs. 5
Product Y	=	26 – 20 = Rs. 6
Budgeted Profit Per Unit	=	Budgeted Sales Price – Actual Cost
Product X	=	46 – 45 = Re. 1
Product Y	=	28 – 20 = Rs. 8
Actual Profit	=	Actual Quantity x Actual Profit Per Unit
Product X	=	400 x Rs. 5 = Rs. 2,000
Product Y	=	450 x Rs. 6 = Rs. 2,700
		Actual Profit = Rs. 4,700
Budgeted Profit	=	Budgeted Quantity x Budgeted Profit Per Unit
Product X	=	300 x Re. 1 = Rs. 300
Product Y	=	500 x Rs. 8 = Rs. 4,000
		Budgeted Profit = Rs. 4,300
Sales Margin Value Variance	=	Rs. 4,700 – Rs. 4,300
	=	Rs. 400 (F)

#### (2) Sales Margin Price Variance :

$$= (\text{Actual Price} - \text{Standard Price}) \times \text{Actual Quantity}$$

$$\text{Product X} = (50 - 46) \times 400$$

$$= 4 \times 400 = \text{Rs. 1600 (F)}$$

$$\begin{aligned}\text{Product Y} &= (26 - 28) \times 450 \\ &= 2 \times 450 = \text{Rs. } 900 \text{ (A)}\end{aligned}$$

$$\begin{aligned}\text{Sales Margin Price Variance} &= \text{Rs. } 1600 \text{ (F)} + \text{Rs. } 900 \text{ (A)} \\ &= \text{Rs. } 700 \text{ (F)}\end{aligned}$$

**(3) Sales Margin Volume Variance :**

$$\begin{aligned}&= (\text{Actual Quantity} - \text{Standard Quantity}) \times \text{Standard Profit Per Unit} \\ \text{Product X} &= (400 - 300) \times \text{Rs. } 1 \\ &= 100 \times \text{Rs. } 1 = \text{Rs. } 100 \text{ (F)} \\ \text{Product Y} &= (450 - 500) \times \text{Rs. } 8 \\ &= 50 \times \text{Rs. } 8 = \text{Rs. } 400 \text{ (A)}\end{aligned}$$

$$\begin{aligned}\text{Sales Margin Volume Variance} &= \text{Rs. } 100 \text{ (F)} + \text{Rs. } 400 \text{ (A)} \\ &= \text{Rs. } 300 \text{ (A)}\end{aligned}$$

**Verification :**

$$\begin{aligned}\text{Total Sales Margin Value Variance} &= \text{Sales Margin Price Variance} \\ &+ \text{Sales Margin Volume Variance} \\ \text{Rs. } 400 \text{ (F)} &= \text{Rs. } 700 \text{ (F)} + \text{Rs. } 300 \text{ (A)} \\ \text{Rs. } 400 \text{ (F)} &= \text{Rs. } 400 \text{ (F)}\end{aligned}$$

**Illustration: 12**

The budgeted production of a company is 20,000 Units per month. The Standard Cost Sheet is as under :

Direct Materials	1.5 kg @ Rs.6 per kg
Direct Labour	6 hours @ Rs.5 per hour
Variable Overheads	6 hours @ Rs.4 per hour
Fixed Overheads	Rs. 3 per unit
Selling Price	Rs. 72 per unit

**The following are the actual details for the month:**

- (1) Actual production and sales 18,750 units
- (2) Direct materials consumed 29,860 kg. at Rs. 5.25 per kg.
- (3) Direct labour hours worked 1,18,125 hours at Rs. 6 per hour
- (4) Actual overheads were Rs. 5,25,000 out of which a sum of Rs. 40,000 was fixed
- (5) There is no change in the selling price.

**Calculate:**

- (i) Direct Materials Usage and Price Variances
- (ii) Direct Labour Efficiency and Rate Variances
- (iii) Variable Overheads Efficiency and Expense Variances
- (iv) Fixed Overhead Volume and Expense Variances
- (v) Sales Volume Variance and Gross Margin.

**Solution:**

Actual Output = 18,750 units

**Direct Materials:**

Standard Requirements	= 18,750 units x 1.5 kg.
	= 28,125 kgs.
Standard Quantity (SQ)	= 28,125 Kgs.
Actual Quantity (AQ)	= 29,860 kgs.
Standard Price (SP)	= Rs. 6 per kg.
Actual Price (AP)	= Rs. 5.25 per kg.
SQ x SP	= 28,125 x Rs. 6 = Rs. 1,68,750
AQ x SP	= 29,860 x Rs. 6 = Rs. 1,79,160
AQ x AP	= 29,860 x Rs. 5.25 = Rs. 1,56,765

**Calculation of Material Variances :**

(1) Material Usage Variance	= (SQ x SP) – (AQ x SP)
	= Rs. 1,68,750 – Rs. 1,79,160
	= Rs. 10,410 Adverse
(2) Material Price Variance	= (AQ x SP) – (AQ x AP)
	= Rs. 1,79,160 – Rs. 1,56,765
	= Rs. 22,395 Favourable

**Direct Labour:**

Standard Hours Produced 18750 x 6	= 1,12,500 hours
Standard Hours (SH)	= 1,12,500 hours
Actual Hours (AH)	= 1,18,125 hours
Standard Rate	= Rs.5
Actual Rate	= Rs.6
SH x SR	= 1,12,500 x 5 = Rs. 5,62,500
AH x SR	= 1,18,125 x 5 = Rs. 5,90,625
AH x AR	= 1,18,125 x 6 = Rs. 7,08,750

**Calculation of Labour Variances:**

(1) Labour Efficiency Variance	= (SH x SR) – (AH x SR)
	= Rs. 5,62,500 – Rs. 5,90,625
	= Rs. 28,125 Adverse
(2) Labour Rate Variance	= (AH x SR) – (AH x AR)
	= Rs. 5,90,625 – Rs. 7,08,750
	= Rs. 1,18,125 Adverse

**Variable Overheads:**

A. Charged to Production	= 1,12,500 hours x Rs. 4
	= Rs. 4,50,000
B. Standard Cost of Actual Hours	= 1,18,125 hours x Rs. 4
	= Rs. 4,72,500
C. Actuals	= Rs. 5,25,000

**Calculation of Overhead Variance:**

(1) Efficiency Variance (A – B)	= 4,50,000 – 4,72,500
	= Rs. 22,500 Adverse.
(2) Expenses Variance (B – C)	= Rs. 4,72,500 – Rs. 5,25,000
	= Rs. 52,500 Adverse

**Fixed Overheads:**

Standard Rate	$\frac{3}{6}$	=	Rs. 0.50
A. Charged to Production		=	1,12,500 hours x Rs. 0.50 = Rs. 56,250
B. Budget		=	20,000 hours x Rs. 3 = Rs. 60,000
C. Actuals		=	Rs. 40,000

**Calculation of Fixed Overhead Variances:**

(1) Volume Variance (A – B)	=	Rs. 56,250 – Rs. 60,000
	=	Rs. 3,750 Adverse
(2) Expenses Variance (B – C)	=	Rs. 60,000 – Rs. 40,000
	=	Rs. 20,000 Favourable

**Sales:**

Standard Quantity (SQ)	=	20,000 units
Actual Quantity (AQ)	=	18,750 units
Standard Price (SP)	=	Rs. 72
SQ x SP	=	20,000 x 72 = Rs. 14,40,000
AQ x SP	=	18,750 x 72 = Rs. 13,50,000

**Calculation:**

Sales Volume Variance	=	(SQ x SP) – (AQ x SP)
	=	Rs. 14,40,000 – Rs. 13,50,000
	=	Rs. 90,000 Adverse

**Total Standard Cost:**

Direct Material	=	Rs. 9 (1.5 kg x Rs. 6)
Direct Labour	=	Rs. 30 (6hrs x Rs. 5)
Variable Overhead	=	Rs. 24 (6 hrs x Rs. 4)
Fixed Overhead	=	Rs. 3
		Rs. 66
Standard Gross Margin (SGM)	=	Rs. 72 – Rs. 66 = Rs. 6
Standard Quantity (SQ)	=	20,000 units
Actual Quantity (AQ)	=	18,750 units
Standard Gross Margin (SGM)	=	Rs. 6
SQ x SGM	=	Rs. 1,20,000
AQ x SGM	=	Rs. 1,12,500

**Calculation of GM Sales Volume Variance:**

GM Sales Volume Variance	=	(SQ x SGM) – AQ x SGM)
	=	Rs. 1,20,000 – Rs. 1,12,500 = Rs. 7,500 Adverse.

**Illustration: 13**

A Company produces a finished product by using three basic raw materials. The following standards have been set up for raw materials :

Material	Standard Mix in Percentages	Standard Price per kg. in Rs.
A	25	4
B	35	3
C	40	2

The standard loss in process is 20% of input. During a particular month, the company produced 2,400 kgs of finished product. The details of stock and purchases for the month are as under :



Materials	Opening Stock	Closing Stock (Kgs)	Purchases during the month	
			Qty in Kgs.	Cost in Rs.
A	200	350	800	3,600
B	150	200	1,000	3,500
C	300	200	1,100	1,980

The opening stock is valued at standard cost. Compute :

**(1) Material Price and Material Cost Variances, When :**

- (a) Variance is calculated at the point of issue of First In – First Out basis (FIFO).
- (b) Variance is calculated at the point of issue of Last In – First Out basis (LIFO).
- (ii) Material Usage Variance
- (iii) Material Mix Variance
- (iii) Material Yield Variance

**Solution:**

Standard Price at Standard Mix for output of 80 kg (100 kgs – 20% loss, i.e., 20 kgs)

Material	%	Qty (kgs)	Std. Price (Rs.)	Amount (Rs.)
A	25	25	4	100
B	35	35	3	105
C	40	40	2	80
		100	-	-
Standard Loss		20	-	-
		80		285

**Actual Consumption :** Opening Stock + Purchase – Closing Stock

For A in kgs	200 + 800 – 350	=	650
B	150 + 1,000 – 200	=	950
C	300 + 1,100 – 200	=	1,200
			2,800
	Output		2,400
	Loss		400

**(1) Material Price Variance at the Point of Issue :**

$$\text{MPV} = \text{AQ} (\text{SP} - \text{AP})$$

**(a) When FIFO Method is used:**

A = issued from opening stock 200kg @ Rs.4 (no variance) + balance 450 kgs

(Rs. 4 – 4.50)

A	=	650 – 425	=	Rs. 225 Adverse
B	=	150 (Rs. 3 – 3) + 800 (Rs. 3 – 3.50)	=	Rs. 400 Adverse
C	=	300 (Rs. 2 – 2) + 900 (Rs. 2 – 1.80)	=	Rs. 180 Favourable
				<u>Rs. 445 Adverse</u>

**(b) When LIFO Method is used :**

A	=	650 (Rs.4 – 4.50)	=	Rs. 325 (A)
B	=	950 (Rs.3 – 3.50)	=	Rs. 475 (A)
C	=	1,100 (Rs.2 – 1.80) + 100 (2 – 2)	=	Rs. 220 (F)
				<u>Rs. 580 (A)</u>

(i) **Material Cost Variance at the Point of Issue :**

$$MCV = (TSC - TAC)$$

Material Cost Variance = Total Std. Cost – Total Actual Cost

Total Std. Quantity for Actual Output (TSC)

$$= \frac{285}{80} \times 2,400 = \text{Rs. } 8,550$$

(a) **Total Actual Quantity (TAC) :**

$$A (200 \times 4) + 3,600 - (350 \times 4.5) = \text{Rs. } 2,825$$

$$B (150 \times 3) + 3,500 - (200 \times 3.5) = \text{Rs. } 3,250$$

$$C (300 \times 2) + 1,980 - (200 \times 1.8) = \text{Rs. } 2,220$$

$$\text{Total Actual Quantity} = \text{Rs. } 8,295$$

$$\text{Material Cost Variance} = \text{Rs. } 8,550 - \text{Rs. } 8,295 = \text{Rs. } 255 \text{ (F)}$$

(b) **When LIFO Method is used :**

$$\text{TAC} = A \text{ Rs. } (200 \times 4) + 3,600 - [(150 \times 4.5) + (200 \times 4)] = \text{Rs. } 2,925$$

$$B \text{ Rs. } (150 \times 3) + 3,500 - (50 \times 3.5 + 150 \times 3) = \text{Rs. } 3,325$$

$$C \text{ Rs. } (300 \times 2) + 1,980 - (200 \times 2) = \text{Rs. } 2,180$$

$$\text{Total Actual Cost} = \text{Rs. } 8,430$$

$$\text{MAC} = \text{Rs. } 8,550 - \text{Rs. } 8,430 = \text{Rs. } 120 \text{ (F)}$$

(ii) **Material Usage Variance (MUV)**

Calculation of standard quantity for actual output

$$A = \frac{25}{80} \times 2,400 = 750 \text{ kgs}$$

$$B = \frac{35}{80} \times 2,400 = 1,050 \text{ kgs}$$

$$C = \frac{40}{80} \times 2,400 = 1,200 \text{ kgs}$$

$$\text{MUV} = \text{SP} (SQ - AQ)$$

$$A = 4 (750 - 650) = \text{Rs. } 400 \text{ (F)}$$

$$B = 3 (1,050 - 950) = \text{Rs. } 300 \text{ (F)}$$

$$C = 2 (1,200 - 1,200) = \text{Nil}$$

$$\text{Rs. } 700 \text{ (F)}$$

(iii) **Material Mix Variance (MMV) = SP (RSQ - AQ)**

Calculation of Revised Standard Quantity

$$A = \frac{25}{100} \times 2,800 = 700 \text{ kgs}$$

$$B = \frac{35}{100} \times 2,800 = 980 \text{ kgs}$$

$$C = \frac{40}{100} \times 2,800 = 1,120 \text{ kgs}$$

MMV	=	A	=	4 (700 – 650)	=	200 (F)
		B	=	3 (980 – 950)	=	90 (F)
		C	=	2 (1,120 – 1,200)	=	160 (A)
						<u>Rs. 130 (F)</u>

$$\begin{aligned}
 \text{(iv) Material Yield Variance} &= \text{Standard Rate (Actual Yield – Standard Yield)} \\
 &= \text{MYV} = \text{SC per unit (AY – SY)} \\
 \frac{285}{80} (2,400 – 2,240) &= \text{Rs. 570 (F)}
 \end{aligned}$$

Where :

$$\text{SY} = \frac{80}{100} \times 2,800 = 2,240 \text{ kgs}$$

Verification :

$$\text{MMV} + \text{MYV} = \text{MUV}$$

$$\text{Rs. 130 (F)} + \text{Rs. 570 (F)} = \text{Rs. 700 (F)}$$

### Flexible Budget and Standard Costing

Budgets are prepared for different functions of business such as production, sales etc. Actuals results are compared with the budgets and control is exercised. However, fixed budgets are not suited for cost control because all costs are related to one level of activity. Flexible budgets are prepared in order to overcome the limitations, they are recast on the basis of volume of activity. Flexible budgets is as an effective tool for cost control because costs are analysed by behaviour and variable costs are allowed as per activity attained. Although budgetary control is concerned with origin of expenditure at functional levels, in practice flexible budgets are well suited with standard costing. Accordingly when flexible budgetary control operates with standard costing fixed expenses, variable expenses and semi variable expenses are computed either on the basis of ratio method or variance method for different levels of activity.

### Illustration: 14

The Managing Director of your company has been given the following statement showing the results for August 2003 :

	Master Budget	Actual	Variance
Units Produced and Sold	10,000	9,000	(1,000)
	Rs.	Rs.	Rs.
Sales	40,000	3,50,000	(5,000)
	Rs.	Rs.	Rs.
Direct Material	10,000	9,200	800
Direct Wages	15,000	13,100	1,900
Variance Overheads	5,000	4,700	300
Fixed Overhead	5,000	4,900	100
Total Cost	35,000	31,900	3,100
Net Profit	5,000	3,100	(1,900)

Figures in parentheses indicate adverse variances.

The Standard Costs of the product are as follows :

	<i>Per unit Rs.</i>
Direct Material (1kg @ Re.1 Per kg)	1.00
Direct Wages (1 hour @ Re.1.50)	1.50
Variable Overhead (1 hour @ Re.0.50)	0.50

Actual results for the month showed that 9,800 kgs of material were used and 8,800 labour hours were recorded.

**Required :**

- Prepare a flexible budget for the month and compare with actual results and
- Calculate the variances which have arisen.

**Solution:**

**Statement Showing Flexible Budget and its Comparison with Actual**

<i>Particulars</i>	<i>Master Budget For 10,000 Units Rs.</i>	<i>Flexible Budget (at Standard Cost)</i>		<i>Actual for 9,000 units Rs.</i>	<i>Variance Rs.</i>
		<i>Per unit Rs.</i>	<i>For 9,000 Units Rs.</i>		
Sales (A)	40,000	4	36,000	35,000	1,000 (A)
Direct Materials	10,000	1	9,000	9,200	200 (A)
Direct Wages	15,000	1.50	13,500	13,100	400 (F)
Variable Overhead	5,000	0.50	4,500	4,700	200 (A)
Total Variable Cost (B)	30,000	3	27,000	27,000	-
Contribution (A) – (B)	10,000	1	9,000	8,000	1,000 (A)
Less : Fixed Cost	5,000	0.50	5,000	4,900	100 (F)
Net Profit	5,000	0.50	4,000	3,100	900 (A)

**Calculation of Variances:**

(1) Material Cost Variance	= Rs. 9,000 – Rs. 9,200	= Rs. 200 (A)
(2) Material Usage Variance	= Rs. 9,000 – Rs. 9,800	= Rs. 800 (A)
(3) Material Price Variance	= Rs. 9,800 – Rs. 9,200	= Rs. 600 (F)
(4) Labour Cost Variance	= Rs. 13,500 – Rs. 13,100	= Rs. 400 (F)
(5) Labour Efficiency Variance	= Rs. 13,500 – Rs. 13,200	= Rs. 300 (F)
(6) Labour Rate Variance	= Rs. 13,200 – Rs. 13,100	= Rs. 100 (F)
(7) Fixed Overhead Expenditure Variance	= Rs. 5,000 – Rs. 4,900	= Rs. 100 (F)
(8) Variable Overhead Efficiency Variance	= Rs. 4,500 – Rs. 4,400	= Rs. 100 (F)
(9) Variable Overhead Expenditure Variance	= Rs. 4,400 – Rs. 4,700	= Rs. 300 (A)
(10) Total Variable Overhead Variance	= Rs. 4,700 – Rs. 4,500	= Rs. 200 (A)
(11) Sales Margin Value Variance	= Rs. 5,000 – Rs. 3,500	= Rs. 1,500 (A)
(12) Sales Margin Volume Variance	= Rs. 5,000 – Rs. 4,500	= Rs. 500 (A)
(13) Sales Margin Price Variance	= Rs. 4,500 – Rs. 3,500	= Rs. 1,000 (A)

**Note :** If Fixed Overhead is changed proportionately on volume basis in the Flexible Budget, then Fixed Overhead at level 9,000 units would be shown as Rs. 4,500 in the budget. In that case the total variance would become Rs. 400 (A). The break up of the Same would be :

(1) Fixed Overhead Efficiency Variance	= Rs. 4,500 – Rs. 4,400	= Rs. 100 (F)
(2) Fixed Overhead Capacity Variance	= Rs. 4,400 – Rs. 5,000	= Rs. 600 (A)
(3) Fixed Overhead Expenditure Variance	= Rs. 5,000 – Rs. 4,900	= Rs. 100 (F)
		<u>Rs. 400 (A)</u>

**Illustration: 15**

P Q R Ltd. uses a comprehensive budgeting process and compares actual results to the budgeted amount on a monthly basis. The production is upset about the result of October 2003 that are shown below. He has implemented several cost cutting measures in the manufacturing area and is discouraged by Adverse Variance in Variable Costs.

**Operating Results for the month of October, 2003**

Particulars	Master Budget	Actual	Variance
Units Sold	7,500	7,200	300 (A)
Revenues	Rs. 18,00,000	Rs. 17,28,000	Rs. 72,000 (A)
Variable Costs	Rs. 11,40,000	Rs. 11,70,000	Rs. 30,000 (A)
Contribution Margin	Rs. 6,60,000	Rs. 5,58,000	Rs. 1,02,000 (A)
Fixed Overheads	2,70,000	2,70,000	-
Fixed General and Administration Overheads	1,80,000	1,72,500	7,500 (F)
Operating Income	Rs. 2,10,000	Rs. 1,15,500	Rs. 94,500 (A)

When master budget was being prepared, the Cost Accountant supplied the following unit costs data:

	Rs.
Direct Material	60
Direct Labour	44
Variable Overheads	36
Variable Selling Overheads	12

The total variable costs for the month of October, 2003 of Rs. 11,70,000 are comprised of :

	Rs.
Direct Materials	4,80,000
Direct Labour	2,88,000
Variable Overheads	2,64,000
Variable Selling Overheads	1,38,000

The Cost Accountant believes that monthly report would be more meaningful to everyone, if the company adopts flexible budgeting and prepares more detailed analysis.

**Required :**

Determine the flexible budget variances.

**Solution:****Master Budget**

<i>Particulars</i>	<i>Based on Output (Actual 7,200 Units)</i>		<i>Actual</i>		<i>Variance</i>
	<i>Per unit</i>	<i>Amount (Rs.)</i>	<i>Per unit</i>	<i>Amount (Rs.)</i>	
Revenue (A)	Rs. 240	Rs. 17,28,000	Rs. 240	Rs. 17,28,000	Nil
<b>Variable Cost :</b>					
Direct Material	60	4,32,000	66.67	4,80,000	48,000 (A)
Direct Labour	44	3,16,800	40	2,88,000	28,800 (F)
Variable Overheads	36	2,59,200	36.67	2,64,000	4,800 (A)
Variable Selling Overheads	12	86,400	19.16	1,38,000	51,600 (A)
<b>Total Variable Cost (B)</b>	152	10,94,400	162.50	11,70,000	75,600 (A)
<b>Contribution (A – B)</b>	88	6,33,600	77.50	5,58,000	75,600 (A)
<b>Fixed Costs :</b>					
Fixed Overheads		2,70,000		2,70,000	Nil
Fixed Gen. & Admn. Overheads		1,80,000		1,72,500	7,500 (F)
<b>Total Fixed Cost (C)</b>		4,50,000		4,42,500	
<b>Operating Profit (Contribution–Fixed Cost )</b>		1,83,600		1,15,500	68,100 (A)

## VARIANCE ANALYSIS

### Summary of Formulas

Variances	Formulas
<b>I. Material Variances</b>	
(1) Material Cost Variance (MCV)	= (Standard Quantity x Standard Price) - (Actual Quantity x Actual Price) (or) = (SQ x SP) - (AQ x AP)
(2) Material Price Variance (MPV)	= Actual Quantity x (Standard Price - Actual Price) (or) = AQ (SP - AP)
(3) Material Usage Variance (MUV)	= Standard Price (Standard Quantity - Actual Quantity) (or) = SP (SQ - AQ)
(4) Material Mix Variance (MMV)	= Standard Price (Standard Quantity - Actual Quantity) (or) = SP (SQ - AQ)
(a) Revised Standard Quantity (RSQ)	= Standard Unit Cost (Revised Standard Quantity - Actual Quantity) (or) = SP (RSQ - AQ)
(b) Revised Material Usage Variance	= $\left\{ \frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Standard Mix}} \times \text{Standard Cost of Standard Mix} \right\} - [\text{Standard Cost of Actual Mix}]$
(5) Materials Yield Variance (MYV)	= Standard Rate (Actual Yield - Standard Yield)
Standard Rate	= $\frac{\text{Standard Cost of Standard Mix}}{\text{Net Standard Output}}$

**Verification**

- |                             |   |
|-----------------------------|---|
| (1) Material Cost Variance  | = Material Price Variance + Material Usage Variance                         |
| (2) Material Usage Variance | = Material Mix Variance + Material Yield Variance                           |
| (3) Material Cost Variance  | = Material Mix Variance + Material Price Variance + Material Yield Variance |

**II. Labour Variances**

- |   |  |
|---|--|
| (1) Labour Cost Variance (LCV)                              | = (Standard Cost of Labour - Actual Cost of Labour)*<br>(or) (Standard Rate x Standard Time for Actual Output) - (Actual Rate x Actual Time) |
| (2) Labour Rate Variance (LRV)                              | = Actual Time Standard Rate - Actual Rate  |
| (3) Labour Efficiency Variance                              | = Standard Rate Standard Time - Actual Time  |
| (4) Labour Idle Time Variance                               | = Idle Hours x Standard Rate   |
| (5) Labour Mix Variance (LMV)                               |  |
| (a) When Standard & Actual Time of the Labour Mix are same  | } = Standard Cost of Standard Labour Mix - Standard Cost of Actual Labour Mix  |
| (b) When Standard & Actual Time of Labour Mix are different |  |
|   | = Standard Rate Revised Standard Time - Actual Time  |

<i>Variances</i>	<i>Formulas</i>
------------------	-----------------

$$\text{Revised Standard Time} = \frac{\text{Total Actual Time}}{\text{Total Standard Time}} \times \text{Actual Time}$$

### Verification

$$\begin{aligned} \text{Total Labour Cost Variance} &= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} \\ \text{Total Labour Efficiency Variance} &= \text{Labour Efficiency Variance} + \text{Labour Idle Time Variance} \end{aligned}$$

### III. Overhead Variances

#### *Essentials of Certain Terms :*

$$(1) \text{ Standard Overhead Rate per unit} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Output}}$$

$$(2) \text{ Standard Overhead Rate per hour} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}}$$

$$(3) \text{ Standard Output for Actual Time} = \frac{\text{Budgeted Output}}{\text{Budgeted Hours}} \times \text{Actual Hours}$$

$$(4) \text{ When Output is measured in Standard Hours:}$$

$$\text{Recorded Overheads} = \text{Standard Rate Per Hour} \times \text{Standard Hours for Actual Output}$$

$$\text{When Output is measured in units :}$$

$$\text{Absorbed Overhead} = \text{Standard Rate Per Unit} \times \text{Actual Output in Units}$$

$$(5) \text{ Budgeted Overhead} = \text{Standard Rate Per Unit} \times \text{Budgeted Output in Units (or)} = \text{Standard Rate Per Hour} \times \text{Budgeted Hours}$$

$$(6) \text{ Actual Overhead} = \text{Actual Rate Per Unit} \times \text{Actual Output in Units (or)} = \text{Actual Rate Per Hour} \times \text{Actual Hours}$$

$$(7) \text{ Standard Overhead} = \text{Standard Rate Per Unit} \times \text{Standard Output for Actual Time (or)} = \text{Standard Rate Per Hour} \times \text{Actual Hours}$$

### Overhead Variances

$$\begin{aligned} \text{Overhead Cost Variance} &= (\text{Actual Output} \times \text{Standard Overhead Rate per Unit}) - \text{Actual Overhead Cost} \\ &(\text{or}) = \text{Standard hours for Actual Output} \times [\text{Standard Overhead Rate Per Hour} - \text{Actual Overhead Cost}] \end{aligned}$$

#### (A) Variable Overhead Variances :

$$(1) \text{ Variable Overhead Cost Variance} = \text{Standard Variable Overhead for Actual Output} - \text{Actual Variable Overhead}$$



<i>Variances</i>	<i>Formulas</i>
(2) Variable Overhead Expenditure Variance	$= \text{Actual Time (Standard Variable Overhead Rate per Hour - Actual Variable Overhead Rate per Hour)}$ $(\text{or}) = \text{Standard Variable Overheads - Actual Variable Overheads}$
(3) Variable Overhead Efficiency Variance	
	$= \text{Standard Rate per Hour} \times (\text{Standard Hours for Actual Production} - \text{Actual Hours})$

#### (B) Fixed Overhead Variances

- (1) Fixed Overhead Cost Variance :  $= \text{Actual Fixed Overhead} - \text{Standard Fixed Overhead for Actual Production}$   
 $(\text{or}) = \text{Actual Output Standard Fixed Overhead Rate per Hour} - \text{Actual Fixed Overheads}$
- (2) Fixed Overhead Expenditure Variance (or) Budget Variance  $\} = (\text{Budgeted Fixed Overheads}) - (\text{Actual Fixed Overheads})$
- (3) Fixed Overhead Volume Variance  $= \text{Budgeted Fixed Overheads} - \text{Standard Fixed Overheads on Actual Production}$
- (4) Fixed Overhead Capacity Variance  $= \text{Standard Fixed Overheads} - \text{Budgeted Fixed Overheads}$   
 $(\text{or}) = \text{Standard Fixed Overhead Rate per Hour} \times (\text{Actual Hours Worked} - \text{Budgeted Hours})$
- (5) Fixed Overhead Efficiency Variance  $\} = \text{Standard Fixed Overhead Rate per Hour} \times (\text{Standard Quantity} - \text{Actual Quantity})$
- (6) Fixed Overhead Calendar Variance  $= \text{Standard Rate per Hour / per Day} \times \text{Excess or Deficit Hours or Days Worked}$

### IV. Sales Variances

#### (A) Sales Value Method Variances

- (1) Sales Value Variance  $= \text{Actual Value of Sales} - \text{Budgeted Value of Sales}$
- (2) Sales Price Variance  $= \text{Actual Quantity} \times (\text{Standard Price} - \text{Actual Price})$
- (3) Sales Volume Variance  $= \text{Standard Price Actual Quantity of Sales} - \text{Budgeted Quantity of Sales}$
- (4) Sales Mix Variance  $= (\text{Standard Value of Actual Mix}) - (\text{Standard Value of Revised Standard Mix})$
- (5) Sales Quantity Variance  $= \text{Standard Selling Price Revised Standard Sales Quantity} - \text{Budgeted Sales Quantity}$

#### (B) Sales Margin or profit Method of Variances :

- (1) Sales Margin Value Variance  $= \text{Budgeted Profit} - \text{Actual Profit (or)}$   
 $(\text{Budgeted Sales Quantity} \times \text{Budgeted Profit Per Unit}) - (\text{Actual Quantity Sold} \times \text{Actual Profit per Unit})$
- (2) Sales Margin Volume Variance  $= \text{Standard Profit} \times (\text{Standard Quantity} - \text{Actual Quantity})$
- (3) Sales Margin Price Variance  $= \text{Standard Profit} - \text{Actual Profit (Or)}$   
 $\text{Actual Quantity Sold Budgeted per Unit} - \text{Actual Profit per Unit}$
- (4) Sales Margin Mix Variance  $= \text{Standard Profit per Unit Revised standard Quantity} - \text{Actual Quantity}$

**QUESTIONS**

1. Define Standard Costing.
2. What do you understand by Standard Cost and Standard Costing?
3. What are the differences between Standard Costing and Estimated Costing?
4. Briefly explain and compare and contrast between Standard Costing and Budgetary Control.
5. What are the advantages of Standard Costing?
6. Discuss the preliminary steps for determination of Standard Cost.
7. Explain the limitations of Standard Costing.
8. Explain the different types of Standards.
9. What do you understand by Variance Analysis?
10. Explain the different types of variances used in Standard Costing.
11. Write short notes on :
  - (a) Material Cost Variance. (b) Labour Mix Variance. (c) Fixed Overhead Cost Variance. (d) Fixed Overhead Calendar Variance. (e) Sales Margin Volume Variance.
12. Explain the different types of Material Cost Variance.
13. What are the important uses of Variance Analysis?

**PRACTICAL PROBLEMS**

- (1) From the following information, calculate:

- (a) Material Cost Variance
- (b) Material Price Variance
- (c) Material Usage Variance

Quantity of materials purchased 3,000 units

Value of material purchased Rs. 9,000

Standard quantity of material required per tone of finished product = 25 units

Standard rate of materials Rs. 2 per unit

Opening stock of materials Nil

Closing stock of materials 500 units

Finished production during the year 800 tons

[Ans : Material Cost Variance Rs. 3,500 (A) ; Material Price Variance Rs. 2,500 (A) ; Material Usage Variance Rs. 1,000 (A)].

- (2) From the following details, calculate (a) Material Cost Variance (b) Material Price Variance (c) Material Usage Variance (d) Material Mix Variance and (e) Material Yield Variance:

Materials	Standard		Actual	
	Qty.	Rate	Qty.	Rate
A	8,000	1.05	7,500	1.20
B	3,000	2.15	3,300	2.30
C	2,000	3.30	2,400	3.50

[Ans : (a) Rs. 3,540 (A) ; (b) Rs. 2,100 (A) ; (c) Rs. 1,440 (A) (d) Rs. 1,110 (A) ; (e) Cannot be Calculated]

- (3) Calculate labour variances from the following information standard hours for manufacturing a product X - 7,800 hours:

Actual Hours Worked = 8,050 hours

Actual Wages paid during the period = Rs. 16,100

Standard Wages = Rs. 15,600

[Ans : (a) Labour Cost Variance = Rs. 500 (A) ; (b) Labour Rate Variance = Nil ; (c) Labour Efficiency = Rs. 500 (A) ]

- (4) From the following data, calculate labour variances : The budgeted labour force for producing product A is :

20 Semi-Skilled workers @ Re. 0.75 per hour for 50 hours

10 Skilled workers @ Rs. 1.25 per hour for 50 hours

The actual labour force employed for producing A is :

22 Semi-Skilled workers @ Re. 0.80 per hour for 50 hours

8 Skilled workers @ Rs. 1.20 per hour for 50 hours

[Ans : (a) Labour Cost Variance = Rs. 15 (F)

(b) Labour Rate Variance = Rs. 35 (A)

(c) Labour Efficiency Variance Rs. 50 (F)

(e) Labour Mix Variance = Rs. 50 (F)]

- (5) From the following data, calculate Overhead Variances:

	Budgeted	Actual
Output 15,000 units	16,000 units	
Number of working days	25	27
Fixed Overheads	Rs. 30,000	Rs. 30,500
Variable Overheads	Rs. 45,000	Rs. 47,000

There was an increase of 5% in capacity

- [Ans : (1) Total Overhead Cost Variance Rs. 2,500 (F) (5) Volume Variance Rs. 2,000 (F)  
 (2) Variable Overhead Expenditure Variance Rs. 1,000 (F) (6) Capacity Variance Rs. 1,620 (F)  
 (3) Fixed Overhead Variance Rs. 1,500 (F) (7) Calendar Variance Rs. 2,400 (F)  
 (4) Expenditure Variance Rs. 500 (A) (8) Efficiency Variance Rs. 2,020 (A)].

- (6) From the following information, calculate: (1) Overhead Budget Variance (2) Volume Variance  
 (3) Efficiency Variance (4) Capacity Variance (5) Total Overhead Cost Variance:

Normal Overhead Rate Rs. 3  
 Actual hours worked 20,000  
 Allowed hours for actual production 21,000  
 Allowed overheads for budgeted hours Rs. 70,000  
 Actual overheads Rs. 72,000

- [Ans : (1) Overhead Budget Variance Rs. 2,000 (A) (4) Capacity Variance Rs. 10,000 (A)  
 (2) Volume Variance Rs. 7,000 (A) (5) Total Overhead Cost Variance Rs. 9,000 (A)  
 (3) Efficiency Variance Rs. 3,000 (F)]

- (7) From the following informations calculate (a) Calendar Variance (b) Capacity Variance  
 (c) Efficiency Variance and (d) Volume Variance:

Actual Overheads Rs. 1,800  
 Budgeted Overheads Rs. 2,000  
 Budgeted period 4,000 labour hours  
 Standard hours per unit 10 labour hours  
 Budgeted number of days 20  
 Standard overhead per hour Re. 0.50  
 Actual number of days 22  
 Actual hours 4,300  
 Actual production 425 units.

- [Ans : (a) Calendar Variance Rs. 200 (F) ; (b) Capacity Variance Rs. 150 (F) (c) Efficiency Variance Rs. 25 (A) ; (d) Volume Variance Rs. 125 (F)].

- (8) The budgeted and actual sales of a concern manufacturing a single product are given below :

Sales as budgeted : 10,000 units at Rs. 3 per unit Rs. 30,000 ; Actual Sales.

5,000 units at Rs. 3 per unit Rs. 15,000

8,000 units at Rs. 2.50 per unit Rs. 20,000

Ascertain Sales Price Variance and Sales Volume Variance

- [Ans : Sales Value Variance Rs. 5,000 (F); Sales Price Variance Rs. 4,000 (A) Sales Volume Variance Rs. 9,000 (F)]

- (9) From the following information relating to the month of Jan. 2002, you are required to compute Sales Margin Variances:

Product	Budgeted Sales			Actual Sales		
	Qty.	Price Rs.	Value Rs.	Qty.	Price Rs.	Value Rs.
X	2,500	4	10,000	2,000	4	8,000
				600	3.75	2,250
Y	3,000	2	6,000	2,500	2	5,000
				350	1.80	630
	5,500		16,000	4,500		15,880
				950		

Budgeted Costs : X Rs. 3 per unit  
 Y Rs. 1.50 per unit

**Calculate Sales Margin Variance :**

- [Ans : (1) Total Sales Margin Variance X Rs.50 (A) ; Y Rs.145 (A)  
 (2) Sales Margin Price Variance X Rs.150 (A) ; Y Rs.70 (A)  
 (3) Sales Margin Volume Variance X Rs.100 (F) ; Y Rs.75 (A)  
 (4) Sales Margin Quantity Variance X Rs.15.63 (F) ; Y Rs.9.37 (F)  
 (5) Sales Margin Mix Variance X Rs.84.37 (F) ; Y Rs.84.37 (A)]

- (10) From the following information, calculate Labour Variances for the two departments.

	<i>Department X</i>	<i>Department Y</i>
Actual Gross Wages	Rs. 2,000	Rs. 1,800
Standard Hours Produced	8,000	6,000
Standard Rate per hour	80 Paise	35 Paise
Actual Hours Worked	8,200	5,800

- [Ans : Labour Cost Variance X Rs.400 (F) ; Y Rs.300 (F)  
 Labour Rate Variance X Rs.460 (F) ; Y Rs.230 (F)  
 Labour Efficiency Variance X Rs.60 (A); Y Rs.70 (F)].

- (11) The standard materials required to produce 100 units is 120 kgs. A standard price of 0.50 paise per kg is fixed and 2,40,000 units were produced during the period. Actual materials purchased were 3,00,000 kgs at a cost of Rs. 1,65,000. Calculate material variance.

[Ans: material cost variance Rs. 21,000 unfavourable; material price variance Rs. 15,000 unfavourable; materials usage variance Rs. 6,000 unfavourable]

- (12) The standard cost of a certain chemical mixture is:

Material P - 40% at Rs. 20 per tonne

Material Q - 60% at Rs. 30 per tonne

A standard loss of 10% as expected in production. During a period there is used :

90 tonnes material P at the cost of Rs. 18 per tonne; 110 tonnes material Q at the cost of Rs. 354 per tonne.

The weight produced is 182 tonnes of good production. Calculate : (a) material cost variance, (b) material price variance, (c) material mix variance and (d) material yield variance.

[Ans: material cost variance Rs. 102:22 Adverse  
 Material price variance Rs. 260 Adverse  
 Material usage variance Rs. 157.78 Favourable  
 Material mix variance Rs. 100 Favourable  
 Material yield variance Rs. 57.78 Favourable]

- (13) The following figures have been extracted from the cost books of a factory for the month of January 2003 :

	<i>Standard Rs.</i>	<i>Actual Rs.</i>
Number of units produced	30,000	32,000
Capacity	100%	100%
Number of days worked	25	26
Variable overheads	60,000	63,000
Fixed overheads	90,000	93,000

Analyse the total overhead variance in to:

- (a) Expenditure  
 (b) Capacity  
 (c) Calendar  
 (d) Efficiency variance.

[Ans: Expenditure variance Rs. 300 (A)  
 Efficiency variance Rs. 800 (F)  
 Total variable overhead variance Rs. 500(F)  
 Fixed overhead variance Rs. 1,500 (F)  
 Fixed expenditure variance Rs. 1,500 (A)  
 Fixed volume variance Rs. 3,000 (F)  
 Capacity variance Rs. 1,800 (F)  
 Efficiency variance Rs. 1,200(F)  
 Calendar variance Rs. 1,800 (F)]

- (14) RR& Co. Ltd. manufacture a simple product the standard mix of which is:

Material × 60% at Rs. 20 per kg

Material × 40% at Rs. 10 per kg

Normal loss in production is 20% of input. Due to shortage of material X, the standard mix was changed. Actual results for March 2003 were :

Materials X 105 Kg at Pr. 20 per Kg

Materials Y 95 Kg at Pr. 3 per Kg

Input 200 Kg

Loss 35 Kg

Output 165 Kg

Calculate:

(1) Material price variance

(2) Material usage variance

(3) Material mix variance and

(4) Material yield variance.

[Ans : Material price variance X Nil ; Y Rs. 95 (F)

Material usage variance X Rs. 375 (F) ; Y Rs. 125(F)

Material mix variance X Rs. 300 (F) ; Y Rs. 150 (A)

Material yield variance Rs. 100 (F)]

- (15) A gang of workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard hours rates as under:

Men Re. 0.80

Women Re. 0.60

Boys Re. 0.40

In a normal week of 40 hours, the gang is expected to produce 2000 units of output. During the weekend 31<sup>st</sup> December 2003, the gang consisted of 40 men, 10 women and 5 boys. The actual wages paid were @Re. 0.70, Re. 0.65 and Re. 0.30 respectively. 4 hours were lost due to abnormal idle time and 1600 units were produced.

Calculate : (1) Wage variance (2) Wage rate variance (3) Labour efficiency variance (4) Gang composition variance (i.e., Labour mix variance) and (5) Labour idle time variance.

[Ans : Labour cost variance Rs. 256 (A)

Labour rate variance Rs. 160 (F)

Labour efficiency variance Rs. 416 (A)

Labour mix variance Rs. 108 (A)

Labour idle Time variance Rs. 160 (A)].

# Budgetary Control: Meaning, Objectives, Control, Advantages

1. Meaning and Definition of Budgetary Control 2. Objectives of Budgetary Control 3. Essentials 4. Advantages 5. Limitations.

## **Meaning and Definition of Budgetary Control:**

Budgetary control is the process of preparation of budgets for various activities and comparing the budgeted figures for arriving at deviations if any, which are to be eliminated in future. Thus budget is a means and budgetary control is the end result. Budgetary control is a continuous process which helps in planning and coordination. It also provides a method of control.

According to Brown and Howard “Budgetary control is a system of coordinating costs which includes the preparation of budgets, coordinating the work of departments and establishing responsibilities, comparing the actual performance with the budgeted and acting upon results to achieve maximum profitability”.

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Wheldon characterises budgetary control as planning in advance of the various functions of a business so that the business as a whole is controlled.

I.C.M.A defines budgetary control as- “the establishment of budgets, relating the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results either to secure by individual action the objectives of that policy or to provide a basis for its revision”.

## **Following are the features of budgetary control as per the above definitions:**

1. The pre-requisite for budgetary control is to set different kinds of budgets and fix the responsibility of personnel for the successful implementation of the policy.

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2. Actual performance is compared with budgets to reveal deviations for the purpose of cost control.

3. Corrective action is initiated to set right the unfavourable deviations.

### **Objectives of Budgetary Control:**

Budgetary control is inevitable for policy formulation, planning, control and coordination. The essence of budgeting is to plan and control.

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### **Following are the main objectives of budgetary control:**

#### **1. Planning:**

Budgeting ensures effective planning by setting up of budgets.

#### **2. Coordination:**

Budgets are helpful in coordination of business activities.

#### **3. Efficiency and Economy:**

Effective budgetary control results in cost control and cost reduction.

#### **4. Increase in Profitability:**

Costs are controlled with help of budgets and profits targeted are achieved.

#### **5. Anticipation of Future Capital Expenditure:**

Estimated increases in sales necessitating higher production capacity provides advance warning for the possible capital expenditure in near future.

#### **6. Control:**

Controlling function is made to be effective as the control is centralised while budgets are prepared and implemented.

## **7. Deviations:**

Ascertainments of deviations are essential to fix responsibility and correct the deviations as far as possible.

## **Essentials of Successful Budgetary Control:**

A business budget is a detailed plan covering phases of operations for a definite future period. It is laying down of policies, plans, objectives and goals set in advance by the top management for the enterprise as a whole and for each segment.

### **The following are the essential requisites for implementing budgetary control successfully:**

#### **1. Top Management Support:**

The budgetary control system should have continuous support of top management which can ensure its all-round acceptance.

#### **2. Clearly Defined Organisational Structure:**

The authority and responsibilities are to be properly defined to pin-point the responsibility of specific individuals in key positions.

#### **3. Efficient Accounting System:**

The accounting system should provide the required information in time.

#### **4. Reporting of Deviations:**

Efficient system has to be devised to reduce the differences between the budgets and actual performance.

#### **5. Motivation:**

Staff are to be appraised of the budgets and benefits they are going to derive directly and indirectly.



## **6. Realistic Targets:**

The targets set should be realistic so that they are achievable and budgets should not frustrate the workers by fixing unrealistic targets.

## **7. Participation of All Departments Concerned:**

Budgets are to be set for all the departments so that their participation in implementation will be effective.

## **8. Flexibility:**

Budgets are prepared on the basis of certain conditions. If there is change in conditions budgets also should be adjusted to accommodate the changes.

## **Advantages of Budgetary Control:**

Budgetary control is helpful in setting targets for the whole concern and achievement of the targets. It also makes the various operations of the enterprises economical.

## **Following are some of the advantages of budgetary control:**

### **1. Maximisation of Profits:**

Budgetary control aims at increasing the over-all profits of the organisation. This is achieved through planning, coordination and control of various activities in a programmed manner.

### **2. Effective Coordination:**

Performance and working of various activities is effectively coordinated through budgetary control. Budgets of the various functions are interlinked and dependent. Effective implementation of budgets depends on cooperation of concerned personnel of various departments. Emphasis on co-ordination and cooperation helps in achieving the predetermined targets and goals.

### **3. Evaluation of Executive Performance:**

Goals are set for each department. Actual performance is compared with standards and deviations are reported to top management for action against unfavourable deviations. Thus, the performance of the department heads and other executives is constantly monitored.

#### **4. Clear-Cut Goals and Targets:**

Through the process of budgeting the goals of different departments are set in advance in consultation with those in charge of them. This makes the vision of the organisation clear and employee motivation and morale boosted by achievement of clearly set objectives.

#### **5. Economy in Operations:**

Expenses are properly planned and financial resources are put to optimum use. The benefits are extended to the industry and then to national economy. Budgetary control is helpful in conservation, effective utilization and elimination of wastage in scarce resources.

#### **6. Revelation of Ineffectiveness:**

Comparison of actual performance with budgeted performance reveals weak spots so that attention is focused on them to improve the performance.

#### **7. Correction of Performance Continuously:**

The deviations of actual performance compared with budgets are frequently reported and corrections are made to rectify the unfavourable deviations immediately. In the absence of budgetary control this may be done at the end of the accounting year by which time corrections may not be fruitful or practicable.

#### **8. Introduction of Incentive Schemes of Remuneration:**

Incentive schemes can be easily introduced as the predetermined targets act as base to compare actual performance and determine efficiency. Higher and lower efficiency are suitably rewarded or discouraged respectively.

#### **9. Shutting Down of Unprofitable Products and Activities:**

Budgetary control reveals inefficiencies in products, processes and departments. This is helpful in closing down of loss making divisions to improve the overall profitability.

### **Limitations of Budgetary Control:**

Budgetary control is an effective tool for management control. However it has certain limitations while operating it as a technique.

#### **1. Prediction of Uncertain Future:**

Budgeting is a process of forecasting and estimation. Forecasting may not be accurate. Therefore budgets based on inaccurate forecasts and estimates may not be accurate and effective.

#### **2. Changes of Conditions:**

Budgets are prepared on the basis of certain prevailing conditions. If the conditions change budgets are also to be revised. Constant changes in budgets may frustrate the employees and the charm in budgeting and implementation may be lost.

#### **3. Complacency:**

General tendency of employees is to achieve the targets as budgeting fixes the targets. Some of the employees who are highly skillful may also be satisfied in performing up to the goals set without showing full potential, which will be a loss to the enterprise as well as the employee in terms of productivity.

#### **4. Difficulty in Coordination:**

Effective implementation of budgetary control depends upon proper coordination among various departments as the performance of a department depends on the work of other departments and vice versa. It requires budgetary officer to oversee the integration of various activities to successfully implement the budgets. Ineffective coordination leads to inefficient performance.

#### **5. Conflict among Different Departments:**

Budgetary control sets targets for different departments individually. This will make the departmental heads to be selfish to get maximum funds and think in terms of achieving their own set targets, thereby raising conflict among different departments. Inter-departmental rivalries may endanger the performance of the whole organisation.

**UNIT - 5**

**Module – 8**

**Budgets & Budgetary**

**Control**

**Practical Problems**

**(with solutions)**

# Flexible Budget

**(1)** Prepare a Flexible budget for overheads on the basis of the following data. Ascertain the overhead rates at 50% and 60% capacity.

<b>Variable overheads:</b>	At 60% capacity (Rs)
Indirect Material	6,000
Labour	18,000
<b>Semi-variable overheads:</b>	
Electricity: (40% Fixed & 60% variable)	30,000
<b>Repairs:</b> (80% fixed & 20% Variable)	3,000
<b>Fixed overheads:</b>	
Depreciation	16,500
Insurance	4,500
Salaries	15,000
Total overheads	93,000
Estimated direct labour hours	1,86,000

**Solution:**

**Flexible Budget**

Items	Capacity	
	50%	60%
<b>Variable overheads:</b>	<b>Rs.</b>	<b>Rs.</b>
Material	5,000	6,000
Labour	15,000	18,000
<b>Semi-variable</b>		
Electricity	27,000	30,000

Repairs	2,900	3,000
<b>Fixed overheads:</b>		
Deprecation	16,500	16,500
Insurance	4500	4500
Salaries	15,000	15,000
Total Overheads	85,900	93,000
Estimated direct labour hours	1,55,000	1,86,000
Overhead Rate	0.55	0.50

### Working Note:

#### Electricity

At 50% capacity =  $\frac{18,000}{60} \times 50$

60

= Rs. 15,000

Rs. 12,000 + Rs. 15,000 = Rs. 27,000

60% capacity = Rs 18,000 + Rs. 12,000 = Rs. 30,000

#### Repairs

For 60% capacity = Rs.600

=Rs. 2400 + Rs.600 =Rs.3,000

At 50% capacity : =  $600/60 \times 50$

= RS. 500

=Rs.2400 + 500

=Rs.2,900

- (2) Prepare a flexible budget for overheads on the basis of the following data. Ascertain the overhead rates at 60% and 70% capacity.

<b>Variable overheads:</b>	At 60% capacity(Rs)
Material	6,000
Labour	18,000
<b>Semi-variable overheads:</b>	
Electricity:	30,000
40% Fixed	
60% variable	
<b>Repairs:</b>	
80% fixed	3,000
20% Variable	3,000
<b>Fixed overheads:</b>	
Depreciation	16,500
Insurance	4,500
Salaries	15,000
Total overheads	93,000
Estimated direct labour hours	1,86,000

**Solution:**

**Working:**

**Repairs**

For 60% capacity    Fixed  $80/100 * 3,000 = \text{Rs.}2400$

Variable =  $20/100 * 3,000 = \text{Rs.} 600$

=Rs. 2400 + Rs.600 =Rs.3,000



**Electricity Exp.:**

At 60% capacity      Fixed=  $40/100 * 30,000 = 12,000$

Variable =  $60/100 * 30,000 = 18,000$

At 70% capacity:      Fixed =  $40/100 * 30,000 = \text{Rs. } 12,000$

Variable =  $18,000/60 * 70 = \text{Rs. } 21,000$

Total Rs. =33,000

**Flexible Budget**

Items	Capacity	
	60%	70%
<b>Variable overheads:</b>	<b>Rs.</b>	<b>Rs.</b>
Material	6,000	7,000
Labour	18,000	21,000
<b>Semi-variable</b>		
Electricity	30,000	33,000
Repairs	3,000	3,100
<b>Fixed overheads:</b>		
Deprecation	16,500	16,500
Insurance	4,500	4,500
Salaries	15,000	15,000
Total Overheads	93,000	1,00,100
Estimated direct labour hours	1,86,000	2,17,000
Overhead Rate	0.50	0.46

**(3)** The expenses budgeted for production of 1,000 units in a factory are furnished below:

Particulars	Per Unit Rs.
Material Cost	700
Labour Cost	250
Variable overheads	200
Selling expenses (20% fixed)	130
Administrative expenses (Rs. 2,00,000)	200
	<hr/>
Total Cost	1,480

Prepare a budget for production of 600 units and 800 units assuming administrative expenses are rigid for all level of production.

**Solution:** **Flexible Budget**

Particulars	For 600 units		For 800 units	
	Per unit Rs.	Total Rs.	Per unit Rs.	Total Rs.
<b>Variable Cost:</b>				
Materials	700	4,20,000	700	5,60,000
Labour	250	1,50,000	250	2,00,000
Variable overheads	200	1,20,000	200	1,60,000
<b>(A)</b>	<b>1,150</b>	<b>6,90,000</b>	<b>1,150</b>	<b>9,20,000</b>
<b>Semi variable cost:</b>				
Variable selling expenses	104	62,400	104	83,200
Fixed selling expenses	43.33	26,000	32.50	26,000
<b>(B)</b>	<b>147.33</b>	<b>88,400</b>	<b>136.50</b>	<b>1,09,200</b>
<b>Fixed cost:</b>				
Administrative expenses	333.33	2,00,000	250.00	2,00,000
<b>Total Cost(A+B+C)</b>	<b>1,630.66</b>	<b>9,78,400</b>	<b>1,536.50</b>	<b>12,29,200</b>

- (4) The budgeted output of a industry specializing in the production of a one product at the optimum capacity of 6,400 units per annum amounts to Rs. 1,76,048 as detailed below:

Particulars	Rs.	Rs.
Fixed costs		20,688
Variable costs:		
Power	1,440	
Repairs etc.	1,700	
Miscellaneous	540	
Direct material	49,280	
Direct Labour	1,02,400	1,55,360
Total cost		1,76,048

The company decides to have a flexible budget with a production target of 3,200 and 4,800 units (the actual quantity proposed to be produced being left to a later date before commencement of the budget period)

Prepare a flexible budget for production levels of 50% and 75%. Assuming, selling price per unit is maintained at Rs. 40 as at present, indicate the effect on net profit.

Administrative , selling and distribution expenses continue at Rs.3,600.

### Solution:

The production at 100% capacity is 6400 units, so it will be 3,200 units at 50% and 4,800 units at 75% capacity. The variable expenses will change in that proportion.

#### Flexible Budget

Particulars	100%	75%	50%
(i) Sales (per unit Rs.40)	2,56,000	1,92,000	1,28,000
Cost of Sales:			

(a)variable costs:			
Direct material	49,280	36,960	24,640
Direct Labour	1,02,400	76,800	51,200
Power	1,440	1,080	720
Repairs	1,700	1,275	850
Miscellaneous	540	405	270
<b>Total variable costs</b>	<b>1,55,360</b>	<b>1,16,520</b>	<b>77,680</b>
(b)Fixed Costs:	20,688	20,688	20,688
<b>(ii) Total Costs</b>	<b>1,76,048</b>	<b>1,37,208</b>	<b>98,368</b>
<b>Gross Profit(i)- (ii)</b>	<b>79,952</b>	<b>54,792</b>	<b>29,632</b>
Less: Adm., selling and Dist. Costs	3,600	3,600	3,600
<b>Net Profit</b>	<b>76,352</b>	<b>51,192</b>	<b>26,032</b>

**(5)** A factory engaged in manufacturing plastic buckets is working at 40% capacity and produces 10,000 buckets per month.

The present cost break up for one bucket is as under:

Materials Rs.10

Labour Rs.3

Overheads Rs.5 (60% fixed)

The selling price is Rs.20 per bucket. If it is desired to work the factory at 50% capacity the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by a similar fall in the price of material.

You are required to prepare a statement the profit at 50% and 90% capacities and also calculate the break- even points at this capacity production.

## Solution

### Flexible Budget

Particulars	Capacity		
	40%	50%	90%
Production and sales units	10,000	12,500	22,500
Sales price per unit	20	19.40	19.00
Sales Amount	2,00,000	2,42,500	4,27,500
<b>Marginal Cost:</b>			
Material: Rs.10 per unit(at 90% - Rs.9.50 per unit)	1,00,000	1,25,000	2,13,750
Labour	30,000	37,500	67,500
Variable overhead	20,000	25,000	45,000
<b>Total</b>	<b>1,50,000</b>	<b>1,87,500</b>	<b>3,26,250</b>
Contribution	50,000	55,000	1,01,250
Less: Fixed Cost	30,000	30,000	30,000
Profit	20,000	25,000	71,250
Contribution per unit	5	4.40	4.50
<b>BEP (units) (F /C)</b>	<b>6,000</b>	<b>6,818</b>	<b>6,667</b>

# CASH BUDGET

- (1) Saurashtra Co. Ltd. wishes to arrange overdraft facilities with its bankers from the period August to October 2010 when it will be manufacturing mostly for stock. Prepare a cash budget for the above period from the following data given below:

Month	Sales (Rs.)	Purchases (Rs.)	Wages (Rs.)	Mfg. Exp. (Rs.)	Office Exp. (Rs.)	Selling Exp. (Rs.)
June	1,80,000	1,24,800	12,000	3,000	2,000	2,000
July	1,92,000	1,44,000	14,000	4,000	1,000	4,000
August	1,08,000	2,43,000	11,000	3,000	1,500	2,000
September	1,74,000	2,46,000	12,000	4,500	2,000	5,000
October	1,26,000	2,68,000	15,000	5,000	2,500	4,000
November	1,40,000	2,80,000	17,000	5,500	3,000	4,500
December	1,60,000	3,00,000	18,000	6,000	3,000	5,000

## Additional Information:

- (a) Cash on hand 1-08-2010 Rs.25,000.
- (b) 50% of credit sales are realized in the month following the sale and the remaining 50% in the second month following. Creditors are paid in the month following the month of purchase.
- (c) Lag in payment of manufacturing expenses half month.
- (d) Lag in payment of other expenses one month.

**Solution:**

**CASH BUDGET**

**For 3 months from August to October 2010**

Particulars	August (Rs.)	September (Rs.)	October (Rs.)
<b>Receipts:</b>			
Opening balance	25,000	44,500	(66,750)
Sales	1,86,000	1,50,000	1,41,000
<b>Total Receipts(A)</b>	<b>2,11,000</b>	<b>1,94,500</b>	<b>74,250</b>
<b>Payments:</b>			
Purchases	1,44,000	2,43,000	2,46,000
Wages	14,000	11,000	12,000
Mfg. Exp.	3,500	3,750	4,750
Office Exp.	1,000	1,500	2,000
Selling Exp.	4,000	2,000	5,000
<b>Total payments(B)</b>	<b>1,66,500</b>	<b>2,61,250</b>	<b>2,69,750</b>
<b>Closing Balance(A-B)</b>	<b>44,500</b>	<b>(66,750)</b>	<b>(1,95,500)</b>

Working Note:

1. Manufacturing Expense:

Particular	August	September	October
July (4000/2)	2000	---	---
August (3000/2)	1500	1500	---
September (4500/2)	---	2250	2250
October (5000/2)	---	---	2500
Total	3500	3750	4750

## 2. Sales

Particular	August	September	October
June (180000/2)	90000	---	---
July (192000/2)	96000	96000	---
August (108000/2)	---	54000	54000
September (174000/2)	---	---	87000
Total	186000	150000	141000

- (2)** S. K. Brothers wish to approach the bankers for temporary overdraft facility for the period from October 2010 to December 2010. During the period of this period of these three months, the firm will be manufacturing mostly for stock. You are required to prepare a cash budget for the above period.

Month	Sales (Rs.)	Purchases (Rs.)	Wages (Rs.)
August	3,60,000	2,49,600	24,000
September	3,84,000	2,88,000	28,000
October	2,16,000	4,86,000	22,000
November	3,48,000	4,92,000	20,000
December	2,52,000	5,36,000	30,000

- (a) 50% of credit sales are realized in the month following the sales and remaining 50% in the second following.
- (b) Creditors are paid in the month following the month of purchase
- (c) Estimated cash as on 1-10-2010 is Rs.50,000.



**CASH BUDGET****For 3 months from October to December 2010**

Particulars	October (Rs.)	November(Rs.)	December(Rs.)
<b>Receipts:</b>			
Opening balance	50,000	1,12,000	(94,000)
Collection from Debtors	3,72,000	3,00,000	2,82,000
<b>Total Receipts(A)</b>	4,22,000	4,12,000	1,88,000
<b>Payments:</b>			
Payments to Creditors	2,88,000	4,86,000	4,92,000
Wages	22,000	20,000	30,000
<b>Total payments(B)</b>	3,10,000	5,06,000	5,22,000
<b>Closing Balance(A-B)</b>	<b>1,12,000</b>	<b>(94,000)</b>	<b>-3,34,000</b>

**Working Note : Collection from debtors**

Particulars	October (Rs.)	November(Rs.)	December(Rs.)
<b>Sales</b>			
August	1,80,000		-
September	1,92,000	1,92,000	-
October	-	1,08,000	1,08,000
November	-		1,74,000
	3,72,000	3,00,000	2,82,000

- (3) TATA Co. Ltd. is to start production on 1<sup>st</sup> January 2011. The prime cost of a unit is expected to be Rs. 40 (Rs. 16 per materials and Rs. 24 for labour). In addition, variable expenses per unit are expected to be Rs. 8 and fixed expenses per month Rs. 30,000. Payment for materials is to be made in the month following the purchase. One-third of sales will be for cash and the rest on credit for settlement in the following month. Expenses are payable in the month in which they are incurred. The selling price is fixed at Rs. 80 per unit. The number of units to be produced and sold is expected to be:

January 900; February 1200; March 1800; April 2000; May 2,100 June 2400

Draw a Cash Budget indicating cash requirements from month to month.

**CASH BUDGET of TATA LTD.**  
**For 6 months from January to June 2011**

Month	Jan.	Feb.	March	April	May	June
<b>Receipts</b>						
Opening Balance		(34,800)	(37,600)	(32,400)	(5,867)	(27,600)
Cash sales	24,000	32,000	48,000	53,333	56,000	64,000
Collection from Debtors		48,000	64,000	96,000	1,06,667	1,12,000
<b>Total receipts(A)</b>	24,000	45,200	74,400	1,16,933	1,56,800	1,48,400
<b>Payments</b>						
Creditors		14,400	19,200	288,00	32,000	33,600
Wages	21,600	28,800	43,200	48,000	50,400	57,600
Variable Exp.	7,200	9,600	14,400	16,000	16,800	19,200
Fixed Exp.	30,000	30,000	30,000	30,000	30,000	30,000
<b>Total Payment(B)</b>	58,800	82,800	1,06,800	1,22,800	1,29,200	1,40,400
<b>Closing Balance</b>	<b>-34,800</b>	<b>-37600</b>	<b>-32400</b>	<b>-5867</b>	<b>-27,600</b>	<b>8,000</b>

**(4)** Prepare a Cash Budget from the data given below for a period of six months (July to December)

(1) Month	Sales	Raw Materials
May	75,000	37,500
June	75,000	37,500
July	1,50,000	52,500
August	2,25,000	3,67,500
September	3,00,000	1,27,500
October	1,50,000	97,500
November	1,50,000	67,500
December	1,37,500	_____

(2) Collection estimates:

- ❖ Within the month of sale: 5%
- ❖ During the month following the sale: 80%
- ❖ During the second month following the sale: 15%

(3) Payment for raw materials is made in the next month.

(4) Salary Rs. 11,250, Lease payment Rs. 3750, Misc. Exp. Rs. 1150, are paid each month

(5) Monthly Depreciation Rs. 15,000

(6) Income tax Rs. 26,250 each in September and December.

(7) Payment for research in October Rs.75,000

(8) Opening Balance on 1<sup>st</sup> July Rs.55,000.

**CASH BUDGET**  
**For the six months from July to December**

Particulars	July	Aug.	Sep.	October	Nov.	December
<b>Receipts</b>						
Opening Balance	55,000	80,100	1,53,950	-38450	24150	83000
Collection from Debtors	78,750	1,42,500	2,17,500	2,81,250	1,725,00	1,49,375
<b>Total receipts(A)</b>	1,33,750	2,22,600	3,71,450	2,42,800	1,96,650	2,32,375
<b>Payments</b>						
Payment to suppliers	37,500	52,500	3,67,500	1,27,500	97,500	67,500
Salary	11,250	11,250	11,250	11,250	11,250	11,250
Lease payment	3750	3750	3750	3750	3750	3750
Misc. expense	1,150	1,150	1,150	1,150	1,150	1,150
Income tax			26,250			26,250
Payment for Research				75,000		
<b>Total Payment(B)</b>	53,650	68,650	4,09,900	2,18,650	1,13,650	1,09,900
<b>Closing Balance</b>	<b>80,100</b>	<b>1,53,950</b>	<b>-38,450</b>	<b>24,150</b>	<b>83,000</b>	<b>1,22,475</b>

**Note:** Depreciation is a non-cash item. It does not involve cash flow. Hence, depreciation will not be considered as payment through cash.

**(5)** Prepare a cash Budget of R.M.C. LTD. for April, May and June 2012:

Months	Sales(Rs.)	Purchases(Rs.)	Wages(Rs.)	Expenses(Rs.)
Jan.(Actual)	80,000	45,000	20,000	5,000
Feb.(Actual)	80,000	40,000	18,000	6,000
March (Actual)	75,000	42,000	22,000	6,000
April (Budget)	90,000	50,000	24,000	7,000
May(Budget)	85,000	45,000	20,000	6,000
June(Budget)	80,000	35,000	18,000	5,000

**Additional Information:**

- (i) 10% of the purchases and 20% of sales are for cash.
- (ii) The average collection period of the company is  $\frac{1}{2}$  month and the credit purchases are paid regularly after one month.
- (iii) Wages are paid half monthly and the rent of Rs. 500 included in expenses is paid monthly and other expenses are paid after one month lag.
- (iv) Cash balance on April 1,2012 may be assumed to be Rs.15,000

**CASH BUDGET**

*(For the months ending April, May & June 2012)*

Particulars	April (Rs.)	May (Rs.)	June (Rs.)
<b>Receipts</b>			
Opening Balance	15,000	27,200	35,700
Cash Sales	18,000	17,000	16,000
Collection from Debtors	66,000	70,000	66,000
<b>Total Receipts(A)</b>	99,000	1,14,200	1,17,700
<b>Payments</b>			
Cash Purchases	5,000	4,500	3,500
Payment to creditors	37,800	45,000	40,500
Wages	23,000	22,000	19,000
Rent	500	500	500
Other Exp.	5,500	6,500	5,500
<b>Total Payments(B)</b>	71,800	78,500	69,000
<b>Closing balance</b>	<b>27,200</b>	<b>35,700</b>	<b>48,700</b>