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UNIT OR OUTPUT COSTING-I (COST SHEET, COST STATEMENT AND PRODUCTION ACCOUNT)

"Single or Output Cost System is used in business where a standard products is turned out an it is desired to find out the cost of a basic unit of Production." —J. R. Battib

Unit or Output costing is used in those industries or organisations where standard products are produced from a common process and all the units produced are more or less similar to each other. This method is also known as single costing method.

DEFINITIONS OF UNIT OR OUTPUT COSTING

Herold J. Wheldon—"Production cost accounting or unit cost accounting is such a method of cost ascertainment which is based on production unit. It is applicable where the production work is done continuously and the units are of same types or manufactured identical."

Walter W. Bigg—"Unit costing method is a method of costing applied to ascertain the cost per unit or production where standard and identical products are manufactured."

From the analysis of the above definitions it is clear that generally this method is used in those industries, where following characteristics are found :

- (i) Production should be uniform or homogeneous and a continuous affair;
- (ii) The units of production should be identical;
- (iii) The cost units should be physical and natural;
- (iv) Per unit cost has to be determined, for example per, ton, per metre, per kg, etc.

Generally, these characteristics are found in following industries—Coal mines, Sugar mills, Cloth mills, Flour mills, Cement factory, Brick kilns, etc.

OBJECTIVES OF UNIT OR OUTPUT COSTING

The following are the main objectives for its application :

- (i) To know the total cost of production and per unit cost within specific period.
- (ii) To classify cost under related categories such as Prime Cost, Works Cost, Cost of Production, etc. and having its detailed analysis in order to determine per unit cost.
- (iii) To determine the effect of each element of cost on total cost so as to have control over cost.
- (iv) To compare the cost during two or more periods and to make efforts for cost control on the basis of comparative analysis.
- (v) To determine proposed selling price to earn desired profit.
- (vi) To determine tender price on the basis of Cost data and future prospects.

In this method there is no need of apportionment of cost because all the expenses are made on a similar type of production. But where production is done for various grades or for various sizes, their expenses have to be apportioned on the basis of size or grades in detail.

ELEMENTS OF COST UNDER UNIT OR OUTPUT COSTING

In Output Costing, in order to determine total cost and per unit cost, collection of various elements of cost is done as follows :

Materials : The quantity and value of material consumed is determined by preparing a Material Abstract. The materials which are issued from stock are valued on an appropriate basis.

Labour : As required, Wage Analysis Sheet are prepared so that direct and indirect labour cost can be determined. Where production is not done on various jobs, there is no need of maintaining job cards. But where job has been distributed among various departments or sub-jobs and a particular worker has to work in various departments or jobs, their job card is required, so that with the help of these job cards the remuneration of the workers may be apportioned to various departments or jobs.

Direct Expenses : In addition to material and labour, there are certain other expenses incurred which are termed as direct expenses. These expenses are directly related to production, hence they are charged to respective production unit by preparing a summary sheet.

Overheads : The overheads are debited to production for the period for which the cost is being determined. These overheads expenses are taken from the financial records. There are certain expenses which cannot be determined before the end of the accounting period. For these expenses, an estimate is made in beginning of the year and are apportioned on appropriate basis. These estimates are based on the past year expenses and if required, considering the current expenses. These estimates are reviewed from time to time. These overheads are the total of indirect material, indirect labour and indirect expense. In output costing, for in depth analysis of overheads, these are classified as Factory Overheads, Office or Administrative Overheads and Selling and Distribution Overheads. As per need, these overheads can also be classified on the basis of nature as fixed overhead, variable overhead and semi-variable overhead.

METHODS OF DETERMINING UNIT COST

In those industries where production is carried out on mass scale and on a continuous basis and standard products are manufactured, the total cost and per unit cost can be determined by the use of following methods :

- (1) Cost Sheet,
- (2) Statement of Cost,
- (3) Production Account.

COST SHEET

Meaning of Cost Sheet

Cost Sheet is a statement which is used to determine the total cost of goods produced or units in a specific period and in which total cost, per unit cost and the cost incurred at various stages from manufacturing a products to the stage of making it saleable are shown. In this way, it can be said that cost sheet is a statement in which the cost of production is presented in an analytical way. This statement as per convenience, can be prepared on weekly, monthly or quarterly intervals.

Definitions of Cost Sheet

ICMA, London—"Cost Sheet is a document which provides for the assembly of the detailed cost of a cost centre or cost unit."

Wheldon—"Cost Sheets are prepared for the use of management and consequently they must include all the essential details which may assist the manager in judging the efficiency of production."

W. W. Bigg—"The expenditure which has been incurred upon production for a period is extracted from the financial books and the store records set out in a memorandum statement.

If this statement is confined to the disclosure of the cost of units produced during the period, it is termed as Cost Sheet."

On going through the above definitions, the Cost Sheet presents the following facts:

- (i) Total quantity of production.
- (ii) Total cost of total quantity produced.
- (iii) Per unit cost of total quantity produced.
- (iv) Various components of cost at various stages of production viz., Prime cost, Factory cost, Cost of production, Cost of goods sold, etc.
- (v) Direct and Indirect cost of production.
- (vi) The proportion of each individual cost to total cost expressed in percentage.
- (vii) Comparative cost of two periods and its analysis, etc.

Characteristics and Objects of Cost Sheet

- (1) The cost sheets are prepared under Unit Costing method of costing because its object is to determine per unit cost.
- (2) The cost sheet is a periodic document which may be prepared weekly, fortnightly, monthly or quarterly.
- (3) The object of preparing a cost sheet is to ascertain the total cost and the burden of each individual cost on the cost per unit of production for the period.

Advantages of Cost Sheet

A cost sheet is advantageous in the following ways:

- (1) *Determination of Selling Price*: Cost sheet helps in fixing the selling price of the product.
- (2) *Control on Expenses*: Cost sheet helps the management to compare the costs of any two periods, and ascertain the inefficiencies and control the expenses.
- (3) *Help in Minimising the Expenses*: Cost sheet helps in minimising the expenses during the period of trade depression and competition.
- (4) *Comparative Study of Cost*: Where different factories producing similar products are run by the same management at different places, a comparative study of the costs of the different factories is possible through the cost sheets prepared by them.
- (5) *Benefit to Common Man*: It helps in cost-control, cost-reduction and better management, the benefit of which goes to the common people as they can get good products at reasonable price.

DIFFERENCE BETWEEN COST ACCOUNT AND COST SHEET

The points of difference are:

- (1) *Double Entry System*: Cost account is based on double entry principle and has Dr. and Cr. sides while it is not so with cost sheet.
- (2) *Use*: Cost accounts are used to prepare Production A/cs, Process A/cs, Contract or Job A/cs, Ledger A/cs, etc. These accounts show the costs but only after the end of the year or period when they are closed. But cost sheets are prepared during the currency of production weekly, monthly, etc. Secondly, the cost sheets render cost information related to that period only for which they are prepared.
- (3) *Comparative Study*: Cost sheets are helpful to know comparative costs, to exercise cost control and costs reduction effectively and to fix up selling prices and quote for articles; but the accounts are not such a guide.
- (4) *Per unit Cost*: Cost sheets ascertain cost per unit, but the cost accounts do not show cost per unit in a detailed or analytical way as the cost sheets do.
- (5) *Reconciliation*: The cost accounts are useful in reconciling the profits of financial book with cost books, while the cost sheets are not.

(6) Basis : Cost accounts are prepared on the basis of cost sheet, whereas cost sheet is not based on the basis of cost accounts.

TYPES OF COST SHEET

TYPES OF COST SHEET

Various types or forms of cost sheet are as follows :
Cost Sheet,

- (1) Simple Cost Sheet
 - (2) Cost Sheet with Profit,
 - (3) Cost Sheet with Statement of Profit,
 - (4) Comparative Cost Sheet.

(1) Simple Cost Sheet

SPECIMEN OF SIMPLE COST SHEET

Cost Sheet (for March)

SPECIMEN OF SIMPLE COST SHEET

Cost Sheet (for March

(Unit :.....)

(Output :

<i>Particulars</i>	<i>Total Cost</i>	<i>Cost per Unit</i>
Direct Material	₹ _____	₹ _____
Direct Wages	_____	_____
Direct or Chargeable Expenses	_____	_____
Works Overhead or Factory Overhead* (By any method of allocation, say a percentage of direct labour)	(a) Prime Cost _____	_____
Office Overhead* (By any percentage on works cost)	(b) Works Cost _____	_____
Selling and Distribution Expenses*	(c) Cost of Production _____	_____
	(d) Total Cost _____	_____

uses included in it have been discussed later on in this chapter.

<i>Particulars</i>	₹	₹
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Particulars	₹
1. Direct Material Cost (a)	
2. Direct Labour Cost	
3. Direct Expenses	
4. Prime Cost ($1 + 2 + 3$)	
5. Production Overhead	
6. Administrative Overhead	
7. Research and Development Cost	
8. Cost of Production (b) ($4 + 5 + 6 + 7$)	
9. Selling Cost	
10. Distribution Cost	
11. Cost of Sales ($8 + 9 + 10$)	

11. Cost of Sales ($8 + 9 + 10$)

Note : To arrive at value at different points as indicated above, adjustments with opening and closing stock is necessary at following different points :

- (a) Opening and Closing Stock of Raw Materials.
 (b) Opening and Closing Stock of Work-in-progress and Finished goods

(2) Cost Sheet with Profit

This Cost Sheet is prepared in accordance to the above cost sheet and along with the cost of production and per unit cost, it also shows the total profit earned. This profit is the difference between sales value and total cost.

~~SPECIMEN OF COST SHEET WITH PROFIT~~

Cost Sheet (for March

(Output :

(Unit:

Particulars	Total Cost ₹	Cost per Unit
Opening Stock of Direct Raw Material	—	—
Add : Purchases during the year	—	—
Add : Incidental Expenses regarding purchases (Carriage, Freight, Octroi, Custom duty, etc.)	—	—
Less : Closing Stock of Direct Raw Material	—	—
Less : Defective Materials Returned	—	—
Less : Residue used in other products	—	—
Cost of Direct Raw Material Consumed	—	—
Direct Wages/Labour Charges or Productive Wages	—	—
Direct Expenses/Chargeable Expenses	—	—
Prime Cost		
Add : Factory Overheads/Works Overheads/ Factory Oncost or Works Oncost :	—	—
Indirect Wages/Unproductive Labour	—	—
Fuel	—	—
Power	—	—
Coal	—	—
Light & Water	—	—
Factory Insurance	—	—
Rent of Factory	—	—
Dep. on Factory Building/Machine	—	—
Repairs on Factory Building/Machine, etc.	—	—
By any method of allocation may be Prime Cost or Direct Wages		
Add : Opening Stock of Work-in-Progress	—	—
Less : Closing Stock of Work-in-Progress	—	—
Add : Additional Overburden on Rectification	—	—
Less : Sale of Scrap/Defective, etc.	—	—
Factory / Works Cost		
Add : Office and Administrative Overheads/Office and Administration Oncost :	—	—
Legal Expenses	—	—
Office Expenses	—	—
Office Salaries	—	—
Office Lighting	—	—
Adm. Expenses	—	—
Printing & Stationery	—	—
Fees of Directors	—	—
Telephone & Telegrams	—	—
Managing Director's Salary (Office)	—	—
Dep. on Office Building/Furniture, etc.	—	—
Repairs to Office Building/Furniture, etc.	—	—
Appropriated by any % on works cost		
Office Cost or Cost of Production		

Add : Opening Stock of Finished Goods		
Less : Closing Stock of Finished Goods		
Add : Selling & Distribution Overheads :		
Advertisement		
Discount		
Travelling Expenses		
Salesman Commission		
Dep. on Delivery Vans		
Packing & Distribution Charges		
Bad Debts		
Upkeep of Delivery Vans		
Warehouse Rent, etc.		
Profit (Certain % on Total Cost or Sales)		
	Cost of Goods Sold	
	Cost of Sales	
	Selling Price	

(3) Cost Sheet with Statement of Profit

This method of preparing the Cost Sheet is considered as more proper and reliable. In this cost sheet, only the cost of production is shown and for the purpose of profit determination a separate Statement of Profit & Loss is prepared. The cost of production is the aggregate of prime cost, factory overheads and office and administration overheads and for profit determination, in Statement of Profit, selling and distribution overheads are added to cost of production to arrive at total cost. The total cost is then deducted from sales to determine profit or loss.

SPECIMEN OF COST SHEET WITH STATEMENT OF PROFIT**Cost Sheet (for.....)**

(Output :

Particulars	Total Cost ₹	Cost per Unit ₹
Raw Material Consumed		
Direct Labour/Wages		
Direct Expenses		
Factory/Works Overheads :		
Factory Expenses		
Light		
Rent of Factory		
Unproductive Wages, etc.		
Office & Administrative Overheads :		
Office Salaries		
Office Rent		
Dep. on Office Building & Equipment		
General Expenses, etc.		
	Factory/ Works Cost:	
	Cost of Production	

Statement of Profit

Particulars	Total Cost	Cost per Unit
	₹	₹
Cost of Production for.....units @ ₹....per unit	—	—
Selling & Distribution Overheads :	—	—
Selling Expenses	—	—
Bad Debts	—	—
Discount	—	—
Advertisement, etc.	—	—
	<i>Cost of Sales</i>	—
Profit	—	—
	<i>Sales/Selling Price</i>	—

(4) Comparative Cost Sheet

Comparative Cost Sheet can be prepared for two purposes. First, when a study has to be made for the comparison of cost of two periods then comparative cost sheet is prepared. In this type of comparative sheet, a comparison of each item of expenses during the relevant two periods can be made and it can be determined that on which item the cost per unit has increased, decreased or has remained stable. Thus, the reasons for the above changes can be examined and analysed which can help in controlling of cost.

Secondly, when a manufacturer produces similar type of two products and wants to determine the difference in cost of each item of expense and further wants to take a decision as to manufacturing of which product can be more profitable, the information in this regard can be easily made available from comparative cost sheet.

SPECIMEN OF COMPARATIVE COST SHEET

Comparative Cost Sheet

Period/Product	Particulars		Period/Product	
Total	Cost per kg		Cost per kg	Total
₹	₹		₹	₹
—	—	Raw Materials (Direct)	—	—
—	—	Direct Wages	—	—
—	—	(a) Prime Cost	—	—
—	—	Works Expenses :	—	—
—	—	Fuel	—	—
—	—	Electric Power	—	—
—	—	Repairs	—	—
—	—	Depreciation	—	—
—	—	Rent, etc.	—	—
—	—	(b) Works Cost :	—	—
—	—	Office Expenses :	—	—
—	—	Office Salaries	—	—
—	—	Office Lighting, etc.	—	—
—	—	(c) Total Cost	—	—
—	—	Profit (% on C.P. or S.P.)	—	—
—	—	(d) Selling Price	—	—

STATEMENT OF COST

Where a statement is prepared to show total cost and the profit or loss, but where it is not desired to find out cost per item of expense, the statement so prepared is the Statement of Cost. If from this statement the cost per unit has to be determined then it can be had by dividing the total cost by the number of units produced. In cost sheet, per unit cost of each item of expense is calculated whereas in statement of cost it is not done.

In some statements, percentage of each component costs is to be reckoned on the total cost, e.g., percentage of prime cost and its components on the total cost, percentage of Factory overhead or Factory cost on total cost, etc. Similarly percentage of Gross Profit or Net Profit on turnover is worked out for the purpose of cost control through cost comparison.

DIFFERENCE BETWEEN COST SHEET AND STATEMENT OF COST

Though various items of cost are arranged in the same sequence in cost sheet as well as in statement of cost and various elements of cost are also similar in both these documents. However, there are some technical differences as given below :

- (1) In cost sheet, per unit cost of each item of expense is calculated whereas it is not shown in statement of cost.
- (2) Cost sheet can be prepared only when quantity of output is given in the question. If quantity is not given in the question, then statement of cost is prepared.
- (3) Cost sheet is more useful than Statement of Cost in case of comparison of cost of two products or two periods.

EXPLANATION OF COST COMPONENTS APPEARING IN COST SHEET OR STATEMENT OF COST

(A) Prime Cost

'Prime Cost' is the main element of cost of any product. It is also known as 'Direct Cost' or 'First Cost' or 'Flat Cost'. This cost is obtained by adding the cost of direct material, direct labour and direct expenses, e.g.,

$$\text{Prime Cost} = \text{Direct Material} + \text{Direct Wages} + \text{Direct Expenses}$$

(i) Direct Material : Direct material means that material which enters into and forms major part of the product, e.g., timber in furniture making, sugarcane in sugar and yarn in cloth production, etc. If several items related to direct material are given in the question, then 'Direct Material Consumed' or 'Raw Material Consumed' is calculated as follows :

(A) Simple Calculation of Raw Material Consumed :

Opening Stock of Raw Material

+ Purchase of Raw Material

+ Carriage Inward or Freight

- Closing Stock of Raw Material

Raw Material Consumed

(B) Typical Calculation of Raw Materials Consumed :

Opening Stock of Raw Material

Add : (i) Purchase of Raw Material

(ii) Carriage Inward or Freight on Material

(iii) Octroi and Customs Duty

(iv) Direct Expenses on Materials

- Less :**
- Closing Stock of Raw Material
 - Cost of Material Sold
 - Material returned to Suppliers
 - Abnormal Wastage of Material
 - Sale of Waste and Scrap Materials

Value of Material Consumed

It is worth mentioning that as per **Cost Accounting Standard-6 (CAS-6)**, Cost of material should be classified under suitable heading. Such classification may be as follows:

According to Nature	According to Availability
Direct Materials :	Direct Materials :
(a) Raw Materials	(a) Purchased :
(b) Components	(i) Indigenous
(c) Semi-finished Goods	(ii) Imported
(d) Sub-assemblies	(b) Self-manufactured

Illustration 1

From the following data determine value of raw materials consumed :

Opening stock of raw materials	5,00
Closing stock of raw materials	10,00
Purchase of raw materials	60,00
Freight on purchase of materials	60
Paid octroi duty on purchase	50
Cost of materials sold	10
Sale of waste materials	2,00
Direct expenses on materials	2,40
Abnormal wastage of materials	1,00
	20

Solution

Calculation of Value of Raw Materials Consumed

Opening Stock of Raw Materials	₹ 5,00
Add : Purchase of Raw Materials	
Freight on Purchase of Materials	60,00
Octroi Duty on Purchase	50
Direct Expenses on Materials	1,00
	66,600
Less : Closing Stock of Raw Materials	
Sale of Waste Materials	10,000
Cost of Materials Sold	2,400
Abnormal Wastage	2,000
	14,600
Raw Materials Consumed	₹ 52,000

(ii) **Direct Wages or Labour :** Direct wages means wages paid to workers who are engaged in converting the shape of the raw material and whose time can be conveniently and economically traceable to units of product or service. It is also known as 'Productive wages', 'Factory wages', 'Process and General wages', etc.

(iii) **Direct Expenses :** These expenses are also called as 'Chargeable Expenses', 'Prime Cost Expenses' or 'Productive Expenses'. These are the expenses which are directly identified with a particular job or process.

Illustration 2
Determine the Prime Cost from the following :

Opening Stock of Materials		₹
Material Purchased	20,000	
Direct Wages	1,30,000	
Chargeable Expenses	80,000	
Carriage Inward	10,000	
Carriage Outward	3,000	
Closing Stock of Materials	5,000	
Material returned to suppliers	30,000	
	4,000	

Solution

Opening Stock of Materials		₹
Materials Purchased	20,000	
Carriage Inward	1,30,000	
	3,000	
	<u>1,53,000</u>	

Less : Material returned to suppliers	4,000	
Closing Stock of Materials	30,000	34,000
Raw Material Consumed		1,19,000
Direct Wages		80,000
Chargeable Expenses		10,000
		<u>Prime Cost</u> <u>2,09,000</u>

Note : Carriage outward is not the item of Prime Cost.

Illustration 3

Direct Materials Consumed ₹ 50,000; Direct Wages ₹ 15,000; Direct expenses ₹ 5,000; Opening Stock of Work-in-Progress ₹ 8,000; Closing Stock of Work-in-Progress ₹ 5,000. Calculate Prime Cost if Work-in-progress is valued at prime cost.

Solution

Statement of Cost		
Direct Materials Consumed		₹
Direct Wages	50,000	
Direct Expenses	15,000	
	5,000	
	<u>70,000</u>	<u>Prime Cost</u>
Add : Opening Stock of Work-in-progress	8,000	
	<u>78,000</u>	
Less : Closing Stock of Work-in-progress	5,000	
	<u>73,000</u>	<u>Prime Cost</u>

(2) Factory Cost or Works Cost

The next stage after prime cost is factory cost, which is generally calculated as follows :

$$\text{Factory/Works Cost} = \text{Prime Cost} + \text{Factory Overheads}$$

Those expenses are included in factory overheads which are of indirect nature and are incurred in factory or production process or in operating and controlling production activity.

These expenses are also known as 'Manufacturing Overheads'. Some of the important items of factory overheads are as follows :

- (i) Factory rent, rates and tax, (ii) Factory light, power, fuel, etc., (iii) Loose tools and spares, (iv) Wages and salaries of factory employees (Administrative and Accounts Staff), (v) Salary of Factory Manager, (vi) Remuneration of Technical Director, (vii) Depreciation, insurance and repairs of factory building, (viii) Depreciation, insurance and repairs of plant and machinery of factory, (ix) Store expenses, (x) Cotton waste, oil, lubricants, nut and bolts, (xi) Expenses of training of factory employees, (xii) Factory stationery and telephones, (xiii) Employees welfare expenses, (xiv) Bonus to factory employees, (xv) Cost of idle time, (xvi) Research and development expenses, (xvii) Drawing office salary, (xviii) Haulage, (xix) Cost of rectification of defective work, (xx) Removal of overburden, (xxi) Rent of Productive Assets taken on lease, (xxii) Quality Control Expenses, (xxiii) Expenses of Service Departments such as Tool room, Engineering and Maintenance, Pollution, Control, etc.

Note : If stock of work-in-progress and sale of scrap are also given in the question, works cost is computed as follows:

Prime Cost

Add : Factory Expenses

Add : Opening Stock of Work-in-Progress

Less : Closing Stock of Work-in-Progress

Less : Sales of Scrap

Works/Factory Cost

(3) Office and Administration Cost

When office and administrative expenses are added to factory cost, then office and administration cost is derived. This cost is also known as Cost of Production.

The expenses which are incurred in operating and controlling the business are included in this overhead. Thus, expenses incurred on effective functioning and maintenance of business, policy creation and implementation are termed as office and administrative expenses. In this overhead following expenses are included :

- (i) Rent, rates and tax of office building, (ii) Expenses on light and cleaning of office premises, (iii) Salaries & wages to office employees (Administrative and Accounts Staff), (iv) Depreciation on office furniture, (v) Repair of office furniture, (vi) Repair of office building, (vii) Depreciation of office building, (viii) Insurance of factory building and furniture, (ix) Salaries of office manager and executives, (x) Expenses on printing and stationery, (xi) Postage, Telegraph & Telephone, (xii) Expenses on business magazine, (xiii) Audit fee, (xiv) Bank charges, (xv) Legal expenses, (xvi) Counting office salaries, (xvii) Director's fees, (xviii) Other office and administration expenses.

(4) Total Cost

When selling and distribution expenses are added in cost of production, then the cost arrived is known as total cost. The selling expenses are those expenses which are incurred on creating or increasing the demand of the product whereas distribution expenses includes those expenses which are incurred in keeping the finished stock in godown and on delivering to the customer godown. The following expenses are included in selling and distribution overheads :

- (i) Expenses of sales office, (ii) Salary, commission allowed to sales manager & sales representative, (iii) Travelling expenses of sales representative, (iv) Advertisement, (v) Bad debts, (vi) Price-list, samples and gifts, (vii) Discount allowed to customers. It should be noted that 'Cash Discount' should not be treated as selling and distribution overhead. But if it is given as 'Cash discount allowed' it will be treated as selling and distribution overhead, (viii) Legal expenses regarding sales, (ix) Stationery regarding sales, (x) Expenses on tender and estimates, (xi) Market research, (xii) Warehouse expenses, (xiii) Salary of warehouse staff, (xiv) Transi-

or insurance of goods, (xv) Depreciation and maintenance expenses of delivery vans, (xvi) Carriage or freight of sale of goods, (xvii) Theft or loss of goods in transit, (xviii) Reconditioning, repairs and packing expenses of containers, (xix) Royalty on Sale, (xx) After-sales Service Cost, (xxi) Sales Incentives, (xxii) Warranty Claims, (xxiii) Petty expenses for the welcome of customers.

Some Other Important Points
 (1) **Cost of Goods Sold** : If there is difference in the quantity of goods produced and goods sold or there is stock of finished goods, then cost of goods sold is computed after obtaining cost of production in the following manner :

	Units	Amount (₹)
Cost of Production		
Add : Opening Stock of Finished Goods		
Less : Closing Stock of Finished Goods		
Cost of Goods Sold		

(2) **Cost of Sales** : When selling and distribution expenses are added to cost of goods sold, then the cost arrived at is known as Cost of Sales.

(3) **Profit on Goods Sold and Net Profit** : If both these profits are to be calculated then profit on goods sold is obtained on the basis of difference between cost of goods sold and sale, while net profit is calculated by deducting selling and distribution expenses from the amount of profit on goods sold as shown below :

	Sales	
Cost of Goods Sold		
Profit on Goods Sold (Difference)		
Profit on Goods Sold		

	Net Profit
Less : Selling & Distribution Expenses	

(4) **Valuation of Work-in-Progress (W.I.P.)** : Work-in-progress is the incomplete part of job, work or product which is still in the process of manufacture and which is still not a saleable product. In every manufacturing process some or more work-in-progress is likely to exist at the end of period's work where the production is continuous. A furniture manufacturer may complete the manufacture of 20 chairs but may still have by the end of the day some 5 incomplete chairs which require seats to be fixed and polished. These five chairs constitute work-in-progress. The question is how to value the work-in-progress? Some accountants value it at the *Prime Cost* basis and some at *Factory Cost* basis. At Prime cost basis, only the Direct material, Direct wages and Direct expenses incurred in the W.I.P., are taken to be the cost of W.I.P. At Factory Cost basis, the factory overheads attributable to the W.I.P. are also included over and above the Prime cost. So, where the opening and closing balances of W.I.P. are given, the cost of W.I.P. is ascertained as follows :

Example

1. Where W.I.P. is Valued at Prime Cost

	₹
Direct Material	2,000
Direct Labour	1,500
Direct Charges	200
	3,700
Add : W.I.P. as on 1-1-20 . . . (Opening)	800
	4,500
Less : W.I.P. as on 31-12-20 . . . (Closing)	500
Prime Cost	₹ 4,000

2. Where W.I.P. is Valued at Factory Cost

✓ Direct Material
Direct Labour
Direct Charges

Prime Cost	₹ 3,500
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Factory Overheads :
Factory Rent
Lighting
Power
Indirect Labour
Depreciation

400	400
200	200
300	300
500	500
300	300
5,400	5,400

Add : W.I.P. as on 1-1-20.....

80	80
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Less : W.I.P. as on 31-12-20.....

6,250	6,250
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Factory Cost	₹ 5,700
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The administration costs are, however, not included in the cost of W.I.P. as a matter of policy, otherwise, the cost of the uncompleted work would increase.

(5) Calculation of Profit by % on Cost : When office and administrative overheads and selling and distribution overheads is added to factory cost, we arrive at total cost. If the desired profit percentage on total cost is calculated on total cost so arrived, will result in the amount of profit. When this profit is added to total cost then sales value is achieved.

Illustration

	₹	(Total above not shown)
Factory Cost		5,700 (as in the above example)
Office & Administration overheads		400
Selling and Distribution overheads		200
	Total Cost	6,300
Add : Profit @ 10% on Total Cost		630
	Selling Price	₹ 6,930
So	Profit = Cost × $\frac{\text{Per cent}}{100}$	$= 6,300 \times \frac{10}{100} = ₹ 630$

Calculation of Profit by % on Selling Price : It is a bit difficult calculation. Here the percentage is on selling price. Selling price is cost + profit. So how to calculate it ?

We know only the cost price. So a percentage should be so calculated on the cost price itself that it may work out to be the desired percentage on the selling price. Suppose, we have to calculate 10% profit on selling price, it will be 1/9 on the cost price as follows :

Sale value	100
(-) Profit	10
Cost Price	90

This profit of ₹ 10 is on ₹ 90 which is the cost price. So, it is 1/9th of the cost price.

In brief calculation of profit is made as follows :

(i) If percentage of profit is given on Cost = $\frac{\text{Total Cost or Cost of Sales} \times \text{Rate of Profit}}{100}$

(ii) If percentage of profit is given on selling price

$$= \frac{\text{Total Cost or Cost of Sales} \times \text{Rate of Profit}}{100 - \text{Rate of Profit}}$$

(6) *Items not included in Cost Accounts* : Certain items of income and expenditure are of purely financial nature and are not shown in cost sheet or statement of cost. Some of such items are as follows :

- (i) Abnormal Loss of Material or Labour
- (ii) Preliminary Expenses or Goodwill written-off
- (iii) Income Tax, Wealth Tax or other Direct Taxes
- (iv) Interest Paid on Capital or Loan
- (v) Interest received on Investment
- (vi) Capital Gains or Losses
- (vii) Transfer to Reserves
- (viii) Discount or Premium on Issue of Shares or Debentures
- (ix) Payment or Receipt of Dividend
- (x) Share Transfer Fee
- (xi) Cash Discount
- (xii) Profit or Loss on Valuation of Stock
- (xiii) Profit or Loss on Foreign Exchange.

COST SHEET

*Illustration 4 (Simple Cost Sheet,
Factory, 1,000 units of pro-*

Illustration In a Factory, 1,000 units of product 'X' were manufactured in the month of April 2014. From the following figures obtained from the costing records, prepare a Cost Sheet showing cost per unit :

	Amount in Rs.
Raw Material Consumed	60,000
Direct Labour	30,000
Direct Expenses	10,000
Factory Overheads	40,000
Office Overheads	10,000
Selling Overheads	20,000

Solution

Cost Sheet
(for the month of April, 2014)

(Output : 1,000 units)

	<i>Elements of Cost</i>	<i>Total Cost</i>	<i>Cost per Unit</i>
Raw Materials Consumed		₹ 60,000	₹ 60
Direct Labour		30,000	30
Direct Expenses		10,000	10
		<i>Prime Cost</i>	
Factory Overheads		1,00,000	100
Office Overheads		40,000	40
Selling Overheads		1,40,000	140
		10,000	10
		<i>Factory Cost</i>	
		1,50,000	150
		20,000	20
		<i>Cost of Production</i>	
		1,70,000	170
		<i>Total Cost</i>	

Illustration 5

Below is the enumerated expenditure for a year in the manufacture of a product :

	₹		₹
Raw Material	56,000	Rent (Factory)	4,000
Fuel	14,000	Tax & Insurance (Factory)	800
Electric Power	2,800	Depreciation on Machine	4,800
Process and General Wages	1,26,000	Advertisement	1,000
Repairs	4,800	Salaries to Sales Agent	1,600
Carriage Inward	4,000	Carriage on Sales	400
Light & Water	800		
Office Salary	14,000		
Administrative Expenses (Office)	10,000		
Units manufactured	40,000		

Prepare a cost sheet for the year showing cost per unit for each item of expenses and also the total cost of the production.

Solution**Cost Sheet (for the year)**

(Output : 40,000 Units)

Particulars	₹	Total Cost	Cost per Unit
Raw Materials	56,000		
Add : Carriage Inward	4,000		
Cost of Material Consumed	60,000		
Process & General Wages	1,26,000		
		Prime Cost	3.15
Add : Works Overheads :		1,86,000	4.65
Fuel	14,000		
Electric Power	2,800		
Repairs	4,800		
Light & Water	800		
Tax & Insurance	800		
Depreciation on Machine	4,800		
Rent	4,000		
		Works Cost	5.45
Add : Office Overheads :		2,18,000	6.05
Office Salary	14,000		
Adm. Expenses	10,000		
		Office / Cost of Production	6.05
Add : Selling & Distribution Overheads :		2,42,000	6.13
Advertisement	1,000		
Salaries to Sales Agent	1,600		
Carriage on Sales	400		
		Cost of Sales / Total Cost	6.13

Illustration 6 (Cost Sheet showing Percentages of Various Cost on Total Cost)

The following expenses are related to the production of 1,000 units during the month of August 2014:

Direct Material	12,000
Wages	10,000
Factory Rent & Taxes	1,000
Depreciation on Machinery	1,000
Supervisor's Salary	2,000
Indirect Material	500
Indirect Labour	300
Office Expenses	1,500
Other Factory Exp.	500

Office Salaries
Printing & Stationery
Selling Expenses
are a cost sheet &

Office Stationery
Printing & Stationery
Selling Expenses
Prepare a cost sheet & show the percentage of various costs on total cost.

Cost Sheet

Cost Sheet
(for the month of August 2014)

Particulars		(Output : 1,000 units)	
		Total Cost	Cost per Unit
Direct Material			
Wages		₹ 12,000	₹ 12.00
Factory Overheads :			
Factory Rent & Taxes	Prime Cost	₹ 10,000	₹ 10.00
Depreciation on Machinery		₹ 22,000	₹ 22.00
Supervisor's Salary			
Indirect Material	Factory Cost	₹ 1,000	₹ 1.00
Indirect Labour		₹ 1,000	₹ 1.00
Other Factory Expenses		₹ 2,000	₹ 2.00
Office Overheads :			
Office Expenses		₹ 500	₹ 0.50
Office Salaries		₹ 300	₹ 0.30
Printing & Stationery		₹ 500	₹ 0.50
Selling Overheads :			
Selling Expenses	Office Cost or Cost of Production	₹ 27,300	₹ 27.30
	Total Cost or Cost of Sales	₹ 1,500	₹ 1.50
		₹ 1,800	₹ 1.80
		₹ 400	₹ 0.40
		₹ 31,000	₹ 31.00
		₹ 2,500	₹ 2.50
		₹ 33,500	₹ 33.50

Calculation of Percentages

- (1) Percentage of Material Cost on Total Cost

$$= \frac{\text{Material Cost}}{\text{Total Cost}} \times 100 = \frac{12,000}{33,500} \times 100 = 35.8\%$$

(2) Percentage of Wages on Total Cost

$$= \frac{\text{Wages}}{\text{Total Cost}} \times 100 = \frac{10,000}{33,500} \times 100 = 29.8\%$$

(3) Percentage of Factory Overheads on Total Cost

$$= \frac{\text{Factory Overheads}}{\text{Total Cost}} \times 100 = \frac{5,300}{33,500} \times 100 = 15.8\%$$

(4) Percentage of Office Overheads on Total Cost

$$= \frac{\text{Office Overheads}}{\text{Total Cost}} \times 100 = \frac{3,700}{33,500} \times 100 = 11.0\%$$

(5) Percentage of Selling Overheads on Total Cost

$$= \frac{\text{Selling Overheads}}{\text{Total Cost}} \times 100 = \frac{2,500}{33,500} \times 100 = 7.5\%$$

Illustration 7 (Cost Sheet relating to mine)

From the following particulars of a colliery mine for the month of April 2014 prepare a cost sheet

Wages

Underground	15,00
Surface	2,50
Working Expenses :	
Repairs and Renewals	60
Timber	35
Royalties and Way-leaves	50
Stable Expenses	15
Stores	20

Rent, Rates and Taxes
Depreciation

Administrative Expenses :
General Administration, Selling and Distribution Charges
(Saleable Ton raised, 500 ton)

Solution

Colliery Cost Sheet (for the month of April, 2014)
(Output : 500 ton)

Particulars	Prime Cost	Total Cost	Cost per unit
Wages :			
Underground	15,000	15,000	30.00
Surface	2,500	2,500	5.00
	17,500	17,500	35.00
Working Expenses :			
Repairs and Renewals	600	600	1.20
Timber	350	350	0.70
Royalties and Way-leaves	500	500	1.00
Stable Expenses	150	150	0.30
Stores	200	200	0.40
Rent, Rates and Taxes	175	175	0.35
Depreciation	300	300	0.60
	19,775	19,775	39.55
Administrative Expenses :			
General Administration, Selling and Distribution Charges	700	700	1.40
	20,475	20,475	40.95

Cost sheet with profit

Illustration 8

A factory produces 'x' product. You are required to prepare a cost sheet for the period ended on 31st December, 2014 on the basis of following informations :

Opening stock of materials	15,000
Purchase of materials	1,70,000
Closing stock of materials	10,000
Productive wages	50,000
Other productive manufacturing expenses	8,000

Factory overhead 80% of productive wages; Office overhead 75% of works oncost; Selling and Distribution overhead @ ₹ 2.50 per unit sold; Finished units in hand at the beginning of the period 500 (value ₹ 10,000); Production during the period 15,000 units; Finished units at the end of the period 1,500.

Also show per unit selling price in the cost sheet. Charge profit @ 25% on selling price.

Solution

Cost Sheet
(for the period ended 31st Dec., 2014) (Units Produced : 15,000)

Particulars	Materials Consumed	Total Cost	Cost per unit
Opening stock of materials		15,000	
Add : Purchase of materials		1,70,000	
		1,85,000	
Less : Closing stock of materials		10,000	
		1,75,000	11.667
Productive wages		50,000	3.333
Other productive manufacturing expenses		8,000	.533
		2,33,000	15.533
Factory overheads 80% of productive wages $(50,000 \times \frac{80}{100})$		40,000	2.667
		2,73,000	18.200

UNIT OR OUTPUT CONSTING-I

Office overheads 75% of works on cost $(40,000 \times \frac{75}{100})$	Cost of Production	Units	30,000	2.00
Add : Opening stock of Finished goods		15,000	3,03,000	20.200
Less : Closing stock of finished goods @ $\text{₹ } 20.20$ per unit		500	10,000	
Selling and Distribution overhead @ $\text{₹ } 2.50$ per unit sold $(2.50 \times 14,000)$	Cost of Goods Sold - जा (करी)	15,500	3,13,000	20.193
Profit 25% on Selling Price $(3,17,700 \times \frac{25}{75})$	Cost of sales	1,500	30,300	2.500
			2,82,700	
			35,000	22.693
			3,17,700	7.564
			1,05,900	
			4,23,600	30.257

Cost Sheet with Statement of Profit

Illustration 9

Following data relate to a manufacturing of product for the month of January, 2014 :

Materials used	₹ 1,00,000
Direct wages	₹ 28,000
Effective Machine Hours	4,000
Machine Hour Rate	₹ 8
Office overhead 10% of works cost	
Selling & Distribution expenses 75 paise per unit	8,000
Units manufactured	7,200
Units sold	7,200
Selling price per unit	₹ 25

Prepare a Cost Sheet showing (i) cost per unit, and (ii) a statement of profit for the period.

Solution

Cost Sheet (for Jan. 2014)

(Output : 8,000 Units)

Particulars	Total Cost	Cost per Unit
Materials used	₹ 1,00,000	12.50
Direct wages	28,000	3.50
	1,28,000	16.00
Works overhead (4,000 Machine hours @ ₹ 8)	32,000	4.00
	1,60,000	20.00
Office overhead (10% of Works Cost)	16,000	2.00
	1,76,000	22.00

Statement of Profit

	Amount	Per Unit
Cost of Production for 8,000 units	₹ 1,76,000	22.00
Less : Closing Stock of 800 units @ 22 per unit	17,600	—
Cost of production of goods sold for 7,200 units	1,58,400	22.00
Add : Selling & Distribution expenses @ 75 paise per unit	5,400	0.75
	1,63,800	22.75
	16,200	2.25
	1,80,000	25.00

~~Comparative Cost Sheet~~
Illustration 10

From the following particulars prepare a cost sheet showing the comparative cost per ton for both the periods:

	Three months ended 31-3-2014	30-6-2014
Productive Wages	72,000	98,000
Administration Expenses	12,000	12,000
Raw Materials	36,000	49,000
Taxes and Insurance—Factory	750	750
Light and Water	1,000	1,000
Direct Expenses	9,000	12,500
Depreciation	2,000	2,000
Factory Rent	1,500	1,500
Unproductive Labour	30,000	41,000
Factory Repairs	3,000	4,500
	1,67,250	2,22,250

The tonnage produced in the two quarters was 12,000 and 16,000 ton respectively.

Solution

Cost Sheet

Three months ended 31-3-2014 12,000 ton		Three months ended 30-6-2014 16,000 ton	
Particulars	Total	Particulars	Total
	Cost per ton		Cost per ton
Raw Materials	49,000	3.06	
Productive Wages	98,000	6.13	
Direct Expenses	12,500	0.78	
		Prime Cost	1,59,500
Unproductive Labour	41,000	2.56	
Factory Rent	1,500	0.09	
Factory Repairs	4,500	0.28	
Light and Water	1,000	0.06	
Depreciation	2,000	0.13	
Taxes and insurance	750	0.05	
		Works Cost	2,10,250
Administrative Expenses	12,000	0.75	
		Cost of Production	2,22,250
	13.94		13.89

Illustration 11

Prepare a Cost Sheet showing cost per cabinet and profit per cabinet from the following particulars:

The cabinets manufactured are classed 'No. 1' and 'No. 2'. There is no opening or closing stock of cabinets.

	No. 1	No. 2
Materials (₹)	12,400	13,232
Labour (₹)	22,540	25,358
No. sold	520	780
Selling price (₹)	150	110

Works overhead comes to 100% on labour and office overheads to 25% on works cost.

What is the total profit for the year as per the above particulars?

Cost sheet showing Cost per Cabinet and Profit per Cabinet Sold			
No. 1 Cost per Cabinet	Cost of 520 Cabinets	Particulars	
		No. 2 Cost per Cabinet	No. 2 Cost of 780 Cabinets
Materials	12,400	16,964	13,232
Labour	22,540	32,510	25,358
Works overhead—100% on Labour	34,940	49,474	38,590
Office overhead—25% on Works Cost	22,540	32,510	25,358
	57,480	81,984	63,948
	14,370	20,496	15,987
	71,850	102,480	79,935
	6,150	7,520	5,865
	78,000	110,000	85,800
Total Profit for the year :			

Cabinet No. 1

Cabinet No. 2

Total

₹ 6,150

—

₹ 5,865

—

₹ 12,015

Illustration 12 (Comparative Cost Sheet of two products with Apportionment of Cost)

The cost of making 40 pianos of which 20 are of Grade A and 20 are of Grade B is ₹ 80,000.

Pianos of Grade B cost 55% and Pianos of Grade A cost 45% of the total.

Ascertain the cost of each grade and add thereto 10 per cent for indirect expenses. Transport and space in the showroom cost ₹ 60 per piano. Selling expenses and advertising are 10 per cent on the selling price which is ₹ 3,150 in the case of Grade A and ₹ 3,885 in the case of Grade B.

Write up a Cost Sheet showing the percentage of profit on total cost and selling price respectively on each Grade.

Solution

Particulars	Piano 'A' (20)		Piano 'B' (20)	
	Total	Per Piano	Total	Per Piano
Manufacturing Cost	₹ 36,000	₹ 1,800	₹ 44,000	₹ 2,200
Indirect Expenses (10% of Manufacturing Cost)	3,600	180	4,400	220
Transport and Showroom charges	1,200	60	1,200	60
Selling and Advertisement (10% on the selling price)	6,300	315	7,770	388.50
	47,100	2,355	57,370	2,868.50
Total Cost	47,100	2,355	57,370	2,868.50
Profit	15,900	795	20,330	1,016.50
Sales	63,000	3,150	77,700	3,885.00
Profit	15,900	795	20,330	1,016.50
Percentage of Profit on Cost = $\frac{\text{Profit}}{\text{Total Cost}} \times 100$	33.76%	35.44%	25.24%	26.16%
Percentage of Profit on Selling Price = $\frac{\text{Profit}}{\text{Sales}} \times 100$				

Note : Total Production Cost is ₹ 80,000 which is divided in A 45% and B 55%.

$$A = 80,000 \times \frac{45}{100} = ₹ 36,000; B = 80,000 \times \frac{55}{100} = ₹ 44,000$$

Apportionment of Overheads

When two or more than two products are being manufactured, then it may be possible that some overheads may be such which may be related to various products. In this situation, these overheads are to be apportioned on some suitable basis so that the total cost of each product may be correctly ascertained. In the chapter of overheads, various basis of apportionment of overheads has been dealt with and any of the suitable basis can be applied for apportionment of overheads. However, if specific instructions have been given, then apportionment of overheads should be done according to instructions. If specific information is not provided, then factory

overheads should be apportioned on the basis of wages, office and administration overheads and selling and distribution overheads should be apportioned on the basis of factory cost.

Illustration 13 (Apportionment of Joint Expenses)

A factory produced 100 units each of commodities 'X' and 'Y'. The cost of production was :

	X (₹)	Y (₹)
Direct Materials	28,000	20,000
Direct Wages	16,000	10,000
Direct Expenses	3,000	2,000

Overhead expenses are (i) Factory ₹ 13,000; (ii) Office ₹ 7,360. If a profit of 25% on sales is realised, what would be the selling price of each article.

Solution

Computation of Selling Price

Particulars	X (100 units)		Y (100 units)	
	Total	Per Unit	Total	Per Unit
Direct Materials	₹ 28,000	₹ 280	₹ 20,000	₹ 200.00
Direct Wages	16,000	160	10,000	100.00
Direct Expenses	3,000	30	2,000	20.00
Prime Cost	47,000	470	32,000	320.00
Factory Overheads (in the ratio of Direct Wages i.e., 16 : 10)	8,000	80	5,000	50.00
Works Cost	55,000	550	37,000	370.00
Office Overheads (in the ratio of Works Cost i.e., 55 : 37)	4,400	44	2,960	29.60
Total Cost	59,400	594	39,960	399.60
Profit (25% on Sales or 25/75 on Total Cost)	19,800	198	13,320	133.20
Selling Price	79,200	792	53,280	532.80

Illustration 14

A company manufactures two types of pens namely 'Hero' & 'Raja'. Following are the details of cost for the year ended 31st March, 2014 :

Direct Material	1,30,000
Direct Labour	1,10,000
Production Overheads	75,000

Following additional information is given :

- (i) The direct materials in 'Raja' pen was 40% of that in Hero pen.
- (ii) The direct labour cost in 'Hero' pen was twice as much as that in 'Raja' pen.
- (iii) Production overhead per pen was in the ratio of 5 : 3 (Hero & Raja).
- (iv) Administration overhead for each type of pen was 100% of direct labour cost.
- (v) Selling and distribution overhead was ₹ 1 per pen.

Following was the production and sale of pen during the year :

	Production (Units)	Sales (Units)	Rate
Hero Pen	20,000	18,000	@ ₹ 22.00
Raja Pen	15,000	14,000	@ ₹ 14.00

Prepare a cost sheet showing the cost details and profit per pen of each type.

Solution

Cost Sheet

Particulars	Hero Pens (20,000)		Raja Pens (15,000)	
	Total	Per Pen	Total	Per Pen
Direct Material ¹	₹ 1,00,000	5.00	₹ 30,000	2.00
Direct Labour ²	80,000	4.00	30,000	2.00
Prime Cost	1,80,000	9.00	60,000	4.00
Production Overhead	46,875	2.34375	28,125	1.875
Works Cost	2,26,875	11.34375	88,125	5.875
Administration Overhead	80,000	4.00	30,000	2.00
Cost of Production	3,06,875	15.34375	1,18,125	7.875

<i>Less : Closing Stock</i>	30,687.50	—	7,875	7,875
<i>Cost of Goods Sold</i>	2,76,187.50	15,343.75	1,10,250	7,875
<i>Selling and Distribution Overhead</i>	18,000.00	1.00	14,000	1.00
<i>Cost of Sales</i>	2,94,187.50	16,343.75	1,24,250	8.875
<i>Profit</i>	1,01,812.50	5.65625	71,750	5.125
<i>Sales</i>	3,96,000.00	22.00	1,96,000	14.00

Working Notes :

1. Material Cost has been determined as:
Let material cost of Hero pen = ₹ 1

$$\therefore \text{Material cost of Raja pen} = 1 \times \frac{40}{100} = 0.40$$

Productive = Hero pen : Raja pen :

$$\begin{aligned}\text{Ratio} &= 20,000 \times 1 : 15,000 \times 0.40 \\ &= 20,000 : 6,000 \\ &= 20 : 6 \text{ i.e. } 10 : 3.\end{aligned}$$

2. Labour Cost has been determined as under :

Let labour cost of Raja pen = ₹ 1

$$\therefore \text{Labour cost of Hero pen} = ₹ 1 \times 2 = ₹ 2$$

Productive = Hero pen : Raja pen

$$\begin{aligned}\text{Ratio} &= 20,000 \times 2 : 15,000 \times 1 \\ &= 40,000 : 15,000 \\ &= 40 : 15 \text{ i.e. } 8 : 3\end{aligned}$$

When Equivalence of one Product to others is given to find out Overheads**Illustration 15**

Messrs Hindustan Traders manufactures three types of fans—table fan, ceiling fan and cooler. The materials and wages costs are as under :

	Materials		Wages	
	₹	₹	₹	₹
Table fan	60	—	80	—
Ceiling fan	100	—	100	—
Cooler	900	—	250	—

His total factory overheads for the month of August, 2013 was ₹ 1,00,000. You are asked to determine the factory cost of each type of fan assuming that one ceiling fan is equivalent to two table fans and one cooler is equivalent to five table fans for the purpose of overheads allocation. The production in the month of August, 2013 was 1,000 table fans, 500 ceiling fans and 100 coolers.

Solution**Proportionate Ratio of Factory Overheads**

$$1 \text{ ceiling fan} = 2 \text{ table fans}$$

$$\therefore 500 \text{ ceiling fans} = 2 \times 500 = 1,000 \text{ table fans}$$

$$1 \text{ cooler} = 5 \text{ table fans}$$

$$\therefore 100 \text{ coolers} = 5 \times 100 = 500 \text{ table fans.}$$

The ratio is :

Table fans	1,000
Ceiling fans	1,000
Coolers	500

Cost Sheet

Particulars	Table fan (1,000)		Ceiling fan (500)		Cooler (100)	
	Total	Per fan	Total	Per fan	Total	Per cooler
Materials	₹ 60,000	₹ 60	₹ 50,000	₹ 100	₹ 90,000	₹ 900
Wages	80,000	80	50,000	100	25,000	250
Prime Cost	1,40,000	140	1,00,000	200	1,15,000	1,150
Factory overheads (2 : 2 : 1)	40,000	40	40,000	80	20,000	200
Factory Cost	1,80,000	180	1,40,000	280	1,35,000	1,350

Calculation of missing items

Illustration 16

A firm purchased a plant to manufacture a new product. The cost data for which is given below:
Estimated annual sale 24,000 units

Estimated costs :	
Materials	₹ 4 p.u.
Direct labour	₹ 0.60 p.u.
Factory overhead	₹ 24,000 p.a.
Administrative expenses	₹ 28,000 p.a.
Selling expenses	15% on sales

Calculate the selling price if profit per unit is ₹ 1.02.

Solution

Statement of Cost

Particulars	Cost per Unit	Total Amount
Materials	₹ 4.00	96,000
Direct Labour	0.60	14,400
Factory Overhead	4.60	1,10,400
Administrative Expenses	1.00	24,000
Selling Expenses (15% on sales)	5.60	1,34,400
	1.17	28,080
	6.77	1,62,480
	1.375	33,000
	8.145	1,95,480
Profit	1.02	24,480
	9.165	2,19,960

Note : Calculation of Selling Expenses :

Let Selling Price be ₹ x

Cost of Production + Selling Exp. + Profit = Selling Price

$$6.77 + 0.15x + 1.02 = x$$

or

$$x - 0.15x = 7.79$$

$$\frac{0.85}{0.85} x = \frac{7.79}{0.85} = ₹ 9.165$$

Cost Sheet of Bricks Kiln

In case of a bricks kiln the main items of cost are royalty, coal, etc. Hence, its cost sheet differs from a general cost sheet.

Illustration 17

From the undermentioned particulars of the Mumbai Brick Works, you are required to prepare monthly cost sheet of mini bricks made in January 2014, showing cost and profit per 1,000 bricks:

Materials :

Coal	31,500
Royalty	5,550
Stores	15,000

Labour :

Direct	15,000
Brick-Making	50,000

Overheads :

Works—25% of Prime Cost	31,500
Office—10% of Works Cost	3,150

Production per month—74,00,000 bricks

Sales per month @ ₹ 27.50—70,00,000 bricks

Stock 1st January, 2014—2,00,000 bricks.

Stock 31st January, 2014—6,00,000 bricks.

You have to assume that stock was valued at the same rate per 1,000 bricks as the production for January 2014.

Solution
Output : 7,400 M. Bricks
1000 lot

MUMBAI BRICK WORKS
Cost Sheet

	Particulars	Period for January, 2014	
		Cost Per M. (1,000)	Total Cost
Materials :			
Coal	31,500	₹ 12.00	37,800
Royalty	5,550		
Stores	15,000	7.03	52,050
Labour :			
Direct	15,000	8.79	65,000
Brick-making	50,000	15.82	1,17,050
Works Overhead (25% of Prime Cost)		3.95	29,262
Office Overhead (10% of Works Cost)		19.77	1,46,312
Total Cost		1.98	14,631
Stock 1.1.2014	21.75	21.75	1,60,943
Cost of Production	200 M	4,350	
(-) Stock 31.1.2014	7,400 M	—	1,60,943
Cost of Bricks Sold	7,600 M	21.75	1,65,293
Profit	600 M	—	13,050
	7,000 M	21.75	1,52,243
		5.75	40,257
		27.50	1,92,500
Sales			

Illustration 18

From the undermentioned particulars, prepare a Cost Sheet of a brick works showing cost and profit per 1,000 bricks:

Wages

Coal : 5,000 ton at ₹ 15 per ton

₹ 1,50,000

Royalties : ₹ 1.50 per 1,000 bricks made

Depreciation on plant and machinery at 10% (Capital cost ₹ 3,00,000)

Removal of overburden : one rupee per 1,000 bricks

Works Overhead : 10% of wages and coal

Office Overhead : 2.5% of wages and coal

Bricks made : 1,01,52,284 (wastage 1.5% of output)

Bricks sold : 80,00,000 at ₹ 40 per 1,000 bricks

Stock of Bricks on 1st Jan., 2014 : 20,00,000 at ₹ 30 per 1,000

Stock of Bricks on 31st December, 2014 : 40,00,000 at ₹ 30 per 1,000

Solution

Cost Sheet

(for the year ending 31st Dec., 2014)

Bricks Made 1,01,52,284 less 1½% for wastage
Effective Output 1,00,00,000 Bricks

	Total	Cost per 1,000 Bricks
Wages	1,50,000	15.00
Coal (5,000 Ton @ ₹ 15 per Ton)	75,000	7.50
Royalties (@ ₹ 1.50 per 1000 bricks on 1,00,00,000 Bricks)	15,000	1.50
Prime Cost	2,40,000	24.00

Works Expenses :

Removal of Overburden (@ ₹ 1 per 1,000 bricks)	10,000	1/2
Depreciation on plant and machinery (10% on ₹ 3,00,000)	30,000	3/2
Works Overheads (@ 10% on Wages and Coal, ₹ 2,25,000)	22,500	2/2
Works Cost	3,02,500	20.25
Office Overheads (@ 2.5% on Wages and Coal ₹ 2,25,000)	5,625	0.5%
Cost of Production	3,08,125	20.51

Statement of Profit

	No. of Bricks ₹	Amount ₹	Per 1000 Bricks
Opening Stock (@ ₹ 30 per 1,000 Bricks)	20,00,000	60,000	
Add : Cost of Production during the year	1,00,00,000	3,08,125	
Less : Closing Stock (@ ₹ 30 per 1,000 Bricks)	1,20,00,000	3,68,125	
Cost of Bricks sold	40,00,000	1,20,000	
Profit	80,00,000	2,48,125	31 = 02
Sales (80,00,000 Bricks @ ₹ 40 per 1,000 Bricks)	80,00,000	71,875	8 = 92
		3,20,000	40 = 00

Illustration 19 (Cost Sheet of Coke and By-product's Company)

On the basis of following information prepare a cost sheet for the month June, 2014 :

	Ton	Rate per Ton
Coal used	7,500	₹ 25
Coke produced	5,250	₹ 48 (Selling Price)
Tar produced	400	₹ 96
Sulphate of Ammonia produced	75	₹ 300
Benzol Produced	50	₹ 60
Raw materials used		8,000
Direct wages		20,000
Repairing expenses		18,000
Salaries		15,000

Calculate the percentage of each product to the weight of coal used. Also ascertain wastage and its percentage.

Solution**Cost Sheet**
(for the month June, 2014)

Particulars	Amount	Amount
Coal used (7500 ton @ ₹ 25 per ton)	187,500	
Raw materials used	8,000	
Direct wages	20,000	
Repairing expenses	2,15,500	
Salaries	18,000	
Office Cost or Cost of Production	2,33,500	
<i>Less : Value of By-products :</i>	15,000	
Tar : 400 ton @ ₹ 96 per ton	38,400	
Sulphate of Ammonia : 75 ton @ ₹ 300 per ton	22,500	
Benzol : 50 ton @ ₹ 60 per ton	3,000	63,900
Cost of Coke (5,250 ton)		1,84,600
Profit (Balancing figure)		67,400
Selling price of Coke @ ₹ 48 per ton		2,52,000

Calculation of percentage of each product to the weight of Coal (7,500 ton)

$$\text{Coke} = \frac{5,250}{7,500} \times 100 = 70\%$$

$$\text{Tar} = \frac{400}{7,500} \times 100 = 5.33\%$$

$$\text{Sulphate of Ammonia} = \frac{75}{7,500} \times 100 = 1\%, \text{ Benzol} = \frac{50}{7,500} \times 100 = 0.67\%$$

Wastage : Coal used 7,500 ton - (5,250 ton Coke + 400 ton Tar + 75 ton Sulphate of Ammonia

$$= 1,725 \text{ ton}$$

% of wastage :

$$\frac{1,725}{7,500} \times 100 = 23\%$$

STATEMENT OF COST

Illustration 20 ↳

During March 2014, Thakkar Ltd. had produced 5,000 units of motor parts. The following cost was incurred on its production :

	₹		₹
Direct Materials	1,20,000	Office Salaries	40,000
Direct Labour	1,80,000	Sales Salaries	60,000
Factory Rent	30,000	Carriage Outward	10,000
Office Rent	20,000	Delivery Van Exp.	15,000
Showroom Rent	40,000	Depreciation on Plant	25,000
Power	15,000	Crane Expenses	20,000
Light	6,000	Depreciation on Office Equipment	5,000
Factory Expenses	8,000	Direct Factory Expenses	40,000
Non-productive Wages	50,000	Counting House Salaries	6,000
Advertisement	50,000	Drawing Office Salaries	8,000
Sales Commission	20,000	Gas & Water	3,000
Bad Debts	9,000	Cash Discount	500
Manager's Salary (2/3 Factory, 1/3 Office)	15,000	Loose Tools	400
Interest on Capital	5,000	Sales	8,50,000
Estimating Expenses	500		
Haulage	1,000		

Prepare a Statement of Cost giving all details regarding various components of cost.

Solution

Statement of Cost

(for the month of March, 2014)

(Output : 5,000 units)

Particulars	Cost	Total Cost	Prime Cost	
			₹	₹
Direct Material	1,20,000			
Direct Labour	1,80,000			
Direct Factory Expenses	40,000			
		3,40,000		
Factory Overheads or Works Oncost :				
Factory Rent	30,000			
Power	15,000			
Factory Expenses	8,000			
Non-productive Wages	50,000			
Manager's Salary (2/3)	10,000			
Depreciation on Plant	25,000			
Crane Expenses	20,000			
Gas & Water	3,000			

	Factory Cost	Cost of Production or Office Cost	Sales
Loose Tools	400		
Haulage	1,000		
Drawing Office Salaries	8,000		
		Factory Cost	
Office Overheads or Office Oncost :			
Office Rent	20,000		
Light	6,000		
Manager's Salary (1/3)	5,000		
Office Salaries	40,000		
Depreciation on Office Equipment	5,000		
Counting House Salaries	6,000		
		Cost of Production or Office Cost	
Selling & Distribution Overheads :			
Estimating Expenses	500		
Showroom Rent	40,000		
Advertisements	50,000		
Sales Commission	20,000		
Bad Debts	9,000		
Sales Salaries	60,000		
Carriage Outward	10,000		
Delivery Van Expenses	15,000		
		Cost of Sales	
Profit	2,04,500		
		Sales	
		8,50,000	

Note : Cash Discount & Interest on Capital being Financial Cost, are excluded.

Illustration 21

The accounts of Ratna Co. Ltd. for the year ended 31st March, 2014 show the following information:

Opening Stock of Raw Materials	40,000
Purchase of Raw Materials	1,00,000
Carriage Inward	5,000
Closing Stock of Raw Materials	25,000
Sale of Scrap of Raw Materials	10,000
Direct Wages	85,000
Abnormal Idle Time	5,000
Sale of Scrap	5,000
Factory Overheads—20% of Wages	
Office Overheads—50% of Factory Overheads	
Direct Expenses	20,000

Prepare a Cost Statement.

Solution

Statement of Cost (for the year ended March 31, 2014)		Amount	Amounts
	Particulars	₹	₹
	Opening Stock of Raw Materials	40,000	
Add : Purchase of Raw Materials		1,00,000	
Carriage Inward		5,000	
		1,45,000	

Less : Closing Stock of Raw Materials	25,000		
Sale of Scrap of Raw Materials	10,000		
Raw Materials Consumed	35,000	1,10,000	
Direct Wages	85,000	80,000	
Abnormal Idle Time	5,000	20,000	
Direct Expenses		2,10,000	
Factory Overheads (20% of Wages)		16,000	
Less : Sale of Scrap		5,000	
Works Cost		2,21,000	
Office Overheads (50% of Factory Overheads)		8,000	
Cost of Production		2,29,000	

Statement of Cost excluding Financial Items

Illustration 22

From the following information, prepare a statement of cost :

Opening Stock of Material	₹ 20,000
Purchase of Raw Materials	1,20,000
Direct Wages	1,50,000
Sale of Waste Material	5,000
Closing Stock of Materials	15,000
Octroi Duty	1,000
Direct Expenses	5,000
Factory Overhead	25,000
Office and General Expenses	15,000
Cash Discount	2,000
Transfer Fee	5,000
Income Tax and Wealth Tax	2,000
Loss on Investment	10,000

Solution

Particulars	₹	₹
Opening Stock of Material	20,000	
Purchase of Material	1,20,000	
Octroi Duty	1,000	
	1,41,000	
Less : Closing Stock of Material	15,000	
Sale of Waste Material	5,000	
	20,000	
Value of Material Consumed		1,21,000
Direct Wages		1,50,000
Direct Expenses		5,000
		2,76,000
Factory Overhead		25,000
Office and General Expenses		15,000
Prime Cost		3,01,000
Works Cost		15,000
Total Cost		3,16,000

Note : Cash Discount, Transfer fee, Income Tax and Wealth Tax and Loss on Investment have not been taken into consideration in Statement of Cost as these are financial items.

Illustration 23 (Calculation of Percentages on Total Cost)

Prepare a statement of cost from the following particulars for the year 2013 showing the percentage that each individual item of cost bears to the total cost :

Opening Stock of Raw Materials	₹ 30,000
Purchase of Raw Materials	40,000
Closing Stock of Raw Materials	20,000

Direct Wages
Factory Overhead
Office and Administration Overhead

Solution**Statement of Cost (for the year 2013)**

Particulars	Total Amount	Percentage (%)
Opening Stock of Raw Materials	30,000	
Add : Purchases of Raw Materials	40,000	
	70,000	
Less : Closing Stock of Raw Materials	20,000	
	50,000	56.82%
Cost of Materials Consumed	20,000	22.73%
Prime Cost	70,000	79.58%
Factory Overhead	10,000	11.36%
Factory Cost	80,000	90.91%
Office and Administration Overhead	8,000	9.09%
Total Cost	88,000	100.00%

Note : Calculation of percentages :

1. Cost of materials consumed :

$$\frac{50,000}{88,000} \times 100 = 56.82\%$$

2. Direct wages :

$$\frac{20,000}{88,000} \times 100 = 22.73\%$$

3. Factory overhead :

$$\frac{10,000}{88,000} \times 100 = 11.36\%$$

4. Office and Administration Overhead :

$$\frac{8,000}{88,000} \times 100 = 9.09\%$$

Illustration 24 (Comparative Cost Statements with Apportionment of Cost)

A manufacturer makes two kinds of Electric Pumps XA and XB. The following particulars relate to these pumps for the year ended 31st March, 2014 :

Pumps manufactured

Direct Costs :

Materials

Wages

Power, etc.

Other Costs :

Factory Supervision

Packing, Wages, etc.

Selling Expenses

You are required to prepare a statement showing the cost of each kind of pump, taking the following into consideration :

- Factory supervision to be charged in proportion to direct costs.
- Packing expenses to be apportioned in the ratio that direct costs plus factory supervision costs of XA bears to similar costs of XB.
- Selling and administration expenses to be charged in proportion to the number of the pumps manufactured.

Solution**Statement of Cost**

Particulars	XA Pump Output	XB Pump Output
Materials	₹ 6,280	₹ 5,300
Wages	18,800	11,400
Power, etc.	4,200	2,820
Direct Cost	29,280	19,520
Prime Cost	29,280	19,520

	Factory Cost	Packing, Wages, etc. (in the ratio of direct cost plus factory supervision, i.e., 33,600 : 22,400 = 3 : 2)	Selling Expenses (on the ratio of pumps manufactured i.e., 250 : 120 = 25 : 12)	Total Cost
29,280 : 19,520 = 3 : 2				
	4,820	2,880		
	33,600	22,400		
			480	320
			6,000	2,880
			40,080	25,600
			160.32	213.33

Where Job Cost Statement is to be Prepared

This statement is prepared to know the costs of the different jobs in relation to the budgeted estimates for the purpose of cost control. As the jobs are completed at short intervals, one has not to wait till the year end to charge the overheads attributable to them. So the overheads are charged to them by a predetermined rate. It makes the comparison all the more necessary.

Illustration 25

The following three jobs were completed in the week ended 7th March, 2014. Compute the total cost by preparing a statement of cost with the information given below :

	Job No. 1	Job No. 2	Job No. 3
Direct Materials	₹ 1,000	₹ 1,200	₹ 3,200
Direct Labour	800	900	1,200
Direct Expenses	200	300	300

Charge works overhead @ 50% on Direct Labour and Office Overhead @ 10% on Works Cost. What shall be the job price if 10% profit is desired on the supply price ?

Solution

Statement of Cost (for the Week ended 7-3-2014)

Particulars	Job No. 1	Job No. 2	Job No. 3		
Direct Materials	₹ 1,000	₹ 1,200	₹ 3,200		
Direct Labour	800	900	1,200		
Direct Expenses	200	300	300		
	Prime Cost	2,000	2,400	4,700	
		400	450	600	
Works Overhead : @ 50% on Direct Labour		2,400	2,850	5,300	
		240	285	530	
Office Overhead : @ 10% on Works Cost		2,640	3,135	5,830	
		293.33	348.33	647.77	
Profit : @ 10% on Supply price being 1/9 of cost		Supply Price	2,933.33	3,483.33	6,477.77

Showing Valuation of W.I.P. at Prime Cost

The work-in-progress has been shown valued at Factory cost. If it is desired to value it at Prime cost, the following illustration is worth study.

Illustration 26

X Cool Air Ltd. are manufacturing room coolers and the following details are given in respect of its factory operations for the year ended 31st March, 2014 :

Work-in-Process, 1st April, 2014 :

At Prime Cost	₹ 25,500
Manufacturing Expenses	7,500

Work-in-Process, 31st March, 2014 :

At Prime Cost	₹ 22,500
Manufacturing Expenses	4,500

Stock of Raw Materials 1st April, 2014

Purchase of Raw Materials	2,38,500
Direct Labour	85,500
Manufacturing Expenses	42,000
Stock of Raw Materials on 31st March, 2014	1,02,000

On the basis of the above data, prepare a statement showing the cost of production. Also indicate separately the amount of manufacturing expenses which enter into cost of production.

Solution (Showing the Valuation of W.I.P. at Prime Cost)

X COOL AIR LTD.

Statement of Cost

(for the year ended 31-3-2014)

	₹
Opening Stock of Raw Materials 1-4-2013	1,12,500
Add : Purchases of Raw Materials	2,38,500
	3,51,000
Less : Closing Stock of Raw Materials 31-3-2014	1,02,000
Cost of Raw Materials Consumed	2,49,000
Direct Labour	85,500
Add : Work-in-Process 1-4-2013 (at Prime Cost)	3,34,500
Less : Work-in-Process 31-3-2014 (at Prime Cost)	25,500
	3,60,000
Manufacturing Expenses	22,500
Add : Manufacturing Expenses included in W.I.P. on 1-4-2013	3,37,500
	7,500
	49,500
Less : Manufacturing Expenses included in W.I.P. on 31-3-2014	4,500
	45,000
	Works Cost
	3,82,500

Preparation of Statement of Cost from Financial Accounts

Illustration 27

From the following Trading Account of a firm ascertain the (a) Cost of Material Used, (b) Cost of Goods Produced and (c) Percentage of Gross Profit on Sales and prepare a Statement of Cost.

Trading A/c

(for the year ended 31st March, 2014)

Particulars	Amount	Particulars	Amount
To Opening Stock :			
Raw Materials	5,000	By Sales	1,40,000
Work-in-Progress	6,000	By Closing Stock :	
Finished Goods	10,000	Raw Materials	6,000
To Purchases	40,000	Work-in-Progress	5,000
To Wages	50,000	Finished Goods	9,000
To Carriage Inward	2,000		20,000
To Factory Expenses	12,000		
To Gross Profit	35,000		
	1,60,000		1,60,000

Solution :

**Statement of Cost
(for the year ended 31st March, 2014)**

Particulars	Amount	Amount
Opening Stock of Raw Materials		₹
Add : Purchases	5,000	
Carriage Inward	40,000	
	2,000	
	47,000	
Less : Closing Stock of Raw Materials	6,000	
		₹
(a) Cost of Material Used	41,000	
Wages	50,000	
Factory Expenses	91,000	
Opening Stock of Work-in-Progress	12,000	
	6,000	
	1,09,000	
Less : Closing Stock of Work-in-Progress	5,000	
		₹
(b) Cost of Goods Produced	1,04,000	
Add : Opening Stock of Finished Goods	10,000	
	1,14,000	
Less : Closing Stock of Finished Goods	9,000	
		₹
Cost of Goods Sold	1,05,000	
Profit	35,000	
		₹
Sales	1,40,000	

(c) Percentage of Profit on Sales :

$$= \frac{\text{Profit}}{\text{Sales}} \times 100 = \frac{35,000}{1,40,000} \times 100 = 25\%$$

Illustration 28

From the following information, prepare a cost statement to show :

- (a) Prime Cost
- (b) Works Cost
- (c) Cost of Production
- (d) Cost of Sales
- (e) Profit

	₹
Raw Materials Purchased	32,250
Carriage on Purchase	850
Direct Wages	18,450
Works Overhead	2,750
Selling Overhead	2,450
Office Overhead	1,850
Sales	75,000
- Sales of Factory Scrap	250
Opening Stock of Finished Goods	9,750
Closing Stock of Finished Goods	11,100

*Solution***Statement of Cost**

Particulars	₹
Raw Materials Purchased	32,250
Carriage on Purchase	850
	33,100
Cost of Material	18,450
Direct Wages	51,550
(a) Prime Cost	

Works Overhead

Less : Sales of Factory Scrap

Office Overhead

Add : Opening Stock of Finished Goods

Less : Closing Stock of Finished Goods

Selling Overhead

(b) Works Cost

(c) Cost of Production

Cost of Goods Sold

(d) Cost of Sales

(e) Profit

Sales

2,700
54,200
250
54,050
1,850
55,900
9,750
65,650
11,100
54,550
2,450
57,000
18,000
75,000

Illustration 29

From the following information relating to the production of commodity 'X', you are required to ascertain :

(a) Value of Material Used, (b) Cost of Production (c) Cost of Sales, (d) Net Profit, and (e) Profit per Ton of Commodity.

Purchase of Raw Materials	1,32,000
Carriage Inward	1,580
Rent, Rates & Insurance of Factory	44,000
Opening Stock of Raw Materials	22,000
Opening Stock of Finished Goods (800 Ton)	17,600
Closing Stock of Raw Materials	24,460
Closing Stock of Finished Goods (1,600 Ton)	35,200
Work-in-Progress Opening	5,280
Work-in-Progress Closing	17,600
Sale of Finished goods	3,30,000
Cost of Factory Supervision	8,800
Direct Wages	1,10,000

Discount allowed, advertisement and selling expenses amount to 75 paise per ton sold. 12,800 ton of commodity were produced during the period.

Solution**Statement of Cost and Profit**

Particulars	₹	₹
Opening Stock of Raw Materials	22,000	
Add : Purchases	1,32,000	
Add : Carriage Inward	1,580	
	1,55,580	
Less : Closing Stock of Raw Materials	24,460	
	1,31,120	(a) Value of materials used
Direct Wages	8,800	
	1,10,000	
Works Overhead :		2,41,120
Rent, Rates, Insurance of Factory	44,000	
Cost of Factory Supervision	8,800	52,800
Add : Opening Stock on Work-in-Progress		5,280
		2,99,200
Less : Closing Stock of Work-in-Progress		17,600
		1,10,000
		2,81,600
		Works Cost

Add : Office Overhead	(b) Cost of Production	
Add : Opening Stock of Finished Goods	12,800 Ton	2,81,600
Less : Closing Stock of Finished Goods	800 Ton	17,600
Cost of Goods Sold	13,600 Ton	2,99,200
Less : Advertising and Discount etc.	1,600 Ton	35,200
Less : Selling Exp., Advertising and Discount etc. @ 75 paise per ton on 12,000 ton	12,000 Ton	2,64,000
(c) Cost of Turnover or Sales		9,000
(d) Net Profit		2,73,000
Sales of Finished Goods		57,000
		3,30,000

$$(e) \text{Net Profit per ton} = \frac{57,000}{12,000} = ₹ 4.75$$

Illustration 30
The following cost information related to a manufacturing company is provided. Prepare a statement showing cost of production, cost of sales and the profit :

₹	Work-in-Progress :	₹	
Opening Stock :			
Raw Materials	80,000	Opening	74,000
Finished Goods	30,000	Closing	72,000
Purchase of Raw Materials	2,60,000	Goodwill written off	10,000
Direct Wages	1,36,000	Closing Stock :	
Work Expenses	70,400	Raw Material	48,000
Dividend paid	80,000	Finished Goods	36,000
Office Expenses	30,000	Sales	6,60,000
Depreciation	10,000	Payment of Trade Tax	16,000
Selling Expenses	36,000		

Statement of Cost

Solution	Particulars	Amount	Amount
	Opening Stock of Raw Materials	₹ 80,000	
Add : Purchase of Raw Materials		2,60,000	
		3,40,000	
	Less : Closing Stock of Raw Materials	48,000	
	Value of Raw Materials Consumed	2,92,000	
	Direct Wages	1,36,000	
		4,28,000	
	Factory Overheads :		
	Work Expenses	70,400	
	Depreciation	10,000	
		5,08,400	
Add : Opening Work-in-Progress		74,000	
		5,82,400	
	Less : Closing Work-in-Progress	72,000	
		5,10,400	
	Office Overheads :		
	Office Expenses	30,000	
Add : Opening Stock of Finished Goods		5,40,400	
		30,000	
	Less : Closing Stock of Finished Goods	5,70,000	
		36,000	
		5,34,000	
	Cost of Production		
	Cost of Production of Goods Sold		

Selling & Distribution Overheads :			
Selling Expenses	Cost of Sales		
Trade Tax	Total Cost of Sales		
Profit	Sales		
		36,000	
		6,70,000	
		16,000	
		5,80,000	
		74,000	
		6,60,000	

Note : Dividend Paid and Goodwill Written off are financial items. So, these will not be shown in Cost Statement.

Illustration 31

The Factory Cost of a product is ₹ 1,600 and the selling price is ₹ 3,200. The following are the direct selling and distribution expenses on it :

Carriage Outward	160
Packing Expenses	40
Insurance	40
Commission	240

The estimated fixed selling and distribution expenses for the year were ₹ 1,20,000 and the estimated value of the sales for the year was ₹ 6,00,000. You are required to find out the final cost of the product and profit, using the method of percentage on the sales value to recoup fixed and selling & distribution expenses.

Solution

Percentage of Fixed Selling and Distribution Expenses on Sales

$$\frac{\text{Fixed Selling and Distribution Expenses}}{\text{Sales}} \times 100$$

$$= \frac{1,20,000}{6,00,000} \times 100 = 20\%$$

Statement of Cost and Profit

Particulars	Amount
Factory Cost	₹ 1,600
Fixed Selling and Distribution Expenses $\left(\frac{3,200 \times 20}{100} \right)$	640
<i>Direct Selling and Distribution Expenses :</i>	
Carriage outward	160
Insurance	40
Commission	240
Packing Expenses	40
<i>Final Cost of Product</i>	2,720
<i>Profit</i>	480
<i>Selling Price</i>	3,200

Calculation of gross weight of material when scrap is given

Illustration 32

Ajeet steel limited has to supply three different types of casting weighing respectively 72 tons, 160 tons and 108 tons. 10% of the raw materials used is wastage in manufacturing process. Which is sold at 20% of materials cost. The cost of raw materials is ₹ 750 per ton. Other informations are as follows:

	A	B	C
	₹ 20,000	₹ 60,000	₹ 30,000
	1,500	1,200	800
Labour cost	Prime cost		
Cost of moulds			
Factory overhead 25% of Direct Labour			
Office and Selling overhead 20% of Works Cost			
Profit 15% on Selling Price			

On the basis of above informations prepare a statement of cost.

Statement of Cost

Particulars	Casting		
	A	B	C
Materials @ ₹ 750 per ton on gross weight i.e., 80 tons, 200 tons, 120 tons less : Sales of Scrap @ 20% of materials cost i.e., ₹ 150 per ton	72 Tons ₹ 60,000.00	180 Tons ₹ 150,000.00	108 Tons ₹ 90,000.00
Scrap :			
A (80 - 72) 8 tons	1,200.00		
B (200 - 180) 20 tons		3,000.00	
C (120 - 108) 12 tons			1,800.00
<i>Cost of Materials used</i>			
Labour cost	58,800.00	1,47,000.00	88,200.00
Cost of moulds	20,000.00	60,000.00	30,000.00
Factory overhead 25% of Direct Labour	1,500.00	1,200.00	800.00
<i>Prime Cost</i>			
Works Cost / Cost of Production	80,300.00	2,08,200.00	1,19,000.00
Office and selling overhead 20% of Works Cost	5,000.00	15,000.00	7,500.00
<i>Cost of Sales</i>			
Office and selling overhead 20% of Works Cost	85,300.00	2,23,200.00	1,26,500.00
Office and selling overhead 20% of Sales	17,060.00	44,640.00	25,300.00
<i>Sales</i>			
Profit 15% on selling price i.e., $\frac{15}{85}$ of cost of sales	1,02,360.00	2,67,840.00	1,51,800.00
	18,063.53	47,265.88	26,788.24
Sales	1,20,423.53	3,15,105.88	1,78,588.24

Calculation of gross weight of materials :

$$\begin{aligned} A & \quad B & \quad C \\ 72 \times \frac{100}{90} & = 80 \text{ tons} & 180 \times \frac{100}{90} = 200 \text{ tons} \\ & & 108 \times \frac{100}{90} = 120 \text{ tons} \end{aligned}$$

Treatment of Defective or Rejected Production

Those goods whose production is not upto standard level are considered as defective or rejected. The factory overheads are reduced by the amount realised from the sale of such defective or rejected goods and also the production quantity is reduced by the units which are defective or rejected. But if such defective goods can be made useful by incurring some expenditure on them, then such expenditure is included in factory overheads as additional work overhead so that the production cost for all saleable units can be estimated.

Illustration 33

The following particulars are derived from the records of a factory :

Materials issued	64,000
Wages paid	56,000
Factory Overhead 60% of wages	800
Materials returned to stores	400
Materials transferred to other jobs	

10% of the production has been scrapped as bad and a further 20% has been brought up to the specification by increasing the factory overheads to 80% of wages. If the scrapped production fetches only ₹ 470, find the production cost per unit of the finished product if the total product (including the quantity scrapped) be 100 units.

Solution

Statement of Cost		Unit	Amount
Particulars			
Materials issued	₹ 800		64,000
Less : Returned to Stores	400		1,200
Transferred to other jobs			62,800
Wages		100	56,000
Factory Overheads (60% of wages)	33,600		1,18,800
Add : Additional Factory Overheads (20% of Wages on 20% of Output)	2,240*		35,840
Less : Sale of Scrapped Material		10	1,54,640
Cost per unit of production	(1,54,170/90)	90	470
			1,54,170
			1,713

* To bring the 20% goods upto the required level factory overheads are increased to 80% of labour, therefore overheads have been increased by 20% of labour.

$$\text{Labour } ₹ 56,000 \times 20\% \text{ output} \times 20\% \text{ increase} = ₹ 2,240$$

Illustration 34

The following figures are collected from the books of an Iron Foundry after the close of the year:

Raw Materials :

Opening stock in the beginning of the year	7,000
Purchases during the year	50,000
Closing stock at the end of the year	5,000

	10,000
--	--------

Direct wages

Works overhead—50% of Direct wages

Stores overhead on material—10% of the cost of material

10% of the casting were rejected being not upto specification and a sum of ₹ 400 was realised on sale as scrap.

10% of the finished casting were found to be defective in manufacture and were rectified by expenditure of additional work overhead charges to the extent of 20% on the proportionate direct wages.

The total gross output of casting during the year—1,000 ton.

Find out the manufacturing cost of the saleable casting per ton.

Solution

Statement of Cost		Quantity in ton	Amount
Particulars			
Opening Stock of Raw Materials	₹ 7,000		₹ 52,000
Add : Purchases during the year	50,000		10,000
	57,000		62,000
Less : Closing Stock of Raw Materials	5,000		5,200
Raw Materials consumed			57,000
Direct Wages			5,200
Works overhead (50% of Direct Wages)			2,600
Stores overhead (10% on the Cost of Materials)			5,700
Total Cost of Gross Output		1,000	72,200
Less : Sale of rejected castings		100	400
Cost of Finished Castings		900	71,800

Additional Works Overhead :

Cost of rectifying 10% of the finished casting found defective to the extent of 20% of the proportionate direct wages
 Manufacturing Cost of Saleable Castings
 (per ton ₹ 79.98 or ₹ 80 per ton approx.)

		120*
900	71,880	

10% of finished castings is 90 ton. These 90 ton have been rectified by increasing works overhead to the tune of 20% of the proportionate direct wages i.e., ₹ 10,000 $\times \frac{90}{1,000} \times 20\% = ₹ 180$.

Computation of Missing Figures**Illustration 35**

The books and records of a factory present the following information for the month of August 2014 of a product :

Direct Expenses	₹ 4,000
Direct Labour being 180% of factory overhead	12,000
Cost of goods sold	70,000

Stock Accounts show the following position :

	1st Aug., 2014	31st Aug., 2014
Raw Materials	₹ 10,800	12,600
Work-in-progress	10,000	12,200
Finished goods	14,000	18,000

Other information :

Selling expenses	3,600
Office expenses (10% of factory overhead)	8,000
Sales	85,000

You are required to prepare a statement showing cost and profit for the month.

Solution**Working Notes :**

(i) Cost of goods sold :	Cost of goods sold	70,000
	Add : Closing stock of finished goods	18,000
		88,000
	Less : Opening stock of finished goods	14,000
		Cost of Production 74,000

(ii) Cost of Production :

Cost of Production	74,000
Less : Office expenses (see below)	1,000

$$(iii) \text{ Factory overhead} = \frac{18,000 \times 100}{180} = ₹ 10,000$$

$$\text{and } \text{Office expenses} = 1,000 \times \frac{10}{100} = ₹ 1,000$$

$$(iv) \text{ Factory Cost :}$$

Factory Cost	73,000
Add : Closing stock of W.I.P.	13,200

Less : Opening stock of W.I.P.	86,200
Factory overhead	10,000

$$(v) \text{ Prime Cost :}$$

Raw Materials consumed	44,200
Add : Closing stock of raw materials	12,600

Less : Opening stock of raw materials	56,800
	10,800

$$\text{Raw Materials Purchased} \quad \underline{\hspace{2cm}} \quad 46,000$$

Statement of Cost and Profit

Opening Stock of Raw Materials	₹ 10,800
Add : Purchases of Raw Materials	<u>46,000</u>
Less : Closing Stock of Raw Materials	<u>56,800</u>
	<u>12,600</u>
	Raw Materials Consumed
Direct labour	44,241
Direct expenses	18,000
Factory overhead	4,954
Add : Opening stock of W. I. P.	66,251
Less : Closing stock of W.I.P.	<u>10,000</u>
Add : Office expenses	10,000
Add : Opening stock of Finished goods	86,251
Less : Closing stock of Finished goods	<u>13,250</u>
Add : Selling expenses	73,000
Profit	1,000
	Prime Cost
	74,000
	14,000
	88,000
	18,000
	70,000
	3,600
	73,600
	11,400
	Cost of Production
	85,000
	Cost of Finished Goods
	Cost of Sales
	Sales

PRODUCTION ACCOUNT

"The term 'Production Account' is used to denote a particular form of manufacturing account prepared in conjunction with the financial accounts in order to show the actual cost of producing the goods manufactured during the period under review. These accounts may be drawn up at short intervals, e.g., monthly."

—G. R. Glower and R. G. Willian

The Production Account is presented in the form of an account based on double entry principle. The object of this account is to show the cost of production, along with the cost per unit in a detailed and analytical way.

The Production Account, also known as 'Manufacturing Account' is used for industries producing Bricks, Coal & Coke, Pig Iron, Yarn & Cloth, etc. The information in this account is presented in such a form that Prime cost, Works cost, Cost of production, Total cost and Profit may be clearly demarcated. The analysis of cost per unit by item of expense adds to the utility of the account.

The proforma of Production Account appears as below :

Production Account			
Particulars	Amount	Particulars	Amount
To Direct materials	₹	By Cost of Production c/d	₹
To Direct labour	SLW to doje girewali bba
		SLW to doje girewali bba
Prime Cost	SLW to doje girewali bba
To Works overheads	SLW to doje girewali bba
To Work-in-progress (Opening)	SLW to doje girewali bba
Less : Work-in-progress (closing)	SLW to doje girewali bba
Less : Sale of by-products or scrap	SLW to doje girewali bba
Works Cost	SLW to doje girewali bba

Administration overheads
Production b/d

To Cost of Production b/d
To Opening stock of finished goods
- Sold b/d

Op.
Cost of Goods Sold b/d
and Distribution overheads

To Cost
To Selling
Profit

By Closing stock of finished good

By Cost of Goods Sold c/c

| By Sales

Illustration 36

Prepare a Program

Illustration 3 Prepare a Production Account from the following particulars, and state the cost per article manufactured. The number of articles produced is 6,000 :

Solution

Production Account

(Output : 6,000 articles)

Particulars	Cost per Article	Total Amount	Particulars	Cost per Article	Total Amount	
To Materials consumed :			By Cost of Production			
Materials at start	11,000			19.43	1,16,600	
Purchases of Materials	63,500			1,16,600		
	74,500			600		
Less:						
Materials at the end 13,000						
Sale of materials	1,500*					
Materials Reserved	1,600	16,100				
To Wages						
Prime Cost	17.96	1,07,800				
Manufacturing Exp.	7,800	1.30				
Add : Opening WIP	4,000	0.67				
	11,800					
Less : Closing WIP	3,000	-0.50	8,800			
	₹	19.43	1,16,600	₹	19.43	1,16,600

Production Account of Pig Iron

Coal, coke, lime-stone, iron-ore, etc. are used in the production of pig iron. These materials are debited in Pig Iron Production Account as direct expenses. During the process of production of pig iron, whatever slag is got, that is sold as residue and the amount received from such is credited in Pig Iron Production Account.

Illustration 37

From the following information prepare Pig Iron Production Account showing cost per ton of class of expenditure and of the pig iron produced :

Particulars	Coal	Coke	Lime-Stone	Iron Ore	Sundries
Stock 1st January, 2014	₹ 4,720	₹ 3,580	₹ 1,450	₹ 3,930	
Purchases during the year	21,880	29,470	5,080	18,690	2
Stock 31st Dec., 2014	3,600	2,050	1,530	3,620	7

The total production of pig iron consisted of 32,000 ton, Sale of slag ₹ 10,500, General works charges ₹ 4,500, Wages ₹ 17,000.

Solution**Pig Iron Production Account**

(Output : 32,000)

Particulars	Cost per ton	Amount	Particulars	Cost per ton	Amount
To Coal consumed	₹ 0.72	23,000	By Sales of Slag	0.33	10,500
To Coke consumed	0.97	31,000	By Cost of Production	3.01	96,000
To Lime-stone consumed	0.16	5,000			
To Iron ore consumed	0.59	19,000			
To Sundries consumed	0.23	7,500			
To Wages	0.53	17,000			
To General works charges	0.14	4,500			
	3.34	1,07,000		3.34	1,07,000

Statement showing Materials Consumed

Particulars	Coal	Coke	Lime-Stone	Iron Ore	Sundries
Stock, 1st Jan., 2010	₹ 4,720	₹ 3,580	₹ 1,450	₹ 3,930	2
Add : Purchases	21,880	29,470	5,080	18,690	7,8
	26,600	33,050	6,530	22,620	10,5
Less : Stock, 31st Dec., 2010	3,600	2,050	1,530	3,620	3,0
Materials Consumed	23,000	31,000	5,000	19,000	7,5

THEORETICAL QUESTIONS**(I) Long Answer Questions**

- What are the characteristic features of Unit Costing?
- What is Output Costing? To what types of concerns is this method suitable?
- What are Cost Sheets? What are their advantages? How do they differ from Cost Accounts?
- Distinguish between a Cost Sheet and a Production Account. Draw a complete specimen form of comparative cost sheet.
- What are the differences between a Cost Sheet and a Cost Account? Give your views as to the respective merits.

- What is a Cost Sheet and why is it prepared? Prepare a cost sheet with imaginary figures.
- What is a Cost Sheet? What are its advantages? Prepare a cost sheet of a cloth manufacturer in proper form with imaginary figures.
- Short Answer Questions**
- Define Cost Sheet.
 - What is Work-in-Progress? How do you account for it in calculating Works Cost?
 - Differentiate between profit by percentage on cost and profit by percentage on sale. Give formulae of both.
 - Discuss the items of income and expenditure which are recorded in financial accounts but not in cost accounts.
 - How does Cost Sheet differ from Cost Statement?
 - Is Production A/c a Cost A/c? How does it differ from Cost Sheet?
 - Give a specimen of Production Account.
 - Describe the meaning of unit or output costing system.

NUMERICAL QUESTIONS

Short Calculation Questions

1. Calculate the cost of material consumed :
- Opening stock of material ₹ 12,000; Material purchased ₹ 60,000; Freight and carriage paid on material purchased ₹ 100; Defective material purchased ₹ 4,000; Material sold ₹ 2,000 (cost price ₹ 1,500).
Ans. ₹ 29,400.

2. Find out the amount of material consumed from the following information :
Total cost of production ₹ 500; Works cost is 80% of cost of production; Works Oncost is 150% of Office Oncost; Material consumed is 25% of wages.
Ans. ₹ 50

3. Calculate the amount of material consumed :

Opening Stock of Raw Materials	₹ 1,00,000
Purchase of Raw Materials	3,00,000
Closing Stock of Raw Materials	1,10,000
Carriage Inward	10,000
Abnormal Wastage of Materials	5,000
Return of Defective Materials	15,000
Ans. ₹ 2,80,000.	

4. Calculate the Factory Cost :
Direct materials ₹ 29,400; Direct wages ₹ 10,600; Direct expenses ₹ 2,000; Indirect material ₹ 1,000; Indirect wages ₹ 3,000; Factory Expenses ₹ 8,000; Work-in-Progress : Opening ₹ 4,000, Closing ₹ 5,000.
Ans. ₹ 53,000.

5. Calculate Prime Cost and Factory Cost :
Direct material ₹ 10,000; Direct labour ₹ 8,000; Factory overhead ₹ 6,000. Work-in-progress (valued at Prime Cost) : Opening ₹ 2,000, Closing ₹ 5,000.
Ans. Prime Cost ₹ 15,000; Factory Cost ₹ 21,000.

6. Cost Price ₹ 18,000; Profit 10% on sales.

- Calculate the profit and sale price.
Ans. Profit ₹ 2,000, Sale price ₹ 20,000.

7. From the following calculate Prime Cost :

- Materials Purchased ₹ 10,000; Materials consumed ₹ 8,000; Materials returned to store ₹ 2,000; Direct wages ₹ 5,000; Direct expenses ₹ 7,000; Foreman's salary ₹ 5,000.
Ans. Prime Cost ₹ 20,000

8. From the following information, find out the amount of material consumed :

Opening Stock of Raw Material	₹ 20,000
Purchase of Raw Material	50,000
Carriage of Purchase of Raw Material	1,000

11

UNIT OR OUTPUT COSTING-II (CALCULATION OF ESTIMATES, TENDER AND QUOTATION PRICE)

One of the main advantages of cost accounting is that it helps in estimating the cost of any job or order or service in advance. Generally, a manufacturer on several occasions, has to supply in advance the tender price of a job or order to a prospect customer. This tender price is quoted considering the cost of the work to be done in future and by adding a certain margin of profit to the cost. In order to determine the total estimated cost, a manufacturer considers his past experience and past cost and also in addition, pays significant attention and consideration to the possible changes in past cost (increase or decrease) in future. In order to achieve this objective, each element of cost of production should be analysed individually and all indirect expenses should be classified into fixed, variable and semi-variable expenses for the purpose of detail analysis. Procuring the order for any tender depends upon the estimated cost which has been quoted. Hence, tender price, estimated price or quotation price should be determined carefully so as to be competitive. In brief, the above three prices can be understood as follows :

(1) Tender Price : A formal statement of price, at which the goods are agreed to be supplied or work order is to be executed, which is sent in reply to an invitation is called tender. Generally, it is given in a sealed envelope and implies a competitive price as being stated. This term is generally used in governmental transactions.

(2) Quotation Price : A statement of price that is quoted for a work order to be executed or service to be rendered or goods to be supplied, is called a "Quotation". This term is generally used in other than government transactions.

(3) Estimation Price : An approximate price of a work order or goods or service, calculated on the basis of general opinion and judgement is called an 'Estimation'. While preparing an estimation, the general work, views, opinions and personal judgements play the dominant roles. As a result, the price so stated, would only be an approximate price.

Generally, in calculation of Tender price or in Estimated price the following costs are included :

- (a) Cost of Direct Material.
- (b) Cost of Direct Labour.
- (c) Cost of Direct Expenses.
- (d) Share of Factory Overhead.
- (e) Share of Office & Administrative Overhead.
- (f) Share of Selling and Distribution Overhead.
- (g) Desired percentage of Profit.

In this way, tender price can be expressed as under :

$$\text{Tender Price} = \text{Cost} + \text{Profit}$$

Points to be Remembered while Determining Tender Price

In order to calculate tender price following points should be taken into consideration:

(1) The quantity or units to be produced. On the basis of analysis of the past period, it should be observed as to what change will be in overheads which can be fixed, variable and semi-variable if there is a change in size and type of product or units required.

(2) In order to determine the tender price, the past accounting records should be taken into consideration to know what was the previous cost. If there is a change in the price of material, labour and expenses, it should accordingly be adjusted in the tender price.

(3) The tender price should be carefully ascertained, because a difference by a single rupee can outclass the manufacturer from the race of acquiring the order.

(4) Where per unit tender price has been demanded, their Cost Sheet are very helpful in this job as whatever change has been there in any element of cost, can be easily adjusted.

(5) Where a quotation is to be given for a job, then after determining the cost of material and direct labour, overheads can be determined by charging it on a certain percentage to a relevant basis and thus total cost can be determined whereby a certain percentage of profit can be added.

(6) In order to determine tender price, a statement of cost is prepared where adjustments are made in material, labour and overheads for prospect changes in price.

(7) In calculation of tender price it should be kept into consideration carefully whether the profit percentage is to be calculated on the basis of cost price or the selling price. In this context, the difference can be understood by the following example:

Illustration 1

The cost price of a tender is ₹ 2,00,000. What will be the tender price if the profit is added 20% on tender price? What will be the difference on tender price, if the profit is to be added 25% on cost price?

Solution

Profit 20% on Tender Price

Cost Price	₹ 2,00,000
Profit 20% on Tender Price =	$\frac{2,00,000 \times 20}{100 - 20}$
	50,000
Tender Price	₹ 2,50,000

Profit 25% on Cost Price

Cost Price	₹ 2,00,000
Profit 25% on Cost Price =	$\frac{2,00,000 \times 25}{100}$
	50,000
Tender Price	₹ 2,50,000

It means that 20% on tender price is equal to 25% on cost price.

CALCULATION OF TENDER PRICE

In various situations and on the basis of information obtained for calculating tender price the estimated cost sheet can be prepared as follows :

(I) When past period cost and units produced are given and tender price is to be determined for a particular quantity.

(II) When past period production quantity is not given and absorption overhead rate is to be determined for determining tender price.

(III) When tender price has to be determined on the basis of behaviour or nature of cost.

(IV) Determination of tender price when costs are given in percentage.

I. WHEN PAST PERIOD COST AND UNITS PRODUCED ARE GIVEN AND TENDER PRICE IS TO BE DETERMINED FOR A PARTICULAR QUANTITY

When for determining tender price, past period output quantity and total cost information is given and tender price following process is to be quoted for a specific quantity, then in such cases for determination of tender price following process will be applied :

- (1) First of all, a cost sheet is prepared from the cost information received of the past period and per unit cost of various costs shown therein is calculated.
- (2) The quantity as desired in the tender will be multiplied by the cost per unit of each element of cost in order to determine the total cost for tender. It may be multiplied with total cost per unit if there is no change in any element of cost.
- (3) At the end, for price determination for tender, the desired profit margin will be added to the total cost calculated.

This type of tender can have three forms which can be understood as follows :

When past period cost, output produced and quantity or output for tender to be quoted are given

(A) When there is no change in past cost and past percentage profit.

(B) When there is a change in past cost but no change in past percentage profit.

(C) When there is a change in previous cost and change in percentage profit.

(A) WHEN THERE IS NO CHANGE IN PAST COST AND PAST PERCENTAGE PROFIT

In this form of tender, first of all past period Cost Sheet is prepared and cost per unit of every element of cost and percentage profit is determined. Thereafter, the tender for desired quantity is prepared. For this purpose, the quantity of desired tender is multiplied by cost per unit of each element of cost in order to ascertain total cost. In this total cost the desired profit is added. The percentage of profit will remain the same which was in the previous period whose calculation is either done at cost or sales value.

Illustration 2

The following figures relate to the costing of a Tarpaulin manufactured in respect of a certain type of sheet for a period of three months :

	₹
Stock of Materials, 1st January	5,500
Stock of Materials, 31st March	3,500
Factory wages	83,000
Materials purchased	61,500
Sales	1,41,500
Indirect expenses	13,000
Finished stock, 1st January	Nil
Finished stock, 31st March	29,000

The number of sheets manufactured during three months was 2,200 and the price is to be quoted for sheets in order to realise the same percentage of profit as for the period under review, assuming no variation in rates of wages and cost of materials.

Prepare a statement of cost for the manufacture of 2,200 sheets and quotation for 648 sheets.

Solution**Statement of Cost
(for the period ending 31st March, 2008)**

Particulars	Total Cost of 2,200 Tarpaulin Sheets	Cost per Tarpaulin Sheet
Materials Consumed :		
Opening stock of Materials	5,500	
Purchases of Materials	61,500	
Less : Closing stock of materials	67,000	
Materials Consumed	3,500	
Factory wages	63,500	28.82
Indirect expenses	83,000	37.73
Prime Cost	1,46,500	66.59
Cost of Production	13,000	5.91
Cost of Goods Sold	1,59,500	72.50
Sales	29,000	
Less : Closing Stock of Finished Goods	1,30,500	
Profit	11,000	
Cost of Production @ ₹ 72.50 per sheet	1,30,500	8.429% = 8.43%

Percentage of Profit on Cost = $\frac{11,000}{1,30,500} \times 100 = 8.429\% \approx 8.43\%$

Quotation for 648 Sheets

Particulars	Total Cost
Cost of Production @ ₹ 72.50 per sheet	46,980
Add : Profit @ 8.43% (on cost)	3,960
Selling Price	50,940

**(B) WHEN THERE IS A CHANGE IN PAST COST BUT NO CHANGE
IN PAST PERCENTAGE PROFIT**

When the form of tender is of the nature that changes in element of cost in future has to be adjusted and the percentage profit has to be kept unchanged, then first of all a cost statement of past period quantity produced has to be prepared and cost per unit of each item of cost has to be determined, thereafter, the tender price will be calculated.

For this purpose, the cost per unit of each element of cost of past period will be multiplied by the quantity for which the tender is desired and thereafter in these cost the expected rate or level of change in cost will be adjusted to determine the total cost. In this total cost, the desired profit rate based on cost or sale value should be added to determine the tender price.

Illustration 3

From the following data, prepare a cost and profit statement of Popular Stove Manufacturing Company for the year 2010 :

Particulars	Amount
Opening Stock of Raw Materials	10,000
Closing Stock of Raw Materials	5,000
Purchase of Raw Materials	15,000
Factory expenses	10,000
Opening stock of finished goods	5,000
Sales	72,450
Factory wages	30,000
Office Expenses	10,000
Closing stock of finished goods	12,000

500 stoves were manufactured during the year 2010. Company has to quote for the supply of 2,000 stoves in 2011. The proposed stoves are of uniform quality and make and similar to those manufactured in the previous year, but the cost of materials has increased by 10%. The same percentage of profit on cost as realised during 2010 has to be earned. Assuming that the cost per unit of overheads remains the same as in previous year, prepare a statement showing quotation price.

Solution**Statement of Cost & Profit**

(for the year 2010)

(500 Stoves)

Particulars	Total Cost	Per Stove
Opening Stock of Raw Materials	₹ 10,000	
Add : Purchase of Raw Materials	15,000	
	25,000	
Less : Closing Stock of Raw Materials	5,000	
Materials Consumed	20,000	40.00
Factory wages	30,000	60.00
Factory expenses	50,000	100.00
Office expenses	10,000	20.00
Cost of Production	60,000	120.00
Add : Opening stock of finished goods	10,000	20.00
Less : Closing stock of finished goods	70,000	140.00
Profit	5,000	
Cost of Goods Sold	75,000	
Sales	63,000	
	9,450	
	72,450	

$$\text{Percentage of Profit on Cost} = \frac{9,450 \times 100}{63,000} = 15\%$$

Statement showing Quotation Price for 2,000 Stoves

Particulars	Total Cost	Quotation Price
Materials @ ₹ 40	80,000	
Add : Increase 15%	12,000	92,000
Factory wages @ ₹ 60	1,20,000	
Add : Increase 10%	12,000	1,32,000
Prime Cost	2,24,000	
Factory expenses @ ₹ 20	40,000	
Office expenses @ ₹ 20	2,64,000	
Cost of Production	40,000	
Profit 15% on Cost $\left(\frac{3,04,000 \times 15}{100} \right)$	3,04,000	45,600
Quotation Price	3,49,600	

$$\text{Quotation Price per Unit} = \frac{3,49,600}{2,000} = ₹ 174.80$$

In above Illustration, it has been stated that "the cost per unit of overheads remains the same as in previous year." If nothing would have been mentioned in the question, there may be two options (a) The cost per unit of overheads remains the same as in the previous year (b) the percentage of overheads remains the same as in the previous year. In this context the assumption should clearly be mentioned in the solution. If the second assumption is applied then the percentages of works overhead on Direct wages, Office overhead on works cost and Selling overhead on cost of production or cost of goods sold are calculated and these are taken into consideration while computing tender price.

Illustration 4

On 15th August, 2011, Hero Cycle Manufacturing Company was required to quote for a contract the supply of 500 bicycles. From the following information prepare a statement showing the price quoted to give the same percentage of net profit on turnover as was realised during the six months ended June, 2011 :

Stock of Material 1.1.2011	50/-
Stock of Material 30.6.2011	7/-
Purchase of Material	75/-
Direct Wages	1,50/-
Indirect Charges	25/-
Completed Stock-in-hand 30.6.2011	50/-
Bicycles manufactured and sold during six months	2,70/-
Sales amount	2,70/-

As from 1st August, 2011 the cost of factory labour is expected to increase by 10% and that of material by 15%.

Solution**Statement of Cost for 6 months (output 2000 Bicycles)**

Particulars	Amount	Amount
Opening Stock of Material	50,000	
Add : Purchase of Raw Material	75,000	
	1,25,000	
Less : Closing Stock of Material		1,18,000
Raw Materials Consumed		1,50,000
Direct Wages		2,68,000
Indirect charges		25,000
	2,93,000	
Less : Closing Stock of Completed Goods		50,000
		2,43,000
Profit		27,000
		2,70,000

Assuming that the indirect expenses are fixed per unit :

Calculation of Quotation Price

Particulars	Amount	Amount
Raw Materials $(1,18,000 \times 500)$	29,500	
Add : 15% increase	4,425	33,925
Direct Wages $(1,50,000 \times 500)$	37,500	
Add : 10% increase	3,750	41,250
Indirect charges $(25,000 \times 500)$		75,175
		6,250
Profit @ 10% on Sales or $\frac{10}{90}$ on Total Cost		81,425
		9,047
Quotation Price		90,472

Assuming that the indirect expenses percentage are fixed.

$$\% \text{ of Indirect Charges on Wages} = \frac{25,000}{1,50,000} \times 100 = 16.67\%$$

	₹
Raw Materials	33,925
Direct Wages	41,250
Indirect Charges (@16.67% on Direct Wages)	75,175
Profit (10% on Sales)	6,875
	82,050
Total Cost	9,117
Quotation Price	91,167

Illustration 5

The following data of a factory for 2010 are given :

Materials used ₹ 75,000; Direct wages ₹ 50,000; Variable production expenses ₹ 1,00,000; Variable selling expenses ₹ 2,00,000; Fixed expenses ₹ 75,000; Total output 50,000 units and Sales ₹ 6,00,000. It is anticipated that in 2011 :

- (i) Factory will produce 1,00,000 units.
- (ii) Cost of material will increase by 33½%.
- (iii) Rate of variable selling expenses will go up by 25% due to increase in rate of commission to salesmen.

If the same rate of profit on sale is to be maintained at what it was in 2010, what should be the selling price per unit in 2011?

Solution

Statement of Cost and Profit in 2010

Particulars	Total Cost (50,000 units)	Cost Per Unit
Materials	₹ 75,000	1.50
Direct Wages	50,000	1.00
	1,25,000	2.50
Factory overheads :		
Variable expenses	1,00,000	2.00
Fixed	75,000	1.50
	3,00,000	6.00
Variable Selling Exp.	2,00,000	4.00
	5,00,000	10.00
Profit	1,00,000	2.00
	6,00,000	12.00

$$\text{Rate of Profit on Sales} = \frac{1,00,000 \times 100}{6,00,000} = 16.67\% \text{ or } \frac{1}{6} \text{ on Sales}$$

Statement of Selling Price in 2011

Particulars	Total Cost (1,00,000 units)	Cost Per Unit
Materials @ ₹ 1.50	₹ 1,50,000	₹
Add : Increase 33½%	50,000	2.00
Direct wages @ ₹ 1.00	1,00,000	1.00
	3,00,000	3.00
Factory overheads :		
Variable @ ₹ 2.00	2,00,000	2.00
Fixed	75,000	0.75
	5,75,000	5.75
Works Cost		

Variable Selling expenses @ ₹ 4	4,00,000	4,00,000	4,00,000
Add : Increase 25%	1,00,000	5,00,000	5,00,000
Profit ($\frac{1}{6}$ on Sales or $\frac{1}{5}$ on Cost)	Total Cost	10,75,000	10,75,000
		2,15,000	2,15,000
	Sales	12,90,000	12,90,000

**(C) WHEN THERE IS A CHANGE IN PREVIOUS COST
AND CHANGE IN PERCENTAGE PROFIT**

When the form of tender depends upon the change in previous cost and profit, then the cost per unit of each element of cost is determined from the Cost Sheet prepared earlier. Thereafter, for determination of tender price the quantity for tender is multiplied by the cost per unit of each element of cost thereby adjusting the change in element of cost for determining the total cost. In this total cost, the desired profit margin is added based on cost or sale value to determine the tender price.

Illustration 6

The following is the summarised Profit & Loss Account of Rajasthan Electric Company for the half-year ending 30th June, 2011. 1,600 electric fans were manufactured and sold by the company during this half-year :

Profit & Loss Account
(for the half-year ending 30th June, 2011)

To Materials consumed	₹ 64,000	By Sales	₹ 3,20,000
To Wages	96,000		
To Manufacturing expenses	40,000		
To Gross Profit c/d	1,20,000		
	3,20,000		3,20,000
To Office Salaries	48,000	By Gross Profit b/d	1,20,000
To Rent & Taxes	8,000		
To Selling expenses	16,000		
To General expenses	24,000		
To Net Profit	24,000		
	1,20,000		1,20,000

The following estimates were made by the costing department of the company for the next half-year ending 31st Dec., 2011 :

- The output and sales will be 2,000 electric fans.
- The price of materials will rise by 25% on the previous half-year's level.
- Wages during this period will rise by 12½%.
- Manufacturing expenses will rise in proportion to the combined cost of materials and wages.
- Selling expenses per unit will remain unchanged.
- Other expenses will remain unaffected by the rise in output.

Prepare a statement showing the price at which each electric fan would be sold so as to ensure a net profit of 10% on the cost price.

Solution

Cost Sheet

(for the half-year ending 30th June, 2011)

(1,600 electric fans)

Particulars	Total Cost	Cost Per Fan
Cost of Materials used	₹ 64,000	40.00
Wages	96,000	60.00
	Prime Cost	100.00
Manufacturing Expenses	40,000	25.00
	Works Cost	125.00
	2,00,000	

Office & General Expenses :

Office Salaries

Rent & Rates

General Expenses

*Selling Expenses**Profit*

Cost of Production	48,000	30.00
	8,000	5.00
	24,000	15.00
Cost of Sales	2,80,000	175.00
	16,000	10.00
Cost of Sales	2,96,000	185.00
	24,000	15.00
Sales	3,20,000	200.00

Statement of Estimate

(for the next half-year ending 31st Dec., 2011)

(Output : 2,000 electric fans)

Particulars	Total Cost	Cost Per Fan
Materials used ($2,000 \times ₹ 40$)	80,000	₹
Add : 25% rise	20,000	50.00
Wages ($2,000 \times ₹ 60$)	1,20,000	
Add : 12½% rise	15,000	67.50
Prime Cost	2,35,000	117.50
Manufacturing Expenses *	58,750	29.375
$(40,000 \times 2,35,000) / 1,60,000$		
Works Cost	2,93,750	146.875
Office & General Expenses (Same in total as in previous period) ($48,000 + 8,000 + 24,000$)	80,000	40.00
Selling expenses ₹ @ 10 per unit	3,73,750	186.875
Cost of Production	20,000	10.000
Cost of Sales	3,93,750	196.875
Profit (@10% on Cost)	39,375	19.687
Sales Price	4,33,125	216.562

* It has been stated in the question that manufacturing expenses will rise in proportion to the combined cost of materials and wages, which means in the proportion of Prime Cost. That is why it has been calculated directly on Prime Cost. Alternatively it can be calculated as follows :

$$\% \text{ of Manufacturing Expenses on Prime Cost} = \frac{40,000}{1,60,000} \times 100 = 25\%$$

$$\text{Hence, } \text{Manufacturing Expenses} = \frac{2,35,000 \times 25}{100} = ₹ 58,750$$

II. WHEN PAST PERIOD PRODUCTION QUANTITY IS NOT GIVEN & ABSORPTION OVERHEAD RATE IS TO BE DETERMINED FOR DETERMINING TENDER PRICE

When past period production quantity is not given then tender price cannot be determined directly. In this case, generally, the desired quantity of tender is provided and the details of direct cost as regard to tender quantity are directly provided. In regard to indirect expenses or overheads the absorption rate has to be determined. On the basis of these overhead rates the overheads or indirect expenses are included in tender price. The amount of profit is added in tender price at the rate specified. In lack of information of overhead rates, the absorption rate can be calculated on the basis of overheads and various cost as shown in the previous cost sheet. Generally, the overheads rate is determined as given on the next page :

$$(i) \text{ Factory Overhead rate} = \frac{\text{Works Overhead}}{\text{Direct Wages}} \times 100$$

$$(ii) \text{ Office & Administration Overhead rate} = \frac{\text{Office & Administration Overhead}}{\text{Factory Cost}} \times 100$$

$$(iii) \text{ Selling & Distribution Overhead rate} = \frac{\text{Selling & Distribution Overhead}}{\text{Cost of Production or Cost of Goods Sold}} \times 100$$

The above overhead rates can remain fixed or they may change in future. If Overheads rates remain fixed then overheads are charged to tender by the old overhead rates, and if there is a change in overhead rate then they are accordingly adjusted as per the change required for determining overheads for tender price.

When Overhead Absorption Rate is Fixed

Illustration 7

The accounts of the Modern Engineering Co. Ltd., show the following details for the year ending 31 December, 2010 :

Materials used	17,50,00
Manual and Machine Labour wages directly chargeable	13,50,00
Works Overhead Expenditure	3,71,25
Establishment and General Expenses	2,32,50

Show the Works Cost and Total Cost, the percentage that the Works Overhead Cost bears to the Manual and Machine Labour Wages and percentage that the Establishment and General Expenses bear to the Works Cost.

What price should the company quote to manufacture a machine which, it is estimated, will require an expenditure of ₹ 7,500 in material and ₹ 6,000 in wages so that it will yield a profit of 25% on the total cost or 20% on selling price ?

Solution

Modern Engineering Co. Ltd.

Summary of Expenditure		Estimate for Machine	
Materials used	₹ 17,50,000	Materials	₹ 7,500.00
Manual and Machine Labour Wages (direct)	13,50,000	Wages (direct)	6,000.00
Prime Cost	31,00,000	Works Overhead : @ 27.5% on Direct Wages	13,500.00 1,650.00
Works Overhead Expenses	3,71,250	Office Overhead : @ 6.7% on Works Cost	1,015.05 16,165.05
Works Cost	34,71,250	Profit : @ 25% on Total Cost	4,041.25
Establishment & Gen. Exp.	2,32,500	Selling Price	20,206.31
Total Cost	37,03,750		
% of Works Overhead on the Cost of Manual and Machine	3,71,250 × 100 / 13,50,000 = 27.5%		
Labour Wages			
% of Establishment & General Exp. on Works Cost	2,32,500 × 100 / 34,71,250 = 6.7%		

Illustration 8

A manufacturer of Scooter finds that in year 2010 it costs him ₹ 6,16,000 to manufacture 200 scooters which be sold at ₹ 4,000 each. The cost was made up of:

Materials	₹ 2,00,000
Direct Labour	3,00,000
Factory Overheads	60,000
Office Overheads	56,000

For the year 2011 his estimates are:

- (i) that each Scooter will require materials to the value of ₹ 1,000 and an expenditure on wages ₹ 1,500.
- (ii) that factory overheads expenses will bear the same relation to direct wages as in the previous year.
- (iii) that the percentage of office overheads on factory cost will be the same as in the previous year.
- Prepare a statement showing the profit he should make if he increases the price of the scooter by ₹ 80.

Statement of Cost (for 2010)

	₹
Materials	2,00,000
Direct Wages	3,00,000
Factory Overheads	5,00,000
Office Overheads	60,000
Prime Cost	5,60,000
Factory Cost	56,000
Total Cost	6,16,000

(i) Percentage of Factory Overheads on Wages

$$= \frac{60,000 \times 100}{3,00,000} = 20\%$$

(ii) Percentage of Office Overheads on Factory Cost

$$= \frac{56,000 \times 100}{5,60,000} = 10\%$$

Statement of Profit (for 2011)

	₹
Materials	1,000
Direct Wages	1,500
Factory Overheads (@ 20% of Wages)	2,500
Office Overheads (@ 10% of Factory Cost)	300
Prime Cost	2,800
Factory Cost	280
Total Cost	3,080
Profit (Balancing Figure)	1,000
Increased Selling Price (4,000 + 80)	4,080

Illustration 9

The following particulars are extracted from the cost-books and other sources in respect of M/s Raman Co.:

- (i) Estimated materials cost of the job is ₹ 50,000 and direct labour cost is likely to be ₹ 10,000.
 - (ii) In the factory it will require machine by a German machine for 20 hours and Japanese machine for 6 hours.
 - (iii) The machine hour rates for German and Japanese machines are ₹ 100 and ₹ 150 respectively.
 - (iv) The direct wages in the factory last year amounted to ₹ 8,00,000 as against ₹ 4,80,000 factory overheads.
 - (v) Last year's factory cost of all jobs amounted to ₹ 25,00,000 as against ₹ 3,75,000 office expenses.
- Make out a quotation in the 20% profit on selling price.

Solution**Statement showing Quotation Price of a Job**

Material Cost	50,000
Direct Labour Cost	10,000
Add : Factory Overheads :	60,000
(A) Machine hours rates :	
(i) German Machine (20 hours \times ₹ 100)	2,000
(ii) Japanese Machine (6 hours \times ₹ 150)	900
(B) Factory Overheads (@ 60%* of Labour ₹ 10,000)	2,300
Add : Office Overheads (@ 15%** of factory cost ₹ 68,900)	10,325
Add : Profit (20% on Selling Price)	79,235
$\left(\frac{79,235 \times 20}{100 - 20} \right)$	19,800
* $\frac{4,80,000 \times 100}{8,00,000} = 60\%$	
** $\frac{3,75,000 \times 100}{25,00,000} = 15\%$	
	Selling Price
	99,044

When Overhead Absorption Rate is Changed**Illustration 10**

The following particulars are obtained from the records of Rajesh Bros. for the year 2010 :

Cost of materials

1,50,000

Direct wages

1,25,000

Factory overheads

75,000

Administrative overheads

84,000

Selling overheads

56,000

Distribution overheads

35,000

Profit

1,05,000

A work order has to be executed in 2011 which will need raw materials worth ₹ 4,000 and wages ₹ 2,500. It is expected that the rate of factory overheads would go up by 20% and that of selling overheads by 12½%, while the rate of distribution overheads is expected to go down by 10%. Administrative overheads will remain constant. At what price the product be sold so as to earn a profit of 15% on selling price? Factory overhead is based on direct wages and the remaining overheads on factory cost.

Solution**Statement of Cost (for 2010)**

Cost of materials	1,50,000
Direct wages	1,25,000
Factory overheads	2,75,000
Administrative overheads	84,000
Selling overheads	56,000
Distribution overheads	35,000
Profit (@ 20% on Cost)	1,05,000
	Total Cost
	5,25,000
	Sales
	6,30,000

Calculation of Rates of Various Overheads

$$(1) \% \text{ of Factory Overheads on Direct Wages} \\ = \frac{75,000 \times 100}{1,25,000} = 60\%$$

$$(2) \% \text{ of Administrative Overheads on Factory Cost} \\ = \frac{84,000 \times 100}{3,50,000} = 24\%$$

$$(3) \% \text{ of Selling Overheads on Factory Cost} \\ = \frac{56,000 \times 100}{3,50,000} = 16\%$$

$$(4) \% \text{ of Distribution Overheads on Factory Cost} \\ = \frac{35,000 \times 100}{3,50,000} = 10\%$$

Statement of Cost & Price for Work Order (for 2011)

	₹	₹
Cost of Materials	4,000	
Direct wages	2,500	
Factory overheads (60% of wages) $\left(\frac{2,500 \times 60}{100} \right)$	6,500	
Add : 20% increase $\left(\frac{1,500 \times 20}{100} \right)$	1,500	
Administrative overheads (24% of Factory Cost) $\left(\frac{8,300 \times 24}{100} \right)$	1,800	
Cost of Production	8,300	
Selling overheads (16% of Factory Cost) $\left(\frac{8,300 \times 16}{100} \right)$	1,992	
Add : $12\frac{1}{2}\%$ increase $\left(\frac{1,328 \times 12.5}{100} \right)$	10,292	
Distribution overheads (10% of Factory Cost) $\left(\frac{8,300 \times 10}{100} \right)$	1,328	
Less : 10% Decrease	166	
Total Cost	1,494	
Profit 15% on Selling Price $\left(\frac{12,533 \times 15}{100 - 15} \right)$	830	
Selling Price	83	
	747	
	12,533	
	2,212	
	14,745	

III. DETERMINATION OF TENDER PRICE ON THE BASIS OF BEHAVIOUR OR NATURE OF COST

The cost as per its nature or behaviour can be classified into three parts :

(i) Fixed Cost, (ii) Variable Cost and (iii) Semi-variable Cost.

Fixed costs are those which do not change irrespective of the change in level of production up to a specified level i.e., they remain unchanged.

Variable costs are those costs which remain fixed per unit but they change in aggregate as per the increase or decrease in level of activity in direct proportion.

Semi-variable costs are those cost where some part is fixed and some part is of variable nature.

Hence, for determining the tender price if the total cost has been classified according to its nature, then these costs should be determined as per their nature and for this purpose whatever instruction is provided, they should be taken into consideration. It should be noted that if the

classification of fixed and variable portion in different overheads are given in the question, nothing is mentioned about the nature of office or administrative overhead, it will be treated as 100% fixed.

Illustration 11

The Manager of a cooler manufacturing concern consults you as Cost Accountant as to the minimum price at which he can sell coolers of the concern which are intended for mass production in future. The concern's records show the following particulars for the past year:

Production and Sales : 500 Coolers

Materials

Direct wages

Direct charges

Works overhead

Office overhead

Selling overhead

Profit

1,20,000

60,000

10,000

70,000

28,000

32,000

48,000

You ascertain that the 50% of the works overhead fluctuates directly with production and 60% of the selling overhead fluctuates with sales. It is anticipated that the department would produce 2,500 coolers per annum and that direct labour charges per unit will be reduced by 20% while fixed works overhead charges will increase by ₹ 30,000. Office overhead and fixed selling overhead charges are anticipated to show an increase of 25% but otherwise no changes are expected.

Prepare a statement for submission to the manager of the concern if the same percentage of profit is desired as in the past year.

Solution

Statement of Cost (500 Coolers)

Particulars	Amount	Amount
Materials	₹ 1,20,000	
Direct Wages	60,000	
Direct Charges	10,000	
Prime Cost	1,90,000	
Works Overhead :		
Fixed	50%	
Variable	50%	
		35,000
		35,000
		70,000
		2,60,000
		28,000
		2,88,000
Office Overhead		
Selling Overhead :		
Fixed	40%	
Variable	60%	
		12,800
		19,200
		32,000
		3,20,000
		48,000
Total Cost		
Profit = $\frac{48,000}{3,20,000} \times 100 = 15\% \text{ on Total Cost}$		
		3,68,000
Sales		

Statement of Cost (2,500 Coolers)

Particulars	Amount	Amount
Materials $\left(\frac{1,20,000 \times 2,500}{500} \right)$		₹ 6,00,000
Direct Wages $\left(\frac{60,000 \times 2,500}{500} \right)$	3,00,000	
Less : 20% $\left(\frac{10,000 \times 2,500}{500} \right)$	60,000	2,40,000
Direct Charges $\left(\frac{10,000 \times 2,500}{500} \right)$		50,000
		8,90,000
Works Overhead		
Fixed	35,000	
Add : Increase	30,000	65,000
Variable $\left(\frac{35,000 \times 2,500}{500} \right)$		1,75,000
Office Overhead		
Add : 25%	28,000	
	7,000	35,000
		11,30,000
Selling Overhead		
Fixed	12,800	
Add : 25%	3,200	16,000
Variable $\left(\frac{19,200 \times 2,500}{500} \right)$		96,000
Profit (15% on Total Cost)		
		12,77,000
		1,91,550
		14,68,550
Suggested Price for Current Year = $\frac{14,68,550}{2,500}$	₹ 587.42	

Illustration 12

The following data of a factory for 2010 are given :

Materials used ₹ 75,000; Direct wages ₹ 50,000; Variable production expenses ₹ 2,00,000; Fixed expenses ₹ 75,000; Total output 50,000 units and Sales ₹ 6,00,000. It is anticipated that in 2011 :

(i) Factory will produce 1,00,000 units.

(ii) Cost of material will increase by $33\frac{1}{3}\%$.

(iii) Rate of variable selling expenses will go up by 25%.

If the same rate of profit on sale is to be maintained as maintained in 2010, what should be the selling price per unit in 2011?

Solution

Statement of Cost (2010)

Particulars	Amount	Amount
Raw Materials used	₹ 75,000	
Direct Wages	50,000	
Variable Production Expenses	1,25,000	
Variable Selling Expenses	1,00,000	
Fixed Expenses	2,00,000	
	75,000	
		5,00,000
Total Cost		5,00,000
Profit		1,00,000
Sales		6,00,000

Calculation of Selling Price (2011)

Raw Materials used $\left(\frac{75,000}{50,000} \times 1,00,000 \right)$

Add : 33 $\frac{1}{3}\%$ Increase

Direct Wages $\left(\frac{50,000}{50,000} \times 1,00,000 \right)$

Variable Production Exp. $\left(\frac{1,00,000}{50,000} \times 1,00,000 \right)$

Variable Selling Exp. $\left(\frac{2,00,000}{50,000} \times 1,00,000 \right)$

Add : 25% increase

Fixed Expenses

Profit (20% on Cost)

Raw Materials used	$\left(\frac{75,000}{50,000} \times 1,00,000 \right)$	1,50,000
Add : 33 $\frac{1}{3}\%$ Increase		50,000
Direct Wages $\left(\frac{50,000}{50,000} \times 1,00,000 \right)$		2,00,000
Variable Production Exp. $\left(\frac{1,00,000}{50,000} \times 1,00,000 \right)$		1,00,000
Variable Selling Exp. $\left(\frac{2,00,000}{50,000} \times 1,00,000 \right)$		3,00,000
Add : 25% increase		2,00,000
Fixed Expenses		4,00,000
Profit (20% on Cost)		1,00,000
		5,00,000
		75,000
		10,75,000
		2,15,000
		12,90,000

Selling Price per unit = ₹ 12.90

Illustration 13

The Cost Sheet of a sewing machine is as under :

Materials

Labour

Variable Expenses

Fixed Expenses

Profit

No. of machines produced and sold 30,000. Capacity is 40,000 machines. Should the company accept an export order for 5,000 machines at ₹ 160 per machine?

Solution

For making extra 5,000 units, the production will not be beyond the capacity, hence there will not be any change in fixed cost. The present fixed cost is $30,000 \times ₹ 40 = ₹ 12,00,000$.

Statement of Cost and Profit

Particulars	Present (30,000)	Export (5,000)	Total (35,000)
Materials @ ₹ 80	₹ 24,00,000	₹ 4,00,000	₹ 28,00,000
Labour @ ₹ 40	12,00,000	2,00,000	14,00,000
Variable Expenses @ ₹ 20	6,00,000	1,00,000	7,00,000
Fixed Expenses	12,00,000	—	12,00,000
Total Cost	₹ 54,00,000	₹ 7,00,000	₹ 61,00,000
Profit	6,00,000	1,00,000	7,00,000
Sales (30,000 @ ₹ 200; 5,000 @ ₹ 160)	₹ 60,00,000	₹ 8,00,000	₹ 68,00,000

Decision : It is clear from the above statement that export order should be accepted because:

- (a) there is an increase in profit by ₹ 1,00,000, (b) capacity will be used in a better way, and (c) there will be an opportunity to enter in a foreign market.

UNIT OR OUTPUT COSTING-II

Illustration 14

The elements comprising the cost of a factory output for three years are as under :

Particulars	2008	2009	2010
Materials	₹ 90,000	₹ 60,000	₹ 1,20,000
Labour	40,000	35,000	45,000
Works overhead	25,000	24,000	26,000
Administration overhead	10,000	10,000	10,000
Selling overhead	12,000	10,000	8,000 <i>[6,000]</i>
Output in ton	6,000	4,000	8,000

On the basis of data given above, prepare an estimate for 10,000 ton to be produced in 2011, profit of 10% on Final Cost will be sufficient.

Solution

Notes : 1. Material : It is clear from the statistics of past three years that cost of material is ₹ 15 per ton. Therefore, cost of 10,000 ton would be ₹ 1,50,000.

2. Labour : Labour cost is semi-variable in nature.

Therefore, we will have to separate the variable and fixed portions :

Cost of Labour for 6,000 ton	40,000
Less :	
" " " 4,000 "	35,000

$$\text{i.e., } \frac{5,000}{2,000} = ₹ 2.50 \text{ per unit}$$

$$\begin{aligned} \text{Fixed Cost} &= 40,000 - (6,000 \times 2.50) = ₹ 25,000 \\ &35,000 - (4,000 \times 2.50) = ₹ 25,000 \\ &45,000 - (8,000 \times 2.50) = ₹ 25,000 \end{aligned}$$

Therefore, variable cost of 10,000 ton = $10,000 \times 2.50 = ₹ 25,000$

$$\begin{aligned} \text{Fixed Cost} &= 25,000 \\ \text{Total Cost} &= ₹ 50,000 \end{aligned}$$

3. Works Overhead : This cost is also semi-variable.

Following the same method as in case of labour variable cost comes to be Re. 0.50 per unit and fixed cost comes to ₹ 22,000. Therefore, total cost of 10,000 ton = $5,000 + 22,000 = ₹ 27,000$.

4. Administrative Overhead : It is same for all the years hence, it is fixed cost. It will be ₹ 10,000 for 10,000 ton also.

5. Selling Overhead : These overheads are decreasing by ₹ 2,000 per year and have no relationship with increase or decrease in output. Hence, they will be ₹ 6,000 in the year 2011.

Statement of Cost and Profit for 10,000 Ton

	₹
Materials @ ₹ 15 per ton	1,50,000
Labour as per Note (2)	50,000
Prime Cost	2,00,000
Works overhead as per Note (3) <i>(₹ 22,000 + 10,000 × 0.5)</i>	27,000
Works Cost	2,27,000
Administration overhead as per Note (4)	10,000
Cost of Production	2,37,000
Selling overhead as per Note (5)	6,000
Total Cost	2,43,000
Profit @ 10% on Total Cost	24,300
Estimated Price	2,67,300

Illustration 15.

The cost of manufacturing 5,000 units of a commodity comprises : Material ₹ 20,000, Wages ₹ 25,000, Direct expenses ₹ 400, Fixed overhead ₹ 16,000 and Variable overhead ₹ 4,000.

For manufacturing every 1,000 extra units of a commodity, the cost of production increases as follows:

- Material proportionately,
- Wages 10% less than proportionately,
- Direct Expenses proportionately,
- Fixed overhead ₹ 200 extra,
- Variable overhead 25% less than proportionately.

Calculate (a) the estimated cost of producing 8,000 units of the commodity, and (b) show how much it would differ if factory overhead is based on labour.

Solution

(A) Statement of Cost

Particulars	Cost of Produced Units		
	5,000 Units	3,000 Extra Units	8,000 Total Units
Materials	₹ 20,000	12,000 ¹	32,000
Wages	25,000	13,500 ²	38,500
Direct Expenses	400	240 ³	640
	45,400	25,740	71,140
Add : Fixed overhead	16,000	600 ⁴	16,600
Variable overhead	4,000	1,800 ⁵	5,800
	65,400	28,140	93,540

Working Notes :

- Material = $\frac{20,000 \times 3,000}{5,000} = ₹ 12,000$
- Wages = $\frac{25,000 \times 3,000}{5,000} = ₹ 15,000 - 10\% = ₹ 13,500$
- Direct Exp. = $\frac{400 \times 3,000}{5,000} = ₹ 240$
- Fixed overhead = ₹ 200 Extra per thousand, $200 \times 3 = ₹ 600$
- Variable overhead = $\frac{4,000 \times 3,000}{5,000} = ₹ 2,400 - 25\% = ₹ 1,800$

(B) Statement of Cost for 8,000 Units

(if factory overhead is based on labour)

	Prime Cost		Total Cost
	5,000 Units	3,000 Extra Units	
Materials	₹ 32,000		
Wages	38,500		
Direct Expenses	640		
	71,140		
Add : Factory overhead (80% on wages) ¹ (fixed and variable)			30,800
			1,01,940

$$1 \quad \frac{20,000 \times 100}{25,000} = 80\%$$

Note : If factory overhead charged at such percentage on wages than cost will differ by
 $= ₹ 1,01,940 - 93,540 = ₹ 8,400.$

IV. DETERMINATION OF TENDER PRICE WHEN COSTS ARE GIVEN IN PERCENTAGES

When for determination of tender price, information for various costs are given in percentage and the information as regard to quantity to produce is not given, then for solving such question the selling price is treated as ₹ 100 or as specified and on the basis of sales the percentage of various cost should be determined. In these cost, the expected increase in cost are adjusted for determining the cost of tender. In this cost the percentage profit as desired is added to determine the total cost of tender.

Illustration 16

A manufacturer finds that an increase in the cost of production has taken place and that whereas formerly his goods cost as : Raw materials 30%; Wages 20%; Rent & Rates 5%; Fuel 10% and General expenses 15%, now there has been an increase of 50% in fuel, 30% in materials, 25% in wages and 20% in rent and rates. He consults you as to what percentage he must add to the selling price in order to obtain the same profit as before.

Solution

Statement of Cost (in Percentage)

Particulars	Before change (%)	After change (%)
Materials	30	39
Wages	20	25
Rent & Rates	5	6
Fuel	10	15
General Expenses	15	15
Total Cost	80	100
Profit	20	25
	100	125

Profit before change is 20% of sales or 25% of cost. To maintain this percentage after change, profit will be ₹ 25 i.e. 25% of Total Cost ₹ 100 and selling price will be ₹ 125. Hence, selling price will be 25% more than the present.

Illustration 17

The cost structure of an article, the selling price of which is ₹ 500, is as follows :

Direct Materials—50% of the Total Cost

Direct Labour—30% of the Total Cost

Overhead—Balance

Due to anticipated increase in existing material price by 20% and in existing labour rate by 10%, the selling profit would come down by 30% if the selling price remains unchanged.

Prepare a comparative statement showing cost, profit and sale price under the present conditions and with the increase expected for the future, assuming the same percentage of profit on cost as under present conditions has to be earned.

Solution

Selling Price = ₹ 500

Assume Total Cost = ₹ X

	Present Conditions	Anticipated Conditions
Direct Materials	0.5 X	0.6 X
Direct Labour	0.3 X	0.33 X
Overhead	0.2 X	0.2 X
Total Cost	<u>1.0 X</u>	<u>1.13 X</u>
Profit	(500 - X)	(500 - 1.13 X)

$$(500 - X) - (500 - 1.13 X) = 30\% \text{ of } (500 - X)$$

$$\Rightarrow -X + 1.13X = 150 - 0.3X$$

$$\therefore X = ₹ 350 \text{ approximately}$$

Thus, Profit = ₹ 150, and Cost = ₹ 500 - ₹ 150 = ₹ 350.

Comparative Statement of Cost, Profit and Sale-price

Particulars	Present Condition	Future Anticipation	
		Sale Price Unchanged	Sale Price Increased
Sale Price per Unit	₹ 500	₹ 500	₹ 564
Direct Materials	175	210	216
Direct Labour	105	115	115
Overhead	70	70	70
Total Cost	350	395	395
Profit	150	105	169*

* $\frac{150 \times 395}{350} = ₹ 169$ profit; Increased sale price = ₹ 395 + 169 = ₹ 564.

THEORETICAL QUESTIONS

- How is tender price determined?
- Define a cost sheet and explain how a cost sheet helps in finding out tender price. Elucidate with the help of an example.

NUMERICAL QUESTIONS

(I) Short Calculation Questions

- The cost price of a tender is ₹ 5,00,000. What will be the tender price if the profit is added 20% on tender price? What will be the difference on tender price, if the profit is to be added 20% on cost price.
Ans. ₹ 6,25,000 and ₹ 6,00,000.
- In a company, works overheads are 20% of wages and office overheads are 10% of works cost. What price should the company quote for a supply which, it is estimated, will require material worth ₹ 1,000 and ₹ 1,500 for wages and profit would be 20% of selling price.
Ans. ₹ 3,850.
- In manufacturing 5,000 units, direct labour cost is ₹ 25,000. For manufacturing additional 1,000 units the cost of labour increases 10% less than proportionately. Find out the amount of direct labour for tender of 8,000 units.
Ans. ₹ 38,500.
- The outputs of a manufacturing concern for the years 2008, 2009 and 2010 were 800, 1,000 and 1,500 units respectively. The factory overheads for these years were ₹ 6,400, ₹ 7,000 and ₹ 8,500 respectively. Find out the amount of factory overhead for 2,000 units to be produced in the year 2011.
Ans. ₹ 10,000.

(II) Long Calculation Questions

When past period cost, output produced and quantity or output for tender to be quoted is given

(A) When there is no change in past cost and past percentage of profit

- The following figures relate to the costing of a manufacturer of electric fans for a period of 3 months ending 31st Dec., 2010 :

Completed stock on 1st Oct., 2010	X 300	Nil
Completed stock on 31st Dec., 2010	X 300	20,250
Stock of raw materials 1st Oct., 2010	X 5,000	5,000
Stock of raw materials 31st Dec., 2010	X 3,500	3,500
Factory wages	X 75,000	75,000
Indirect charges	X 12,500	12,500
Materials purchased	X 32,500	32,500
Sales	X 1,12,500	1,12,500

The number of fans manufactured during the 3 months was 3,000. Prepare a statement showing the cost per fan and the price to be quoted for 750 fans to realise the same percentage of profit as was realized during the three months.

Ans. Cost per fan ₹ 40.50; Quotation for 750 fans ₹ 33,750.