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COMMERCE

DIRECTORATE OF DISTANCE EDUCATION

M.COM., Second Year

PART II – Group A
ADVANCED COST ACCOUNTING
VOLUME - II

Madurai Kamaraj University
Madurai – 625 021

CONTENTS

LESSON -14

JOB COSTING

NOTES

14.1 Introduction

Job costing is the method of costing used to determine the cost of non-standard jobs carried out according to customer's specifications. In this method, cost units are separately identified and are costed individually; it is used in industries where jobs are dissimilar and non-repetitive. Job costing is applicable to printing press, furniture makers, manufacture of automobile spare parts, machine manufacturing industries, builders, repairing shops, hardware etc., This method is also known as Job Order Costing or Specific Order Costing or Production Order Costing.

Production order:

For every customer's order accepted, a separate production order is prepared This order includes specific instructions to the production department.

The main purpose of job costing is to determine the profit or loss of each job. When an estimate is prepared and a quotation is submitted for a specific job, the estimated cost is compared with actual cost not only with a view to distinguishing profitable and unprofitable jobs, to have a basis for properly estimating the costs of similar jobs. The cost is ascertained for each job, since there is no uniformity in the flow of production from department to department. Each job has its own characteristics and hence, needs a special treatment. A separate cost she et is prepared for each job on the basis of distinguishing numbers; and full details of the costs are entered therein, along with the date of commencement and the date of completion and if necessary actual and the estimated costs side by side. Further a separate work in progress ledger is maintained,

14.2 Job Costing Procedure

Under Job Costing, following steps are basically involved: -

1) Estimating

In job order costing, production is not a continuous process as each job is , a non-standard and separate work. So the cost of each job has to be estimated

separately, and price to be quoted separately. Past experience, cost sheets of preceding periods, and a careful forecast of prices of materials, cost of labour and overheads form the bases for cost estimate for the job.

2. Planning

Good planning and strict control is necessary to avoid wastage of materials, manpower, machine hours and other resources. When an order is received from the customer, the planning department prepares a suitable design for the job and prepares requirements of materials, labour etc., and sets out directions for the operation's involved in carrying out the jobs.

3. Production order

The planning department will draw up a "production order" specifying production order number, date and number of the order, customers name, quantity, description of the job, drawing and designs, bill of material number, operations to be carried out, departments and machines allotted for it, starting and completion dates and other instructions. It serves as an authority to carry on the work and also as a plan of the job.

Job cost Sheet:

It is the core document of job costing method. Actual cost of materials labour and overheads are recorded along with the estimated costs in this sheet.

4. Job cost sheet

For every job, a "cost sheet" is issued for recording all direct and indirect expenses incurred in respect of the Job. It shows total material, labour and overhead expenses. It is a Cost Sheet of a specific job.

5. Completion of Job

To secure effective control over production, the planning department prepares a "Route and Time Chart" indicating the sequence of operations to be carried on, their stipulated timings and other manufacturing instructions. Progress Reports are received from departments to assess the extent of work completed from time to time so that job may be completed as per scheduled time. When a job is completed a "job Completion Report" is sent to the planning department and also to the Costing Department. This report is an indication that further expenses

on the Job should cause and the job cost sheet be closed.

14.3 Recording of Costs

The main aim of job costing system is to see that three cost elements ie., direct material, direct labour and manufacturing overhead are correctly charged to job orders. The procedure of recording job order costs is summarized below: -

1. Materials

Material cost of each job can be found out from the Material Abstract prepared on the basis of Material Requisitions. The cost clerk values the cost of direct materials used and cost of indirect materials used. The direct material is posted in the general ledger by debiting the Works in Progress Control Account, and crediting the Stores Control Account. The indirect material is posted by debiting the Overhead Control Account and crediting the Stores Control Account.

2. Labour

Labour cost of the job is calculated from job cards or 'Job Tickets'. On the basis of Job Cards, the direct and indirect labour. Costs are ascertained. The direct labour cost is posted by debiting Work in Progress Control Account and crediting the Wages Control Accounts. Similarly, indirect labour cost is debited to the Overhead Control Account and credited to Wages Control Account.

3. Overheads

Overhead costs are accumulated on departmental basis and then apportioned to the jobs carried out in each department on suitable basis like direct labour hours or machine hours spent on each job. Production overheads are posted by debiting Works in Progress Control Account. The administrative overheads are transferred by crediting Administration Overheads Control Account and debiting Finished Goods Ledger Account. For selling and Distribution Overheads, Cost of Sales Account is debited and Selling and Distribution Overhead Control Account is credited.

Overheads:

It is the cost of indirect material, indirect labour and such other expenses including services as cannot conveniently be charged to a specific unit.

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Cost Control:

The variances reveal whether cost is within control or not. Remedial actions are taken to control the costs which are not within the budgets or standards set.

4. Cost Control

Cost control in the job type of manufacturing is more difficult. The reason is that jobs are diversified and distinct from each other. The materials remaining unused on a job may not be put to use in the immediate future and the chances of wastage of materials and man-hours may be significant. Control Over costs be exercised by comparison of the actual costs with the estimates worked out earlier. The cost sheets of the immediately preceding period pertaining to the same job may help in detecting the variations. The budgets prepared for common jobs also assist in controlling cost.

In job costing all costs related to a job are posted to the cost sheet and the total costs is arrived at. If a job consists of many units of production, the total cost of the job is divided by the number of units to find out the cost per unit. The job cost sheet is prepared with due analysis and classification of cost. A noteworthy feature of job costing is that the production and requirement are determined first and then the expenses are ascertained in relation to it. This approach is in contrast with that of output costing in which the costs incurred during a period are accumulated first and then the total cost is divided by the number of units produced during that period.

In job costing "cost estimates" for each type of job should be prepared to give quotations to his consumers. The cost estimates are developed with great care as they can also be used for exercising control over costs by comparing them with the actual costs and taking up action wherever undue variation Is noticed. Therefore, it is significant to ensure that all cost data should be accurate in the interest of effective cost control, it is desirable to employ standard costs. It may be difficult to introduce standard costing to the entire jobbing industry, since it backs uniformity in its products or in manufacturing processes. However, it is possible to establish standards for parts and operations which are uniform and repetitive. Standard Costs not only assists in controlling function but also In preparing quotations.

14.4 Treatment of Defective Work

If the defective units are clearly identified with a numbered job order and defects are peculiar to the job, the costs to complete the defective units must be charged to the particular job. If defective units cannot be identified with particular job and nature of the work in the factory is such that defective work occurs at times, then cost of defective work should form part of production overhead.

Valuation of Work in progress

Work in progress represents the incomplete job at the end of the accounting period, on which some manufacturing operations are still due. If production order has been partly completed by the end of the accounting period, it is necessary to find out the value of work in progress is obtained from the work in progress account. Generally, a composite work in progress account may be opened for the entire factory. This account is debited with all costs incurred on various jobs during a period and credited with ail costs incurred on various jobs. The debit balance on this account represents cost of work in progress. The debit balance of work in progress account is carried forward to the next period as opening stock.

14.5 Advantages of Job Costing

1. It distinguishes between profitable and non-profitable jobs. Thus it helps in knowing profitability of each job.

2. it collects, and analyses the costs by elements, functions, departments and Jobs. It provides sufficient cost data for preparing cost estimates and quotation.

3. It facilitates cost control by enabling comparison of actual costs with estimated costs.

4. The management would be in a better position to fix selling prices of special orders.

5. Costs recorded in job costing help in preparing budgets for future.

6. It facilitates the application of the cost plus formula of pricing contracts.

7. Spoilage and defective work can be identified with a specific job and , responsibility for the same may be fixed on individuals.

14.6 Limitations of Job Costing

1. It involves too much of clerical work. It is thus expensive besides being laborious.

2. Costing of minute job with considerable clerical/labour may lead to inaccurate results.

3. Being historical in nature, it has all the defects of the historical costing. So the costs do not enable prompt remedial actions.

14.7 Suitability for Job Costing

1. Production consists of special job based on customer's specifications. Material and labour contents of each job are different. Each job uses the indirect facilities to a different extent.

2. Production pattern is not continuous and 'repetitive.

3. Virtually every job is produced somewhat different.

4. Each job maintains its separate identity through out the production stage.

5. The different jobs are independent of each other.

Illustration: 1

The following particulars are extracted from the books and other relevant source in respect of M/s Mohan & Company.

1. Estimated material cost of job is Rs.. 1,00,000 and the direct labour cost is likely to be Rs.20, 000.

2. In machine shop, it will require machining by Japanese Machine for 20hrs and Italy Machine for 6 hrs.

3. The machine, hour rates for Japanese Machine and Italy Machine are Rs 200/- and Rs.300/-respectively.

4. The direct wages in all other shops last year amounted to Rs. 16,00,000 as against Rs.' 9,60,000 factory overheads.

5. Last year factory rest of all jobs amounted to Rs. 50,00,000 as against Rs. 7,50,000 off ice expenses.

Make out a quotation with 20% profit on cost price.

Solution:-

		Rs.
Estimated material cost		1,00,000
Direct Labour cost		20.000
Prime Cost		1,20.000
Factory overhead * 60% of direct wages Rs. 20,000		12.000
Machine expenses:		
Japanese Machine 20 hrs. © Rs. 200	4,000	
Italy Machine 6 hrs @ Rs.300	1,600	5.800
Factory Cost		1,37,800
Office expenses		
15% of factory cost Rs. 1,37,800		20.670
Cost of production		1,58,470
Profit 20% on cost price		31,694
Selling price		1,90.164

Percentage of factory overhead to direct wages

$$\frac{9,60,000}{16,00,000} x100 = 60\%$$

Percentage of office expenses to factory cost

$$\frac{7,50,000}{50,00,000} x\% \ 100 = 15\%$$

Illustration: 2

The information gives below has been taken form the costing records of an Engineering works respect Job No. 303. Materials Rs. 4,010

Wages

Dept:

A - 60 hrs. @ Rs. 3 per hr.

B - 40 Hrs. @ Rs. 2 per hr.

C - 20 hrs. @ Rs. 5 per hr.

Overhead expenses for these three departments were estimated as follows:

Variable Overheads

Dept A Rs. 5,000 for 5,000 labour hours B Rs 3,000 for 1,500 labour hours C Rs. 2,000 for 500 labour hours.

Fixed Overheads

Estimated at Rs. 20,000 for 10,000 normal working hours.

You are required to calculate the cost of job 303 and calculate price to give profit of 25% on selling price.

Solution:-

Cost Sheet

Job No. 303

			Amount	Amount
			Rs.	Rs.
Direct materials.				4,010
Wages: Dept., A 60 hrs x Rs. 3			180	
B 40 hrs x Rs. 2			80	
C 20 hrs x Rs. 5			100	
				360
Variable overhead				
Dept. A	60 x	$\frac{Rs.5,000}{Rs.5,000/hr}$	60	
Dept. B	40 x	$\frac{Rs.3,000}{Rs.1,500/hr}$	80	
Dept. C	20 x	$\frac{Rs.2,000}{Rs.500/hrs}$	80	
Fixed Over head				220
120 hrs	x	$\frac{Rs.20,00}{Rs.10,000/}$		240
Total cost				4,830
Profit 25% on selling price				1,610
Selling price				6,440

Illustration: 3

Ram & Company produces goods against order. Its manufacturing section consists of three departments A, B and C. It is the practice of the company to prepare quarterly budgets for the purpose of control and the absorption of overheads. The following information is extracted from the first quarter budget of the company.

1	Material	60,000	10,000	20,000	30,000
2.	Direct labour cost	23,500	7,000	8,000	8,500
3.	Fixed factory overhead	15,000	5,000	4,000	6,000
4.	Fixed factory overhead	15,000	-	-	-
5.	Administrative overhead	10,000	-	-	-
6.	Machine hours	20,000	6,000	4,000	10,000

The factory overheads are absorbed an the basis of machine hours and the administration overhead is absorbed as a percentage of factory cost.

The company has received an order from a customer for the supply of a specific variety of products that pass through two departments A and B. In respect of the order the following particulars are available

Departments	A	B
Materials cost(Rs.)	1,500	2,500
Direct labour cost (Rs.)	700	800
Machine hours	600	400

Prepare a job order cost sheet and ascertain the price of the order if the margin of 25% on sales is added to the total cost of production.

Solution

Job Order Cost Sheet

	Rs.	Rs. P
Material Cost (Dept. A Rs. 1,500 Dept B. Rs. 2,500)		4,000.00
Direct wages (Dept. A Rs. 700 + Dept. B Rs. 800)		1.500.00
Prime cost		5,500.00
Factory Overhead (on the basis of machine hrs)		
Variable dept A = $\frac{5,000}{6,000} x600$	500	
Variable dept A = $\frac{4,000}{4,000} x400$	400	900.00
Fixed = $\frac{15,000}{20,000} x1,000$		750.00
Factory Cost		7,150.00
Administration overhead		
(8.81% factory cost i.e = $\frac{10,000}{1,13,500} x100$		629,91
Cost of Production		7,773.91
Profit 25% of Price {7.779.91 x 25/75}		2,593.30
Selling price		10.373.21

Illustration : 4

The following information for the year ended 31st December 2002 is obtained from the books of a factory.

	Completed Jobs	Work in progress
	Rs.	Rs.
Raw materials issued	90.000	30,000
Wages	1,00,000	40,000
Chargeable expenses	10,000	4,000

Materials transferred to Work in progress	2,000	2,000
Materials returned to stores	1,000	----

Factory overhead is 10% of wages and office overheads are 25% of factory cost. The value of executed contracts during 2002 was Rs.4,10,000. Prepare (a) Consolidated completed jobs Account and (b) Consolidated work in progress Account.

Solution

Consolidated Completed Job Account

Rs.	Rs.		Rs.
To Raw materials issued		By Contractes's A/c	
Less:Transferred to W.I.P. 2,000		(the amount of contracts	4,10,000
Returned to Stores 1,000		completed)	
3,000	87,000		
To wages			
To Chargeable expenses	10,000		
To Factory overhead (80% of wages)	80,000		
To Office overhead (25% of factory cost Rs. 2,77,000)	69,250		
To Net Profit transferred to P &	63.750		
	4,10,000		4,10,000

Consolidated Work Progress Account

Rs.	Rs.		
To Raw materials issued		By Balance c/d	1,35,000
30,000			
Add: Transferred from completed Jobs 2,000	32000		
	40,000		
To wages			
To Chargeable expenses	4,000		
To Factory Overheads (80% of wages)	32.000		
To Office overheads (25% of wages Rs. 1.08,000)	27.000		
	1,35,000		1,35,000

Illustration: 5

A factory engaged in making non-standard products to customer's specifications processes all production through 3 departments. The cost figures of the factory for the month of August 2003 are furnished below.

Nature of Expenses	Total Rs.	X Rs	Y Rs	Z Rs
Direct materials	18,600	7,500	6,400	4,700
Labour	15,000	6,000	5,000	4,000
Over expression	7,500	3,000	2,500	2,000
	41,100	16500	13900	10700

Prepare a simple cost sheet for products M and N on the basis of data furnished below:

Product	*Cost elements*	Expenses Incurred		
		Dept.X	Dept. Y	Dept. Z
M	Direct Material	100	200	300
	Direct Labour	50	60	70
N	Direct Material	50	90	140
	Direct Labour	70	60	80

NOTES

Solution:

Cost Sheet

	Product M		Product N	
	Rs	**Rs**	**Rs**	**Rs**
Direct material				
Dept X	100		50	
Dept Y	200		90	
Dept Z	300	600	140	280
Direct Labour				
Dept X	50		70	
Dept Y	60		60	
Dept Z	70	180	60	210
Overhead as percentage to direct wages				
Dept A $= \frac{3,000}{6,000} x100 = 50\%$	25		35	
Dept Y $= \frac{2,500}{6,000} x100 = 50\%$	30		30	
Dept Z $= \frac{2000}{4,000} x100 = 50\%$	35	90	40	
Total Cost	870		595	

Illustration: 6

A factory uses job costing. The following cost data is obtained for the year ended 31'st December 2002.

Direct materials	90,000
Direct Wages	75,000
Profit	60,000
Selling & Distribution overheads	52,000
Administration overheads	42,000
Factory overheads	45,000

1) Prepare a job cost sheet indicating the prime cost, works cost production cost of sales and the sales value.

2) In 2003 the factory receives order for a number of jobs. It is estimated that direct materials required will be Rs. 1,20,000 and direct labour cost Rs. 75,000. What should be the price for these jobs if the factory intends to earn the same rate of profit on sales, assuming that the selling and distribution overheads have gone up by 15%? The factory recovers factory overheads as percentage of direct wages and administration and selling and distribution overheads as a percentage of works cost, based on, cost rates prevailing in the previous year.

Solution:

	Rs.
Direct materials	90.000
Direct wages	75,000
Prime Cost	1,85,000
Factory overheads	45,000
Works Cost	2,10.000
Administration Overheads	42,000
Cost of production	2,52,000
Selling & Distribution Overheads	52,500
Total Cost	3,04,50.0
Profit 20% on Cost or 16.67% on Sales	60.900
Sales Revenue	3,65.400

Overhead Recovery Rates

a) Percentage of factory overheads to direct wages'

$$\frac{45,000}{75,000} x100 = 60\%$$

b) Percentage of administration overheads to works cost

$$\frac{42,000}{2,10,000} x100 = 20\%$$

c) Percentage of selling and distribution overheads to works cost

$$\frac{52,500}{2,10.000} x100 = 25\%$$

d) Percentage of profit on sales

$$\frac{60,900}{3,65,400} x100 = 16.67\%$$

(2) Estimates of Cost for 2003

	Rs.	Rs.
Direct material		1,20,000
Direct wages		75,000
Prime Cost		1,95,000
Factory Overheads (60% of wages)		45,000
Works Cost		2.40,000
Administration Overheads (20% of works cost)		48,000
Cost of Production		2,88,000
Selling & Distribution overheads 20% of Works	60,000	
Add: Estimated rise 15%	9,000	
		69,000
Cost of Sales		3,57,000
Profit 16.67% or 20% on cost		71,400
Selling price		4,28,400

Illustration: 7

Rama Products Ltd., have received an enquiry for the supply of 2.00.000 numbers of a special type of machine screw. Capacity exists for manufacture of the screws in the company's unit No. 3; but a fixed investment of Rs. 1.20.000 and working capital to the extent of 25% of the sales. The costs are estimated as follows.

Raw materials 20,000 kgs at Rs. 4.60 per kg.

Labour hours direct 18,090 of which 2.000 would be overtime hours payable at double the about rate.

Labour rate - Rs.2 per hour

Factory overhead - Rs. 2 per direct labour hour

Selling & Distribution Cost - Rs. 46,000

Material recovered as scrap at the end of the operations is estimated at Rs. 4.000.

The company expects a net return of 25% on the capita! employed.

Prepare a cost and price statement indicating the price, which should be quoted to the customer.

Solution:

Cost and Price Statement

	Rs.	Rs.
Raw material 20.000 *kgs* © Rs. *4.60*		92,000
Direct Labour		
16.000 Normal Hrs @ Rs. 2	32.000	
2,000 O.T. Hrs. @ Rs. 4	8.000	
		40.000
Prime Cost		1.32.000
Factory overhead Rs. 2 per Hr. (18,0.00 x *2)*		36.000
		7,68,000
Less: Realisable Value of Scrap		4.000
Works Cost		1.64,000
Selling & Distribution Cost		46.000
Total Cost		2.10,000
Profit		46,000
Selling price		2,56,000

Note: Profit and price are calculated as under.

Let sales value be 'x'

Now, Price = Cost + Profit

x = Cost - 25% of Capital Employed.

2,10,000 + 1/4 (Fixed-Capital + Working Capita!)

=. 2,10,000+ ¼ (1,20,000+ x/4)

= 2.10,000 + 30,000+ x/16

= 15/16 = 2,40,000

x = 2,40,000 x 16/15 = Rs. 2,56,000

x= Sales Price = Rs. 2,56,000

Model Question

1. What is 'Job Costing'? Mention the type of industries in which this system would be suitable. Suggest a suitable Programme Cost Sheet.

2. The following information relates to Job No. 115

Material	Rs, 8.900
Wages	Dept. Casting - 120 hrs at Rs.3 per hr.
	Machining 40 hrs at Rs. 4 per hr.
	Finishing - 80 hrs at Rs. 2 per hr.

Fixed overheads were Rs. 10,000 for 5,000 working hours. Variable overheads: Dept. Casting Rs. 4,000 for 2,000 Labour hours.

Machining - Rs. 6,000 for 1,500 Labour hours.

Finishing-Rs. 2.000 for 500 Labour hours

What should be the price to be quoted if profit expected is 20% on the selling price.

(Ans: Price Rs. 10,975)

3. The following particulars relate to the year ended 30th June 2003,

	Completed Jobs	**Work in progress**
	Rs.	**Rs.**
Material issued	50,000	10,000
Wages	35,000	7,000
Chargeable expenses	7,500	500
Materials returned to stores	500	—

Works expenses were 60% of Prime Cost; Administration Overheads were 30% of works Cost. The value of job completed during the year was Rs. 2,50,000. Prepare (i) Consolidated completed job account to ascertain Profit or Loss during the year and (ii) Consolidated work in progress account.

(Ans: Profit Rs. 58,640).

NOTES

Lesson - 15

Process Costing

15.1 Introduction:-

Process Costing:

It is a method of costing which is used to ascertain the cost of output at each stage of production.

The manufacture of certain products involves several stages of production. The accumulation of costs by each stage of production is known as the Process Cost Accounting. In other words Process Costing is the method of costing used to ascertain the cost of product at each process or stage of production.

Process costing is useful for industries with following characteristics.

a) The production is continuous and the end product is the result of a sequence of processes.

b) The product is homogenous and the units produced are identical and standardized. The units of anyone process are indistinguishable from each other. But the units of one process may differ from the units of the other process: For example, the units of 'A' process may differ from those of 'B' process but the units of 'A' process will be similar to each other.

c) The production involves different processes, and the sequence of operations for processing the product is specific and predetermined.

d) The raw material passes from process.. The output of one process from input (raw material) of another process until the last process from which the finished product comes out.

Process costing method is applied to industries like oil refining chemical works, paints, paper making, Iron & Steel, rubber, soap, biscuit. Textile, weaving, spinning etc.

15.2 Difference between Job costing and process costing

Job costing and "process costing are two distinct systems. Both the systems are used for ascertaining of each unit completed but both the systems are

suitable in different circumstances. Job costing is used when products being manufactured are so dissimilar, that a single cost cannot be applied to all units produced. Process costing system is suitable for industries engaged in mass production of like units and units produced are of standard specification. The main points of differences between job costing and process costing are summarized below:

Job Costing	Process Costing
1) Production is on the basis of special orders individual specifications. So each job is distinguishable from the other.	1) Production is in continuous flow and the products are of uniform variety. So one unit is similar to the other.
2) One job is not related to or dependent on each other.	2) The succeeding process is dependent on the proceeding process.
3) Costs are totaled for each job. The time and period in significant.	3) Costs are collected for each process for a period.
4) The cost of job is ascertained only on the completion of the job by means of job cost	4) The process cost is ascertained at the end of the cost period, for each process separately
5) The loss of one job is not transferred to the other.	5) The costs of one process are transferred to the next process until goods are completely manufactured.
6) Since every job is to be coasted separately, the work is more.	6) Involves less work, as there is no need for allocating costs to each unit.
7) There may or may not be work-in-progress at the beginning or end off accounting period.	7) There is always some, work-in-progress at the beginning as well as at the end of the accounting period.
8) Cost control is difficult as each product unit different and the production is not continuous.	8) Cost control is easy due to uniform is production

Job Costing:

It is that category of basic costing methods which is applicable where the work consists of separate contract jobs or batches each of which is authorized by specific order or contract.

15.3 Combination of Job Costing and Process Costing

Job costing and process Costing are two different methods of cost accounting. Job costing emphasizes the accumulation and allocation of costs to specific jobs. Process costing is concerned with collection of production costs for a specific period by processes, departments or cost centres through which different products flow. In most cases, a company will follow either job costing method or process costing method. However, sometimes a combined job costing and process costing method may be used in the following circumstances.

1) In a multi product company, a combined job costing and process costing method may be used because some products may demand use of job costing while others may necessitate use of process costing for instance, in a company, process costing may be applied in electroplating division and job costing may be applied in machine shop division.

2) In certain cases where process costing is applied in the initial stages of production and in the final stage job costing is applied. The position may also be reversed in some cases. Here, more than one method of costing is applied for computing the cost of a certain product. That is called multiple costing methods.

15.4 Advantages of Process Costing

1. Costs of the processes as well as of the end product are computed periodically at short intervals.

2. The average cost of homogenous products can easily be computed.

3. It involves less clerical work because of the simplicity of cost records associated with this method of costing.

4. Since cost data is available for each process it ensures a close control over production and costs.

5. It helps to assess the efficiency of production against the standards. So use of standard costing system is very effective in process costing.

6. Process costing facilitates in price quotations, because material consumption and operation get more or less standard.

15.5 Limitations of process costing

1. The whole concept of process costing is based on average cost. The average cost ascertained under this method is not the true cost per unit. It conceals weaknesses and inefficiencies in processing. Hence, it may not be of much use in assuring the efficiency of operations.

2. Cost accumulation is linked to a particular period because cost relating to a process during a particular period is divided by output during that period. By the time costs are reported. It may be too late to permit exercise of control.

3. The emergence of joint products may present the problem of apportionment of joint costs. If apportionment is not properly done costs results may not be accurate.

Apportionment:

Charging a fair share of overhead to each cost centre is termed as apportionment

4. The work-in-progress at the end of the period is expressed in terms of completed units. It introduces subjective element in scientific cost determination.

5. The valuation of work-in-progress on the basis of the degree of completion may sometimes be a mere guess work.

6. When two or more dissimilar products are produced in the same process, the related cost is divided in products on some weight age, which can be expressed in terms of points. This may give an incorrect picture of the cost.

7. Process costing does not permit the evaluation of efforts of individual workers or supervisors.

8. Since it is based on historical costs. It has all the weaknesses of historical costing.

15.6 Application of Process Costing

1 A factory is divided into departments of processes. A separate account is kept for each process.

2. The account is debited with the costs of materials, wages and overheads relating to the process.

Wastage:

Wastage is material that is lost, evaporates or shrinks in a manufacturing process or is a residue that has no measurable recovery value.

3. The cost of by - products and wastage of materials, if any, is credited to the process account.

4. The balance of this account representing the cost of the process product which is transferred to next process and so on until the final product is completed

5. In some cases, the whole of the product is not transferred to the next process but a certain part of it is kept in the stock. The cost of such stock is transferred to Process Stock Account and the remaining product is transferred to next process.

6. On completion of manufacture in the final process, the finished product is transferred to the Finished Goods Account.

7. The cost of each unit of Process is computed by dividing the total cost incurred during a period by the number of units produced during that period.

Illustration: 1

A product passes through three district processes to completion. These processes are numbered respectively 1,2 and 3 During the period the following information was obtained.

	Process 1	Process 2	Process 3
Materials	15,000	4,000	7,000
Labour	2,500	12,000	12,000
Direct expenses	1,000	3,000	5,000

The production overhead for the period were Rs.79,500. This should be allocated to process on the basis of 300% of direct wages. Production during the period was 1,000 units. There was no stock of raw materials or work in progress either at the beginning or at the end of the period. Prepare Process Accounts.

Solution

Output: 1.000 Units

Particulars	Cost per Unit Rs.	Amount Rs.	Particulars	Cost per Unit Rs.	Amount Rs.
To Materials	15.00.00	15,000	By Output transferred to process 2	26.00	26,000
To Labour	2.50	2,500			
To Direct expenses	1.00	1,000			
To Production Overhead (300% of 2,500)	7.50	7,500			
	26.00	26,000		26.00	26,000

Process 2 Account

Particulars	Cost per Unit Rs.	Amount Rs.	Particulars	Cost per Unit Rs.	Amount Rs.
To Output transferred from process 1	26.00	26,000	By Output transferred to process 3	80.00	80,000
To Materials	4.00	4,000			
To Labour	12.00	12,000			
To Direct expenses	2.00	2,000			
	36.00	36,000			
	80.00	80,000		80.00	80,000

Process 3 Account

Particulars	Cost per Unit Rs.	Amount Rs.	Particulars	Cost per Unit	Amount Rs.
To Output transferred from process 2	80.00	80,000	By Output transferred to finished stock	140.00	1.40.000
To Materials	7.00	7,000			
To Labour	12.00	12,000			
To Direct expenses	5.00	5,000			
ToProduction Overhead (300% of 12,000)	7.50	7,500			
	36.00	36,000			
	140.00	1,40,000		140.00	1.40,000

Finished Product Stock Account

Particulars	Units Rs.	Amount. Rs.	Particulars	Units	Amount
To Output transferred from Process 3	1,000	1,40,000			

Illustration : 2

A particular brand of phenyl passed through three important processes. During the week ended 31st January 2003, 600 gross of bottles are produced. The cost book shows the following information.

	Process I	Process2	Process 3
	Rs.	Rs.	Rs.
Materials	4,000	2,000	1,500
Labour	3,000	2,500	2,300
Direct expenses	650	1,200	1,300
Cost of bottles	-----	1,075	——
Cost of corks	----	----	325

The indirect expenses for the period were Rs. 1950.

The by-products were sold for Rs. 200 (Process II)

The residue sold for Rs. 150 (Process III)

Indirect expenses have been apportioned to the processes on the basis of labour.

Prepare the account in respect of each process showing its cost and cost of production of the finished product per gross of bottles.

Solution

Apportionment of Indirect expenses

Labour cost in Process I, Process II and Process III

3000 : 2500 : 2300

i.e., 30 : 25 ; 23

Total indirect expenses Rs. 1,950

Process I = $1,950 \times \frac{30}{78} = Rs.750$

Process II = $1,950 \times \frac{25}{78} = Rs.625$

Process III = $1,950 \times \frac{23}{78} = Rs.575$

Process I Account

(Output - 600 gross of bottles)

	Rs.		Rs.
To Materials	4,000	By Transferred to process 11	
„ Labour	3,000	(Cost per gross of bottles Rs. 14.00)	8.400
„ Direct expenses	650		
„ Indirect expenses	750		
	8,400		8,400

Process II Account

	Rs.		Rs.
To Transfer from Process 1	8,400	By Sale of by-Products	200
To Materials	2,000	By Transferred to Process lit	-
To Labour	2,500	(Cost per gross of bottles Rs.26)	15,600
To Direct expenses	1,200		
To Indirect expenses	625		
To Cost of bottles	1,075		
	15,800		15,800

Process III Account

	Rs.		**Rs.**
To Transfer from Process II	15,600	By sale of residue	150
To Materials	1,500	By Finished Product Account	
To Labour	2.300	(Cost per gross of bottles Rs.26)	21,450
To Direct expenses	1,300		
To Indirect expenses	575		
To Cost of corks	325		
	21,600		**21,600**

15.7 Main Aspects Of Process Costing

In process costing the following four main aspects are to be studied in detail

1) Process losses

2) Inter process profits

3) Equivalent production

4) Joint products and By-products

The first aspect is discussed in this lesson; the other three are discussed in the subsequent

Process Losses

In all manufacturing industries, waste, scrap, spoilage and detective work arise in one form or the other, in many process industries, some loss is inevitable. The term loss includes waste scrap and spoilage. These may arise an account of the inherent nature of materials, chemical reaction or evaporation. The Process loss is of two types (i) Normal loss and (ii) Abnormal loss.

Normal Loss:

It is the process which is unavoid and uncontrollabl is to be expecte normal condition the process.

(I) Normal Loss

Normal loss is one, which is incidental to production. Such loss can be estimated in advance on the basis of past experience. Normal process loss may include scrap and/or waste. Whereas waste has no value but scrap has some value, which is recoverable without further processing.

The normal loss reduces the quantity of output. Good units produced, i.e., should absorb all normal losses; the cost of normal loss will be borne by the normal production of the period.

Where the' normal loss, includes scrap, which has saleable value the process account, is credited with the amount realised from sale of normal scrap. To that extent cost of normal production is reduced.

Example

Total cost Rs. 900: Input - 100 Units

a) Where there is no normal loss

Output = 100 units

Cost per unit $\frac{900}{100} = Rs.9.00$

b) where there is normal loss of 10% input out put (100 – 10) + 90 units

Process cost per unit =

$$\frac{Total\ cost\ including\ the\ cost\ of\ normal\ loss}{Good\ units\ (Normal\ production\ of\ the\ period)} = \frac{900-45}{90} = \frac{855}{90}\ Rs.9.50$$

c) Where the scrap is sold at Rs. 4.50 per unit

d) Output = (100 – 10) + 90 Units

Process cost per unit =

$$\frac{Total\ \ cost\ less\ value\ of\ Scrap}{Good\ units} = \frac{900-45}{90} = \frac{855}{90}\ Rs.9.50$$

Illustration: 3

The cost of production of 200 units is Rs. 5,600 as follows: Materials Rs. 3,000; labour Rs.2,000 and overheads Rs:600. the normal loss comprising of scrap is 10% and it is sold at Rs.l0per unit. Find out the cost of remaining units and prepare the process account.

Solution

Process Account

Particulars	Units	Amount to.	Particulars	Units	Amount Rs.
To Materials	200	3,000	By normal loss,	20	200
To Labour		2,000	By Cost of Production @Rs. 30	180	5,400
To Expenses		600			
	200	5,600		200	5,600

Note: If the normal wastage is not sold for any price the cost of production per unit will be 5600 -180 = Rs.31.11

Illustration : 4

The Bengal Chemical Co. Ltd., produced three chemicals during the month of June 2003 by three consecutive processes. In each process 2% of the total weight put in is lost and 10% is scrap which from process (1) and (2) realises Rs. 100 a ton and from process (3) Rs. 20 a ton.

The product of three processes is dealt with as follows:

	Process 1	Process 2	Prpcess3
Passed to next process	75%	50%	—
Stock kept for sale	25%	50%	100%
Expenses incurred:			
Raw materials	1,000 tons	140 tons	. 1,348 tons
	Rs. 1,20,000	Rs. 28,000	Rs. 1,07,840
Wages	Rs. 20,500	Rs. 18,520	Rs. 15,000
General Expenses	Rs. 10,300	Rs.7,240	Rs. 3,100

Prepare process account showing the cost per ton of each product.

Solution:

Process I Account

Particulars	Tons	Amount Rs	Particulars	Tons	Amount Rs.
To Raw materials	1000	1,20,000	By loss of weight	20	
To Wages		20.500	{2% of 1.000 tons).	100	10,000
To General expenses		10,300	By Sale of scrap	220	35.200
			(10% of 1.000 tons)		
			Transfer to ware house	660	1,05,600
			Transfer to process IIA/c (Cost per ton Rs.160)		
	1,000	**1,50,800**		**1.000**	**1.50,800**

Note: Transfer to warehouse =25% of 880 units = 220 units

Transfer to process II =75% of 880 units = 660 units

Process II Account

Particulars	Tons	Amount Rs?	Particulars	Tons	Amount Rs.
To Transfer from Process 1 Account	660	1,05.600	By loss of weight (2% of 800 tons)	16	-
			By Sale of scrap (10% of 800 tons]	80	8,000
To Raw materials	140	28.000			
To Wages		18,520	By Transfer to ware house	352	75,680
To General expenses		7,240	By Transfer to Process Ill Account (cost per tons Rs.215)	352	75.680
	800	1.59,360		800	1.59,360

Note

Transfer to warehouse = 50% of 704 units = 352units

Transfer to process III = 50% of 704 units = 352units

Process III Account

Particulars	Tons	Amount Rs.	Particulars"	Tons	Amount
To Transfer from Process II Account	352	75,680	By loss of weight {2% of 1,700	34	-
To Raw materials	1,348	1,07,840	tons)		
To Wages		15,000	By Sate of scrap (10% of 1,700	170	3.400
To General expenses		3.100	tons)		
			By Transfer to ware house (cost per tons Rs. 132.50)	1,496	1,98,220
	1,700	**2,01,620**		**1.700**	**2.01.620**

(ii) Abnormal Loss

Abnormal loss is one, which is in excess of the normal loss arising due to abnormal cause or due to unforeseen factors. The loss which is not common to production or the occurrence of which is not to be generally experienced in the ordinary course of production is abnormal cause. The defective materials, sickness of machines, natural calamity, carelessness, fire, accident etc., are the examples of abnormal loss.

The loss on account of abnormal loss is not borne by production but by profit and loss account. So abnormal loss is not allowed to affect the normal cost

of production and therefore it is valued just like 'good units'. Abnormal loss account is debited and process account is credited with the cost of abnormal loss.

$$\text{Value Of Abnormal Loss} = \frac{\text{Normal cost of Normal output}}{\text{Normal output}} \text{ Units of Abnormal loss}$$

It abnormal loss includes any scrap having realisable value, the amount realized is credited to abnormal loss account and the net abnormal loss is transferred to the costing profit and loss account.

Illustration : 5

In process x 10.0 units of raw materials were introduced at a cost of Rs. 2,000. The labour cost amounted to Rs.,1,000 and production overhead incurred was Rs. 204, The normal loss and been estimated at 10% of units introduced and they possess a scrap value of Rs. 6 each. The actual production of the process x was only 75 units, prepare process x Account.

Solution

Process X Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Direct materials	100	2,000	By Normal loss		
To Labour		1,000	(10%of100Units@Rs.6each)	10	60
To Production overhead		204	By Abnormal Loss	15	524
			By Cost of production Process A/c	75	2,620
	100	**3,204**		**100**	**3,204**

Working Note: Units

Units Introduced=	100
Less: Normal loss=	10
Normal output=	90
Actual output=	75
Abnormal loss =	15

= Normal cost of normal output X Units of Abnormal loss

Normal output

=Total Cost – Value of scrap X Units of Abnormal loss

Normal output

= 3204-60X 15 = 3144 X 15 =Rs.524

90 90

Further, if scrap value of quantity abnormally lost is (15 x 6)= Rs. 90 to that extent abnormal **loss** account will be credited. Thus net abnormal loss (524 - 90) = Rs. 434 will be credited. Thus net abnormal loss(524 - 90) = Rs.434 will be transferred to costing P & L

Abnormal Loss A/c

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Process X	15	524	By .Cash (value of scrap)	15	90
			By Closing P&L A/c		434
	15	524		15	524

Abnormal Gain

The normal loss is an estimate only. The actual loss may be more or less than the normal loss, if the actual loss is more the normal, it is known as "Abnormal loss" but if the actual loss is less that the normal loss, it is known as "Abnormal Gain" or "Abnormal Effectiveness"

The abnormal gain is valued in the same way as the abnormal loss is done. The abnormal gain account is credited and process account is debited.

The point to be noted about the abnormal gain is that there is reduction in the realisable value of scrap because when there is abnormal gain the actual scrap is less than normal. The loss in revenue from sale of scrap should be set off against the abnormal gain.

Illsutration : 6

In the manufacture of product A 1.200 units of material at Rs. 12 per unit were supplied to the first process during a particular period. Direct wages amounted to Rs. 3,600 and production overhead incurred was Rs. 1.800. The normal loss has been estimated at 10% of input, which can be sold as scrap at Rs. 3 per unit. The actual production realised was 1.110 units. Prepare Process I Account and the Abnormal Gain Account.

Solution

Process I Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Direct materials	1.200	14.400	By normal loss	120	360
To Direct Wages		3.600			
To Production overhead		1.800	By Output transferred to Process II A/c	1,110	19.980
To Abnormal Gain	30	540			
	1.230	20,340		1.230	20.340

Working Note:

1) Calculation of Abnormal Gain

Normal production (1200 - 120)	=	1,080
Actual production	=	1,110
		30

2) Cost of Normal production

$$= \frac{\text{Total cost} - \text{Values of scrap}}{\text{Normal production}}$$

$$= \frac{19,800 - 360}{1,080} = \frac{19,440}{1,080} = Rs.18$$

3)Value of Abnormal Gain

= Rs. 9 x 30 = Rs. 270

4)Abnormal Gain Account will be credited with Rs/540 and will be debited with Rs. 90 (Rs. 3.x 30 = 90) representing the loss of income from scrap because the actual scrap is less than the normal scrap.

Abnormal Gain Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Normal loss (Loss of income)	30	90	By process 1 A/c	30	540
To Costing P&L A/c		450			
	30	540		30	540

Illustration : 7

The product of a company passes through three distinct processes to completion. These processes are known as A, B, and C from past experience it is ascertained that loss is incurred in each process as under:

Process A -10 per cent

Process B - 5 per cent

Process C -10 per cent

In each case the percentage of loss is computed on the number of units entering the process concerned. The loss of each process possesses scrap value. The loss of process A is sold at Rs. 15 per unit and of process B at Rs. 25 per unit and that of process C at Rs. 30 per unit.

The output of each process passes immediately to the next process and the finished units are passed from process C into stock. The following information is obtained.

	Process A	**Process B**	**Process C**
	Rs.	**Rs.**	**Rs.**
Materials	10,000	15,100.	17,310
Labour	15,000	20,000	25,000
Manufacturing expenses	10,000	11,130	12,500

1,000 units have been issued to process A at a cost of Rs.25per unit. The output of each process has been as under

Process A 920; Process B 870; and Process C 800. There is no stock or work-in-progress. Show Process Accounts.

Solution:

Process 'A' Account

Particulars	Unit	Amount Rs.	Particulars i	Units	Amount Rs.
To units introduced	1,000	25.000	By normal loss (100 Units @Rs.15)	100	1,500
To Direct materials		10.000			
To Direct Labour		15,000	By Transferred to Process B A/c	920	59,800
To Manufacturing expenses		10,000			
To Abnormal Gain	20	1,300			
	1,020	61.300		1,020	61,300

Process 'B' Account

Particulars	Unit	Amount RS.	Particulars	Units	Amount Rs.
To Process A A/c	920	59.800	By Normal loss (46 x Rs.25)	46	1.150
To Direct materials		15,100			
To Direct Labour		20,000	By Abnormal loss	4	480
To Manufacturing expenses		11.130	By Transferred to Process C A/c	870	1,04.400
	920	1,06.030		920	1,06.030

Process 'C' Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Process B A/c	870	1.04.400	By Normal loss (87 x Rs.30)	87	2.610
To Direct materials		17.310			
To Direct Labour		25.000	By Finished stock A/c	800	1,60.000
To Manufacturing expenses		12,500			
To Abnormal Gain	17	3.400			
	887	1,62,610		887	1.62.610

Finished Stock Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Process C	800	1.60.000			

Abnormal Loss Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Process B	4	480	By cash A/c (Value of scrap 4 x Rs.25) -	4	100
			By Costing P&L A/c		380
	4	480		4	480

Normal Loss Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Process A	100	1,500	By Normal Gain A/c	37	310
To Process B	46	1,150	By Cash/ Debtors Account	196	4,450
To Process C	87	2,610			
	233	5,260		233	5,260

Abnormal Gain Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Normal loss A/c			By Process A	20	1,300
Reduction in scrap					
To Process A	20	300	By Process C	17	3.400
To Process B	17	510			
To Costing P&L A/c		3,890			
	37	4,700		37	4.700

Working Notes

Process : A

Abnormal Gain

Normal Cost = Rs. 60,000 - Rs. 1.500 (Scrap value) = Rs. 58.500

Normal production 1,000 units - 100 units = 900 units

$$\text{Abnormal Gain} = \frac{58,500}{900} \times 20 = \text{Rs. } 1,300$$

Process : B

Abnormal Loss

Normal Cost = Rs.1,06,030-Rs,1,150 = Rs.1,04,880

Normal production 920 - 46 = 874 units

$$\text{Abnormal Loss} = \frac{1,04,880}{874} \times 4 = \text{Rs. } 480$$

Process : C

Abnormal Gain

Normal Cost = Rs.1.59,210 - Rs.1,150 = Rs. 1,56,600

Normal production = 870 - 87 = 783 units

$$\text{Abnormal Gain} = \frac{1,56,600}{783} \times 17 = \text{Rs. } 3,400$$

Illustration : 8

The product of company passes through two processes namely I and II. From past experience the percentage of loss, which computed on the number of units entering the process concerned, is ascertained as under.

Process 1-2% Process 11-5%

The loss of each process possesses a scrap value. The load of Process I Is sold at Rs.10 per 100 units and that of Process **II** Rs. 20 per 100 units.

The following information is available for the year ended 31st December 2002.

40,000 units of crude materials were introduced in Process 1st at the cost of Rs. 16,000.

	Process I	Process II
	Rs.	Rs.
Material Consumed	8,000	2,800
Direct Labour	12,200	14,000
Manufacturing Expenses	3,080	1,000
	Units	Units
Finished Products Stock	39,000	38,500
January 1	4000	6000
December 31	3000	8000
Stock Valuation at Jan. 1 (per unit)	Rs.0.90	Rs.1.47

Stock at December 31 are to be valued at the cost as shown by the year's process Accounts.

Prepare the necessary accounts.

NOTES

Solution

Process I Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Inputs	40,000	16,000	By Normal Loss	800	80
To Materials		8.000	By Abnormal Loss	200	200
To Labour		12,200			
To Expenses		3.080	By Stock-Account	39.000	39,000
	40,000	39.280		40.000	39.280

Process I Stock Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Balance b/d	4,000	3.600	By Process II	40.000	39,600
To Process I	39,000	39.000	To Balance c/d	3,000	3.000
	43.000	42.600		43.000	42.600

Process II Account

Particulars	Unit.	Amount Rs.	Particulars	Units	Amount Rs.
To Process I Stock A/c	40.000	39.600	By normal loss	2.000	400
, Materials		2.800	By Process stock	38.500	57.750
. Labour		14,000			
. Expenses		1.000			
, Abnormal Gain	500	750			
	40,500	58.150		40.500	58.150

Process II Stock Account

Particulars	Unit '	Amount Rs.	Particulars	Units	Amount Rs.
To Balance b/d	6,000	8,820	By Cost of sales	36.500	54.570
To Process 11	38,500	57,750	By Balance c/d	8.000	12.000
	44,500	66,570		44.500	66.570

Normal Loss Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Process 1	800	80	By Abnormal GainA/c	500	100
To Process II	2,000	400	By Cash A/c	2,300	380
	2,800	480		2,800	480

Abnormal Loss Account

Particulars	Unit.	Amount Rs	Particulars	Units	Amount Rs.
To Process A	200	200	By Cash A/c (value of scrap) By Closing P&L'A/c	20	20 180
	200	200		200	200

Abnormal Gain Account

Particulars	"Unit	Amount Rs	Particulars	Units	Amount Rs.
To normal loss A/c To Closing P&L A/e	500,.	1.00 650	By Process 1/	500	750
	500	750		500	750

Illustration : 9

A Foundry engages in the production of castings. The processes involved are:
a) Foundry work
b) Turning
c) Drilling
d) Inspection and
e) Packing
Foundry produces 1 kg. (Net) costings at a cost of Rs.7 per unit.

	Rs.
Cost of Turning	3.50
Cost of Drilling	2.50
Cost of Inspection (at all stages) and packing per unit on Final net	1.00

Inspection rejects 2 costings per 100 tons on completion of turning and 3 costings on completion of drilling process. The rejected costings after turning are told for Rs. 3.60 per unit and those after drilling @ Rs. 3.50 per unit. Credit for ale of scrapings is Rs. 5 per hundred costings put through.

Assuming that 10,000 costing are put through each month. Prepare a process cost sheet indicating the final output and net cost per unit.

solution:

Process Cost Sheet

Month.....

Particulars	Units	Amount Rs.
Foundry Process		
Costings 10,000 units @ Rs. 7 per unit	10,000	70,000
Turning Process at Rs. 3.50 per unit		35,000
		1,05,000
Less. Rejects (2%) sold at Rs. 3.60 per unit	200	720
	9,800	1,04,280
Drilling Process at Rs. 2.50 per unit		24,500
		1,28,780
Less: Rejects (3%) sold at Rs. 3.50 per unit	294	1,029
	9,506	1,27,751
Inspection and Packing process at Re. 1 per unit		9,506
		1,37.257
Less: Sale of Scrapping		500
Total Cost	9,506	1,36,757
Cost per unit = 1,36,757 / 9.506 = Rs.14.386		

Inter Process Profits

Inter process profit:

The outputs of the earlier processes are transferred at cost to be subsequent processes in process industries.

Ordinarily the output of one process is transferred to the other process at the cost value only. Sometimes inter process transfers are made at a price which includes an element of profit. That is, the output of one process is transferred to the next process not at cost to the process but by adding's percentage to the cost of the process. The following are purposes.

a) Comparison of the cost of process with the market price, to judge whether the working of the process is profitable or not; b) Ascertainment of efficiency of the processes in terms of profits.

On this basis, a decision can be taken whether a product should be processed internally or be purchased in the market.

However, inclusion of inter process profit, makes the accounting complicated. As the transfer price of the output of each process contains profits, the true cost of a process is not ascertained, and profit is calculated on profit. The transfer price of 'A' process becomes the cost price for 'B' process, and B process transfers its output to 'C at profit. So the process stock will contain part of the profit charged to the process. The difficulty is about this profit included in closing stock of every process. Since goods are not sold this profit is unrealized. That is, the profits charged are fictitious only and appear in the books of the undertaking without being realised. It gives an impression that the firm is trading with it and showing profits, which remain, unrealised until the finished products are actually sold in the market. So for profit unrealised. So, whenever inter process transfer is at profit, one important work is to calculate the profit element included in closing stock of processes and in the finished stock.

In order to compute the profit element in closing stock and to obtain the net realised profit for a period, process Account may be planned as follows.

a. Three columns have been shown on each side of process accounts viz., total column, cost column and profit column.

b. Closing stock of process has to be deducted from debit side instead of

showing it on credit side.

c. Cost of closing stock can be obtained by comparing accumulated cost of the process and the total amount charged to the process.

$$\text{Formula} = \frac{\text{Cost}}{\text{Total Account charged}} \times \text{Closing}$$

d. The profit on closing stock can be easily obtained by deducting the cost of closing stock thus arrived at from the total value of stock.

The procedure is illustrated in the following illustration.

Illustration : 1

A product passes through three processes to completion. These processes are known as A, B and C. The output of each process is charged to the next process at a price calculated to give a profit of 25% at cost price. The output of process C is charged to finished stock on a similar basis.

There was no partly finished work in any process on December 31st on which date the following information was obtained.

	Process A Rs	**Process B Rs.**	**Process C Rs.**
Material consumed	8,000	12,000	4,000
Labour	12,000	8,000	15,000
Stock December 31st	4,000	8,000	12,000

Stock in each process has been valued at prime cost to the process.

There were no stocks in hand on Jan. 1st and the question of overheads has been ignored. Of the goods passed into Finished Stock, Rs. 8,000 remained in hands on December 31st the balance has been sold at Rs. 72,000.

a) Show the Process Accounts.

b) Calculate actual realised profit.

c) Show how stock would appear in the Balance Sheet

Solution:

Process 'A' Account

Particulars	Total Rs.	Cost Rs.	Profit Rs.	Particulars	Total Rs.	Cost Rs.	Profit Rs.
To Materials	8,000	8,000	—	By transferred to Process B	20,000	16,000	4,000
To Labour	12,000	12,000					
Total	20,000	20,000					
Less: Closing Stock	4,000	4,000					
Prime cost	16,000	16,000					
Add: 25% Profit	4,000	——	4,000				
	20,000	16,000	4,000		20,000	16,000	4,000
Closing Stock b/d	4,000	4,000	—				

Process 'B' Account

Particulars	Total Rs.	Cost Rs.	Profit Rs.	Particulars	Total Rs.	Cost Rs.	Profit Rs.
To transferred from Process A	20,000	16.000	4,000	By transferred to Process C	40.000	28,800	11.200
To Materials	12.000	12.000	—				
To Labour	8,000	8,000	—				
Total	40.000	36,000	4.000				
Less: Closing Stock c/d	8.000	7.200	800				
Prime cost	32.000	28.800	3,200				
Add: 25% Profit	8,000	—	8.000				
	40,000	28,800	11,200		40,000	28.800	11.200
To Closing Stock b/d	8,000	7,200	800				

Process 'C Account

Particulars	Total Rs.	Cost Rs.	Profit Rs.	Particulars	Total Rs.	Cost Rs.	Profit Rs.
To transferred from Process B	40.000	28,800	11,200	By transferred to finished stock	60,000	39,040	20,960
To Materials	4.000	4.000	—				
To Labour	16.000	16,000	—				
Total	60,000	48,800	11.200				
Less: Closing Stock c/d	12.000	9.760	2.240				
Prime cost	48,000	39,040	8,960				
Add: 25% Profit	12,000	—	12,000				
	60,000	39.040	20,960		60.000	39.040	20,960
To Closing Stock b/d	12.000	9,760	2,240				

1) Calculation of profit on closing stock

$$\text{Cost of stock} = \frac{\text{Cost Column}}{\text{Total Column}}$$

The accounts of cost column and total column are those which appear above the closing stock line

Process A = No profit included

Process B = $\frac{36000}{40,000}$ X 8000= 7200, profit included (8000-7200)= 800

Process C = $\frac{48,800}{60,000}$ X 12,000= 9760 (12,000-9760)=2,240

$$\text{Finished Stock} = \frac{39,040}{60,000} \times 8,000 = 5,206;\ (8,000 - 5,206) = 2,794$$

2) Actual Profit Realised

Verify the profit with that shown in the credit profit column of finished stock Account. It follows.

3) Valuation of Closing Stock for Balance Sheet

The amount of cost column of Finished Stock Account will be taken to the Balance Sheet. It is comprised of:

	Cost of closing stock
Process A	4,000
Process B	7,200
Process C	9,760
Finished Stock	5,206
Total	26,166

4. Test check

Individual costs of processes (A 20,000 + B 20,000 + C 20,000)	Rs.60,000
Less Cost of sales (See finished Stock A/c	Rs. 33, 834
Closing Stock	Rs. 26, 166

Sometimes opening stock and overheads are given. Here opening stock should be shown in the beginning as. usual along with transfer cost of materials and labour. From these total Closing stock should be deducted to calculate prime cost. After this the production overhead should be added. This becomes the cost of the process. The desired percentage of profit is added with the total cost.

Illustration: 2

A product passes through three processes viz A, B, and C and then is transferred to Finished Stock. The output of Process A is transferred to Process B art a profit of 25% on transfer price and the output of Process B and C is transferred at profit of 20% each on the transfer price.

The following information is obtained as on 31st December.

	Process A Rs	Process B Rs.	Process C Rs.	Finished Stock
Opening stock	5,000	6,000	4,000	15,000
Materials	10,000	10,500	15,000	-
Wages	7,500	7,500	8,000	-
Overhead	7,000	3,000	20,000	-
Closing Stock	2,500	3,000	2,000	7,500
Inter process profit for opening stock	-	1,000	1,000	5,500

Stocks in the process are valued at Prime cost. The finished stock has been valued at the price at which it was received from Process 'C' Sales of the finished stock amounted to Rs. 1,75,000.

Prepare and Compute:

a) Process Accounts showing profit element at each stage.

b) Actual realised profit; and

c) Stock valuation for Balance Sheet purpose.

Process 'A' Account

Particulars	Total Rs.	Cost Rs.	Profit Rs.	Particulars	Total Rs.	Cost Rs.	Profit Rs.
To Opening stock b/d	5,000	5,000	----	By Process B A/c - Transfer	36,000	27,000	9,000
To Materials	10.000	10,000	-----				
To Wages	7.506	7.500	----				
Less: Closing Stock	22.500	22.500	----				
	2.500	2,500	------				
Prime cost	20,000	20,000	----				
To Over head	7,000	7.000	----				
	27,000	27.000					
To Profit: 33%% on cost	9,000	-	9,000				
	36.000	27.000.	9.000		36,000	27,000	9,000
To Stock b/d	2,500	2,500	--------				

Process 'B' Account

Particulars	Total Rs.	Cost Rs.	Profit Rs.	Particulars	Total Rs.	Cost Rs.	Profit Rs.
To Opening Stock	6,000	5.000	1.000	By Process C A/c - Transfer	75.000	50,500	24.500
To Process	36.000	27,000	9,000				
To Materials	10,500	10,500					
To Wages	7,500	7,500					
	60.000	50,000	10,000				
Less: Closing Stock	3,000	2,500	500				
Prime cost	57,000	47,500	9.500				
To Overhead	3.000	3,000	—				
	60,000	50,500	9.500				
To Profit 25% on	15,000	—	15,000				
	75.000	50,500	24.500		75,000	50,500	24,500
To Stock b/d	3,000	2,500	500				

Process 'C Account

Particulars	Total Rs.	Cost Rs.	Profit Rs.	Particulars	Total	Cost Rs.	Profit Rs.
To Opening stock b/d	4,000	3,000	1.000	By Finished Stock Transfer	1,50,000	95,000	55,000
To Process B transfer	75,000	50.500	24,500				
To Materials	15.000	15.000					
To Wages	8,000	8,000					
	1,02,000	76,500	25,500				
Less: Closing Stock	2.000	1,500	500				
To Overhead	1,00.000	75,000	25.000				
	20,000	20,000					
To Profit 25% on cost	1,20.000	95,000	25,000				
	30,000		30.000				
	1.50.00	95.000	55.000		1,50.000	95.000	55,000
To Stock b/d	2,000	1,500	500				

Finished Stock Account

Particulars	**Total Rs.**	**Cost Rs.**	**Profit Rs.**	**Particulars**	**Total Rs.**	**Cost Rs.**	**Profit Rs.**
To Opening stock Wd To Process C transfer	15,000	9.500	5.500	By Sales	1,75,000	99.750.	75.250
	1.50,000	95.000	55.000				
Less: Closing Stock	1,65,000	1,04.500	60,500				
	7,500	4,750	2,750				
To Profit	1,57,500	99,750	57,750				
	17,500		17,500				
	1,75,000	99,750	75.250		1,75,000	99,750	75,250
To Stock b/d	7.500	4,750	2,750				

1.Calculation of profit on closing stock

Process A = No Profit included

Process B $= \frac{50,000}{60,000} x3,000 = 2,500$. Profit included (3,000 – 2,500) = 500

Process C $= \frac{76,500}{1,02,000} x2,000 = 1,500$ (2,000–1,500) = 500

Finished Stock $= \frac{39,040}{60,000} x7,500 = 4,750$ (7,500 – 4,750) =2,750

2) Actual Profit Realised

	Process Profit	Unrealised Profit in Opening stock	Unrealised Profit in Closing stock	Actual Profit
	Rs.	Rs.	Rs.	Rs.
Process A	9.000	------	-------	= 9,000
Process B	15,000	(+) 1,000	(-) 500	= 15.500
Process Q	30,000	(+) 1.000	(-) 500	= 30.500
Finished Stock	17.500	(+) 5.500	(-) 2.750	= 20,250
	71,500	(+) 7.500	(-) 3.750	= 75,250

3)Valuation of Closing Stock for Balance Sheet

The amount of cost column of Closing Stock Account will be taken to Balance Sheet.

Process A	=	2,500
Process B	=	2,500
Process C	=	1,500
Finished Stock	=	4.750
Total	=	11,250

NOTES

quivalent roduction:

quivalent units are ›tional quantity of ›mpleted units ıbstituted for an :tual quantity of complete physical ıits in progress.

Lesson -16

Process Costing (Contd.)

16.1 Equivalent Production

In the process costing, the process cost per unit is computed by dividing the total cost of the period by number of units produced during that period. This is the question of simple arithmetic. But, so farm we have ignored the existence of work-in-progress or unfinished units in process industries is a very important problem and frequently a difficult one. But in continuous production, the problem of work-in-progress or uncompleted production. Calculating "Equivalent Production" can solve this problem. It means converting the uncompleted production into its equivalent completed units. In other words it represents the production of a process in terms of completed unit. In each process, an estimate is made of the percentage completion of any work-in-progress.

The Formula for equivalent production is -

Equivalent units of work-in-progress =

Actual number of units in process of manufacture x Percentage of work completed

For example, support there are 200 units 40% completed in all respects (i-e., in respect of material, labour and overheads). They are then equated as 80 units 100% complete. That is 200 units will be equal to 80 completed units. The cost of work-in-progress will be equal to 80 completed units.

Thus, if during a period 500 units are completed fully and 200 units are completed 25% only, the total production of the period is taken as: 500 + 25% of 200 = 550 units.

Calculation of Equivalent Production

1. Obviously, there may be opening balance of work-in-progress for a process. During the year this opening work-in-progress is converted into finished

product by incurring further costs. Here also, process costing involves expressing the costs so incurred in terms of equipment full units. Suppose, at the beginning of the period there were 100 units 70% complete in all respects. Then during the year to complete the production only remaining 30% costs are to be incurred For this reason 100 units are to be equated to 30 units.

2. The number of units started and completed during the period is added with the equivalent units of opening work-in-progress. The number of units started and completed can be found out by deducting the units in the closing work-in-progress from the number of units put into the process.

3. The equivalent completed units of closing work-in-progress are added with the above items. The equivalent units of closing work-in-progress can be found out by applying the percentage of work done on the finished units at the end of the period.

Illustration: 1

Following data is given to you: Opening work-in-progress: 400 units 75% complete. Production during the period: 1,600 units Work-in-progress at the end of the period: 300 units 50% complete. Total cost of production for the period: Rs. 43,500Compute the equivalent production and cost per unit.

Solution

a) Completion of Opening work-in-progress (25% off 400 units)	100
b) Production during the period (Introduced and completed during this period) (1600-400)	1200
c) Work-in-progress at the end (50% of 300 units)	150
Total effective production for the periodic, completed equivalent production units	1450

$$\text{Cost per unit of effective production} = \frac{43500}{1,450} = \text{Rs. } 30$$

16.2 Procedure for Evaluation

The following are the steps to be adopted for evaluation.

1. The equivalent production of opening and / or closing stock is computed after taking into consideration the process losses and degree of completion. In many cases opening as well as closing work-in-progress may remain at different stages of production as regards material, labour and overhead. In such case the concept of equivalent production must be applied separately to materials labour and overhead.

2. The next process costs according to elements of costs i.e., material, labour and overhead should be obtained.

3. Cost per unit of Equivalent production of each element of cost is ascertained separately by dividing each element of costs by respective equivalent production units. That is, cost of material per unit of equivalent production should be obtained by dividing the total cost of material by equivalent production as regards material. Dividing the total labour cost by equivalent production as regards labour should arrive at cost of labour per unit of equivalent production. Same is the procedure for overhead.

4. Evaluate output finished and transferred and work-in-progress.

In short, the following three statements are prepared

1. Statement of equivalent production

2. Statement of cost

3. Statement of Evaluation (i.e., apportioning of process costs).

In order to study the topic clearly, the problems on equivalent production may be divided info four groups.

1. When there is only closing work-in-progress but with no process losses

Under this case, the existence of process losses is ignored. The closing work-in-progress is converted into equivalent production on the basis of estimates as regards degree of completion of materials, labour and overheads. If the degree of completion is the same, the equivalent production for each element will also be the same. As such dividing the respective cost elements by the same number of equivalent units can arrive at the cost per unit of each element.

Sometimes, the units put into process may not have been completed to the same degree as regards materials, labour and overheads. Accordingly, if the stages of completion are different the equivalent units for each element will not be the same. In such a case, the cost per unit of each element is arrived at by dividing the respective cost elements by the equivalent units, which are different for different cost elements. After calculating the equivalent units, it is not difficult to evaluate the closing work-in-progress.

Illustration : 2

Units put into process	-	2,500
Units competed	-	2000
Work-in-progress at close	-	500

Process costs

Materials Rs.22,500; Labour Rs. 6,750; and overhead Rs. 2,250. Work-in-progress is completed 50% as materials labour and overhead Find out the

(I) Equivalent production

(II) Cost per unit of equivalent production and

(III) Process Account.

NOTES

Solution

Statement of Equivalent Production

Input	Units	Output	Units	Equivalent Production (Units)					
				Materials		Labour		Overhead/	
				Qty	%com pletion	Qty	%com pletion	Qty	%com pletion
Units Introduced	2.500	Units Completed and transferred	2.000	2,000	100	2.000	100	2.000	100
		Closing Work-in- progress	500	250	50	250	50	250	50
	2,500		2,500						
				2550		2,250		2.250	

Statement of Cost

Elements of Cost	Cost	Equivalent Production Units	Cost per unit
Materials	22,500	2.250	10
Labour \	6,750	2,250	3
Overhead	2,250	2,250	1

Statement of Evaluation

items	Elements	Equivalent production	Cost per Units	Cost	Total
Introduced	Material	2,000	10	20,000	
And	Labour	2.000	3	6.000	
Finished	Overhead	2,000	1	2,000	
					28,000
Closing	Materials	250	10	2.500	
Work in	Labour	250	3	750	
Process	Overhead	250	1	250	3,500

Process Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Materials	2,500	22.500	By Finished Stock Ate	2,000	28,000
To Labour		5,750			
To Overhead		2,250	By Work-in-Progress	500	3,500
	2,500	31.500		2.500	31,500

Illustration: 3

Following data is available with respect to product 'X'

Work-in-progress at the beginning — NIL

Units produced during the month — 19,000

Cost incurred:

Materials - 60,000

Labour - 58,200

Over head - 19,400

1,37,600

Work-in-progress at the end of the month:

1,000 units for which degree of completion is as follows:

Materials	100%
Labour	40%
Overheads	40%

Prepare necessary statements together with the process account

Solution

Statement of Equivalent production

Input	Units	Output	Units	Equivalent Production (Units)					
				Materials		Labour		Overhead	
				Oty.	%	Qty.	%	Qty	%
Units Introduced	20,000	Introduced and Finished	19,000	19.000	100	19,000	100	19.000	100
		Closing Work-in-progress.	1,000	1,000	100	400	40	400	40
	20,000		20,000						
				20,000		19.400		19,400	

Statement of cost

Elements of Cost	Cost Rs.	Equivalent Production units	Cost per unit Rs.
Materials	60,000	20.000	3
Labour	58.200	19,400	3
Overhead	19,400	19.400	1

Statement of Evaluation

Items	Elements	Equivalent production Unit	Cost per Units	Cost Rs.	Total Rs.
Introduced	Materials	19,000	3	57,000	
and	Labour	19,000	3	57.000	
Finished	Overhead	19,000	1	19,000	1.33,000
Closing	Materials	1,000	3	3,000	
Work-in-	Labour	400	3	1,200	
Process	Overhead	400	1	400	4,600

Process Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Materials	20,000	60.000	By Finished Stock A/c	19,000	1,33,000
To Labour		58.200			
To Overhead		19.400	By Work-in-Progress	1,000	4,600
	20.000	137,600		20,000	1,37.600

II. When there is only closing work-in-progress but with process losses

So far process, losses were not taken into account in computing equivalent production. Losses are inherent in process operations. When process losses exist, the treatment is same as discussed in the previous lesson. In the case of normal loss, nothing should be added as equivalent production because the normal loss, nothing should be borne by good production. However, abnormal loss should be considered as production of good units scrapped (normal) have any realisable value the amount should be deducted from the cost of materials in the cost statement before dividing by equivalent production units. Abnormal gain will be deducted to obtain equivalent production. Special attention should be given while valuing abnormal losses or gains.

Illustration : 5

Units put into process No. I = 5,000

Units Completed and transferred to process No. 11 - 3,000,
Estimated normal loss - 20% of input Work-in-progress at the close =1,000 units

Progress costs :	Rs
Materials	50,000
Labour	48,000
Overheads	48,000

Work-in-progress is completed 100% as to materials and 20% as to labour and overhead. Prepare the necessary statement and the concerned account.

Solution

Statement of Equivalent Production

Input	Units	Output	Units	Equivalent Production (Units)					
				Materials		Labour		Overhead	
				Qty.	%	Qty	%	Qty.	%
Units Introduced	5.000	Normal Loss	1,000	-	-	-	-	-	
		Finished Production	3,000	3,000	100	3,000	100	3.000	100
		Closing Work-in-progress	1,000	1,000	100	200	20	200	
	5,000		5,000						
				4,000		3,200		3,200	

Statement of cost

Elements of Cost	Total Cost Rs.	Equivalent Production units	Cost per unit Rs.
Materials	50,000	4,000	12.50
Labour	48,000	3,200	15.00
Overhead	48,000	3,200	1500

Statement of Evaluation

Items	Elements	Equivalent production Unit	Cost per Units Rs.	Cost Rs.	total Rs.
Finished	Materials	5,000	2.50	37,500	
Production	Labour	3,000	15.00	45,000	
	Overhead	3,000	15.00	45.000	
					1,27,500
Closing	Materials	1,000	12.50	12.500	
Work-in-	Labour	200	15.00	3,000	
Process	Overhead	200	15.00	3,000	18.500

Process Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To Materials	5.000	50,000	By Normal Loss	1,000	-
To Labour		48,000	By Finished goods	3,000	1,27,500
To Overhead		48.600	By work in Progress	1,000	18,500
	5,000	V.46,000		5,000	1,46.000

Illustration : 6

During the month May, 4000 units were introduced into process 'A'. The normal loss was estimated at 5% of input. At the end of the month 2,800 units had been produced and transferred to process 'B'; 920 units were uncompleted and 280 units had been scrapped. It was estimated that the uncompleted units had reached a stage in production as follows:

Materials - 75% completed

Labour - 50% completed

Overhead - 50% completed

The cost of the 4,000 units was Rs. 11,600. Direct materials introduced during the process amounted to Rs. 2,880. Direct wages came to Rs. 6,680. Productions overhead incurred were Rs. 3,340; Units scrapped realised Re. 1 each. The units scrapped had passed through the process, so were 100% completed as regards materials, labour and overhead. Show process 'A' Account.

Solution:

Statement of Equivalent Production

Input	Units	Output"	Units	Equivalent Production (Units)					
				Materials		Labour		Overhead	
				Qty.	%	Qty	%	Qty.	%
Units introduced	4.000	Normal Loss	200	-	-	-	-	-	-
		Abnormal loss	80	80.	100	80	100	80	100
		Finished Production	2,800	2,800	100	2,800	100	2.800	100
		Closing Work-in-progress	920	690	75	450	50	460	50
		Equivalent Production							
	4,000		4,000						
				3,570		3.340		3.340	

Statement of cost

Elements of Cost	Rs.	Total Cost	Equivalent Production	Cost per unit Rs.
Materials	11,600			
Cost of units Introduced	2,880			
Direct material cost				
Less: Value Realised from scrap of normal loss				
	14.480			
	200			
Direct Labour		14,280	3,570	4.00
Overhead		6,680	3,340	2.00
		3,340	3,340	1.00

Statement of Evaluation

Item	Elements of cost	Equivalent production Units	Cost per Rs.	Cost. Rs.	Total. Rs.
Abnormal Loss	Materials	80	4	320	
	Labour	80	2	160	
	Overhead	80	1	80.	560
Finished	Materials	2,800	4	11.200	
Production	Labour	2,800	2	5,600	
	Overhead	2.000	1	2,800	19,600
Closing	Materials	690	4	2,760	
Work-in-Process	Labour	460	2	920	
	Overhead	460	1	460	
					4,140
					24.300

Process 'A* Account

Particulars,	Unit	Amount Rs.	Particulars	Units	Amount Rs.
To units introduced.	4,000	11,600	By Normal loss	200	200:
To Direct materials		2.880	By Abnormal loss	80	560
To Direct Labour		6,680	By Transferred to Process	2,800	19,600
To Production Overhead		3,340	*B*	920	4,140
			By Closing Work-in-Progress		
	4.000	24,500		4,000	24,500
Balance b/f ...	920	4,140			

Abnormal Loss Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount
To Process 'A' A/c	80	560	By Cash (scrap value at Re.1 per unit)	80	80
			By Costing P & LA/c (loss)		480
	80	560		80	560

III When there is opening and closing Work-in-progress with no process losses

When there are units in process both at the beginning and at the end, as usual it becomes necessary to convert the opening as well as closing work in progress into equivalent production units.

The procedure of conversion of opening work-in-progress will vary depending upon whether average cost method or (FIFO) First on First out method of apportionment of costs is followed. Problems of closing work-in-progress have been already discussed.

(A) Average Cost Method

Under this method the closing valuation of work-in-progress in the old period is added to the cost of the new period and average rate is calculated. In calculating the equivalent production, opening units will be shown separately as opening work-in-progress are taken to be included in the units completed and transferred.

Illustration: 7

ABC Company has a single process.

Quantity of work-in-process at commencement 8,000 units

Cost of work-in-progress at commencement

Materials Rs. 29,600

Wages Rs. 6,600

Overhead Rs. 5,800

During the period under review a further 32,000 units were introduced and additional costs were:

Materials Rs.1,12,400

Wages Rs. 33,400

Overhead Rs. 30,200

At the end of the period 28,000 units were fully processed and 12,000 units were in process. The value of closing stock includes the full cost of materials and only one-third of the cost of wages and overheads.

Using the average method of valuation, tabulate the production and cost figures to give quantities, unit values, total values of completed output and detailed values for the closing work-in-progress.

Solution

Input	Units	Output	Units	Equivalent Production (Units).					
				Materials		Labour		Overhead	
				Qty	%	Qty	%	Qty	%
Opening Work-in-progress	8,000	Completed during the period (including opening W.I.P)	28,000	28,000	100	28,000	100	28,000	100
Units during the period	32,000	Closing Work-in-progress.	12,000	12,000	100	4000	331/3	4,000	331/3
	40,000		40,000						
				40,000		32,000		32,000	

NOTES

Statement of Cost

Elements of Cost	Cost Rs.	Equivalent Production units	Cost per unit Rs.
Materials (Rs.29,600 + Rs.1,12,400)	1,42,000	40,000	3.550
Wages (Rs.6,600+Rs.33,400)	40.000	32,000	1,250
Overhead (Rs.5,800+Rs.30,200)	36,000	32,000	1.125
	2,18,000		5.925

Statement of Evaluation

Items	Elements	Equivalent production Unit	Cost per Units Rs.	Cost Rs.	Total Rs.
Finished & Transferred	(Materials + labour + overhead)	28,000	5.925	1,65,900	1,65,900
Closing Work-in-Process	Materials	12.000	3.55	42,600	
	Labour	4,000	1.25	5,000	
	Overhead	4,000	1.125	4,500	52,100
					2,18,000

Process Account

Particulars	Unit,	Amount Rs.	Particulars	Units	Amount Ra.
To work-in-progress (Materials + Labour + Overhead)	8,000	42,000	By Normal loss Stock A/c	28,000	1,65,900
To Units put In (Materials+ Labour + Overhead)	32,000	1,76,000	By Work-in-Progress	12,000	52,100
	40,000	2,18,000		40,000	2,18.000

(B) FIFO Method

Under this method, the raw materials issued to work-in-progress pass through the finished goods in a progressive cycle i.e., what comes first goes out first. Here work-in-progress at the end of the period; the closing work-in-progress will be valued as costs ruling during the old period, while the opening work in progress will be valued at costs ruling during the new period. Thus, where costs are more or less the same in each period, this system is adequate. In this method opening incomplete units are to be converted to equivalent production after taking into consideration the percentage of work to be done and shown separately in the statement of equivalent production.

Illustration: 8

From the following details, prepare statement of equivalent production, statement of cost and find the value of output transferred and closing work-in-progress, by following FIFO method

Opening work-in-progress 2000 units

	Rs.	Rs.
Materials - 100% completed	5,000	
Labour - 60% completed	3,000	
Overhead - 60% completed	1,500	
		9,500

Units introduced in to the process - 8,000 units

There are 2,000 units in progress, and the stage of completion estimated to be

Materials - 100%

Labour - 50%

Overhead - 50%

8,000 units are transferred to next process.

The process costs for the period are:

Materials	Rs.95,000
Labour	Rs.60,000
Overhead	Rs.40,000

Solution:

Statement of Equivalent Production

Input	Units	Output	Units	Equivalent Production (Units)					
				Materials		Labour		Overhead	
				Qty.	%	Qty	%	Qty.	%
Openin g W.t.P	2.000	Opening W.I.P	2.000	-	-	800	40	800	40
Unit intro-duced	8.000	Comptely-process during the period (8,000 - 2.000)	6,000	6,000	100	6.000	100	6,000	100
		Closing W.I.P.	2.000	2,000	100	1,000	50	1,000	50
	10,000		10,000						
				8,000		7.800		7.800	

Statement of cost

Elements of Cost	Cost incurred during the year Rs.	Equivalent Production units	Cost per unit Rs.
Materials	95,000	8,000	11.875
Wages	60,000	7,800	7.692
Overhead	30,000	7.800	3.846
Total	1,85,000		23.413

Statement of Evaluation

Items	Elements	Equivalent production Unit	Cost per Units Rs.	Cost Rs.	Total Rs.
Opening W.I.P (Current Cost)	Materials	---	---	---	
	Labour	800	7.692	6.154	
	Overheads			3.077	
		800	3,846	23.750	9.231
Closing W.LP.			11.875	7,692	
	Materals	2,000		3,846	
	Labour		7.692	1,40,481	35.288
Units Completely Processed during the period	Overhead	1,000	3.846	(approxi-mately)	1,40,481
		1000	23.413		
		8,000			1.85.000

Total value of Opening work -in-progress

	Materials Rs.	Labour Rs.	Overhead Rs.	Total Rs.
Opening value (last period's figure)	5,000	3,000	1,500	9,500
Expenses of the period (as per valuation)		6,154	3,077	9.231
	5,000	9,154	4.577	18.731

Output Transferred to Next Progress

	Units	value Rs.
Opening W.IP "	2000	18,731
Completely processed During the period	6,000	1,40,481
	8,000	1,59,212

V. When there is Opening and Closing work-in-progress with process losses

Under this method equivalent production units regarding opening and closing work-in-progress are to be calculated with due adjustment for processes. The adjustment regarding the process losses is discussed already. This will be clearer from the following illustration.

Illustation : 9

From the following information for December 2003, Prepare process cost accounts for Process II

Opening stock in process II — 600 units at	Rs. 8,400
Transfer from Process I —11,000 units at	Rs. 44.000
Direct materials added in Process II	Rs. 19,280
Direct wages	Rs. 57,240
Production overhead	Rs. 76,320
Units scrapped during the period	1,200
Units transferred to process III	8,800
Closing stock units	1,600

Degree of completion

	Closing stock	closing stock	Scrap
Materials	80%	70%	100%
Labour	60%	60%	70%
Overhead	60%	60%	70%

There was a normal loss of 10% of production and units scrapped were sold at Rs.4per unit.

Solution:

Statement of equivalent production

Input	Units	Output	Units	Equivalent Production {Units}					
				Material 'A'		Material 'B'		Labour overhead	
				Qty.	%	Qty	%	Qty	
Opening W.I.P.	600	Opening W.I.P	600	-	-	120	20	240	40
From Process 1 Transfer	11,000	Completely-processed during the period (6.800 -600)	8,200	8,200	100	8.200	100	8,200	100
		Normal Loss	1,000	-	-	-	-	-	
		Abnormal loss	200	200	100	200	100	140	70
		Closing W.I.P.	1,600	1.600	' 100	1.120	70	960	60
	11.600		11,600						
				10,000		9.640		9.540	

Statement of cost

Elements of Cost	Cost incurred during the year Rs.	Equivalent Production units	Cost per.unit Rs.
Material "A"	44.000		
Less: Scrap value of normal loss	4.000		
	40,000	10,000	4
Material 'B'	19,280	9.640	2
Direct Labour	57.240	9.540	6
Production Overhead	76,320	9.540	8

Note: For Convenience the value of scrap has been deducted from Material A. Detailed allocation is arbitrarily omitted

Statement of Evaluation

Items	Elements	Equivalent production Unit	Cost per Units Rs.	Cost Rs.	Total Rs.
Opening Work-	Materials A	-	--	-	
in-Progress	Materials B	120	2	240	
	Direct Wages	240	6	1.440	
	Prodn. Overhead	240	8	1,920	3,600
Units completely	Materials A	8.200	4	32,800	
Processed	Materials B	8.200	2	16.400	
during this	Direct Wages	8,200	6	49,200	
period	Prodn. Overhead	8,200	8	65.600	1,64,000
Abnormal loss	Materials A	200	4	800	
	Materials B	200	2	400	
	Direct Wages	140	6	840	
	Prodn. Overhead	140	8	1,120	3,160
Closing Work-	Materials A	1,600	4	6.400	
in-Progress	Materials B	1.120	2	2,240	
	Direct Wages	960	6	5,760	
	Prodn. Overhead	960	8	7,680	22,080
					1,92,840

Note:

1. Material 'A' refers to transfer from Process I and material 'B' refers to material added in this process.

2. Material 'A' will always be 100% complete, because it is the finished products of the Process I

3. **Calculation of Normal loss**

Input opening stock	600
Transfer from process 1	11,000
	11,600
Less: Closing Stock	1,600
Units Produced	10,000

Therefore, Normal loss – 10% production (10% of 10000) = 1000 units

4. Units completely processed during the month

Units transferred to process III	8,800
Less: work completed on opening stock	600
Units completely processed during the period -	8,200

5. Quantity abnormally lost is the balancing figure.

Expected production less Actual production:

9,000 - 8,800 = 200 units.

6. For opening stock, material 'A' is not required during this period. Material-'A' would have been calculated during last period and should have been included in Rs.8.400 (which is the value of opening stock)

Process II Account

Particulars	Unit	Amount Rs.	Particulars	Units	Amount Rs:
To opening W.I.P.	600	8,400	By Normal loss	1,000	4,000
To Transfer from	11,000	44,000	By Abnormal loss	200	3.160
To Direct materials		19,280	By Process 111 transfer	8,800	1.76,000
'To Direct Wages		57,240	By Closing W.I.P	1.600	22,080
To Production Overhead		76.320			
	11,600	2.05,240		11,600	2,05,240

Note: Value of units transferred to Process III is arrived at as follows:

Units completely processed during the period 8,200 units at.... Rs. 1,64,000

Opening Stock	600 units	Rs. 8,400
Add. Cost of processing	Rs. 3,600	Rs. 12,000
Units transferred to process III	**8,800**	**Rs. 1,76,000**

Abnormal Less Account

Particulars	Unit	Amount Rs.	Particulates	Units	Amount Rs.
To Process II	200	3,160	By cash A/c	200	800
			(safe of scrap)		
			By Costing P&LA/c		
	200	3,160		200	3,160

Illustration : 10

The following information is obtained in respect of Process II for the month of March 2003.

Opening stock = 800 units (degree of completion: materials: 70% labour 60% overhead 60%)

Transfer from process I 5,100 units at Rs. 10,200

Transfer to process III 4,600 units.

Direct materials added in process II Rs, 4,480

Direct Labour in Process II Rs. 13,140

Manufacturing expenses Rs. 17,520

Units scraped 400 (degree of completion - Materials. 100%; Labour 70%; and manufacturing expenses 70%).

Closing stock 900 units (degree of completion - Materials 60%; Labour 40%; and manufacturing expenses 40%).

Normal loss in the process: 10% ^production. Units scrapped realised Rs. 2 per unit

Solution

Statement of Equivalent production

Input	Units	Output	Units	Equivalent production (Units)							
				Materials I		Materials I		Labour over head		Man expensep	
				Qty.	%	Qty	%	Qty.	%	Qty.	%
Opening W.I.P.	800	Opening W.I.P. Units	800			240	30	320	40	320	40
Transfer from Process 1	5.100	Completely Processed during the period	3800	3800	100	3,800	100	3.800	100	3.800	100
		Normal Loss	500			-	-	-	-	-	-
		Closing W.I.P		---	---						
			900	900	100	540	60	360	40	360	40
		Less:	6.000	4.700		4.580		4.480		4.480	
		Abnormal Gain	100	100	100	100	100	100	100	100	100
	5,900		5.900								
		Equivalent Production		4,600		4.480		4,380		4,380	

Note: The statement shows abnormal gain. The method of calculating equivalent production. When there is abnormal gain should be carefully observed. The equivalent production for abnormal gain at 100% completion for each element is deducted from the total production equivalents of the period as said earlier, this is done in order to eliminate the effects of abnormal gain in production on process costs.

Statement of Cost

Elements of Cost	Cost Rs	Equivalent Production units	Cost per unit Rs.
Material	10,200		
Less: Normal Scrap	1,000		
	9,200		
Material II		4,600	2
Direct Labour	4,480	4,480	1
Manufacturing expenses	13,140	4,380	3
	17,520	4,380	4

Statement of Evaluation

Items	Elements	Equivalent production Unit	Cost per Units Rs..	Cost Rs.	Total Rs.
Opening Work-in-Progress	Materials 1	...	...	---	
	Materials II	240	1	240	
	Direct Labour	320	3	960	
	Man. Expenses	320	4	1,280	2,480
Units completely Processed during this period	Materials	3,800	2	7,600	
	Materials II	3.800	1	3,800	
	Direct Labour	3,800	3	11,400	
	Man. Expenses	3,800	4	15.200	38.000
Closing Work-in-Progress	Materials 1	900	2	1,800	
	Materials II	540	1	540	
	Direct Labour	360	3	1,080	
	Man. Expenses	360	4	1,440	4,860
Abnormal gain	Materials A	100	2	200	
	Materials B	100	1	100	
	Direct Labour	100	3	300	
	Man.Expenses'	100	4	400.	
					1000
					46,340

Process II Account

Particulars	Units	Amount. Rs.	Particulars	Units	Amount Rs.
To Opening W.I.P.	800	5,520	By Normal loss	500	1,000
To Transfer from	5,100	10,200	By Transferred to Process in	4,600	46,000
To Direct materials		4,480			
To Direct Labour		1 3,140	By Closing WIP	900	4,860
To Expenses		17,520			
To Abnormal Gain	100	1000			
	6,000	51,860		6,000	51.860

Abnormal Gain Account

Particulars	Units	Amount. Rs.	Particulars	Units	Amount Rs.
To Normal toss To Costing P&L A/c (Transfer)	100	200 800.	By Process II A/c	100	1,000
	100	1,000		100	1,000

Model Questions:

1) Describe briefly the main features of process costing. Compare process costing with job costing.

2) Define "normal process and abnormal process losses", explaining the possible causes.

3) a) Describe the advantages of Process Costing.

b) State with examples how you would calculate the following under the process costing:

i) Cost of dosing stock of a process,

ii) Cost of units transferred to next process.

iii) Equivalent production for an element of cot currently incurred in a pr6cess when there is abnormal gain.

4) Eighty units are introduced into a process at a cost of Rs. 1,200. The total additional expenditure incurred by the process is Rs. 720. Of the units introduced 10% are normally wasted in the course of manufacture. The wasted units possess a value as scrap of Rs. 15 each. Due to abnormal causes only 64 units are produced.

How would you write the process account showing the abnormal wastage:

(Ans: 64 units transferred to next process at Rs. 1,600; Abnormal loss: Gross Rs. 200;Net Rs. 80).

5) 600 Kgs. of a material was charged to process I at the rate of Rs. 4 per. Kg. The direct labour accounted for Rs. 200 and the other department expenses amounted to Rs. 760. The normal loss is 10 percent of the input and the net production was 500 Kgs. assuming that the process scrap is saleable at Rs. 2. Per Kg. Prepare a ledger account of Process I clearly showing the values of normal loss and abnormal loss.

(Ans: Abnormal loss Rs. 240; output transferred to next process Rs. 3,000)

6) Modern Process Ltd. makes and sells their chemical manufactured by three consecutive process:

The products of these processes dealt with as under:

	Process I	**Process II**	**Process III**
Transferred to next process	662/3%	69%	
Transferred to warehouse for sale	331/3%	40%	100%

In each process 4% of the weight put in is lost and 6% is scrapped, which from Process I realise Rs. 3 per ton, from Process II and Process 111 and Rs. 5 and Rs. 6 per ton respectively.

The following information relates to July 2002.

	Process I	Process II	Process III
Raw materials used	1,400 tons	160 tons	1,260 tons
Rate per ton	Rs.10	Rs.6	Rs.7
Wages and other expenses	Rs.5,152	Rs.3140	Rs.2.895

Prepare process accounts, showing cost per ton of each process.

(Ans: Process I - transfer to next process 840 tons @ Rs. 15 per on; Process II-transfer to next process 540 tons @ Rs. 20 per ton; Process III -transfer to warehouse 1,620 tons @ Rs. 13.50 per ton).

7) The following details are extracted from the costing records of an oil mill for the year ended 31st March 1990, Purchase of 5,400 tons of Coconut - Rs. 2,20,000.

	Crushing. Rs.	Refining Rs.	Finishing , Rs.
Cost of labour	2,750	1,100	1,650
Electric power	660	396	264
Sundry materials.	110	2.200	-
Repairs to machinery	308	363	154
Steam	660	495	495
Factory Expenses	1.452	726	242

Cost of Casks Rs. 8,250

3,200 tons of crude oil was produced 2,600 tons of oil produced by the refining process, 2,550 tons of refined oil were finished for delivery.

	Rs.
Coconut sacks sold	440
1,925 tons of coconut residue sold	12,100

Loss in weight in crushing 275 tons

500 tons of by Products obtained from refining process 7,425

You are required to show the accounts in respect of each of the following stages of manufacture for the purpose of arriving at the cost per ton of each process and the total cost per ton of the finished oil.

a) Coconut crushing Process, b) Refining Process, and c) Finishing Process.

(Ans: 3,200 tons for Rs. 2,13,400 from Crushing Account to Refining Account; 2,600 to for Rs. 2,11,255 from Refining Account to Finishing Account; 2,550 tons in Finishing Account for Rs. 2,22,310)

8) A product passes through three processes for completion. During a month 1,000 units of raw material valued at Rs. 20,000 were put into the first process. Other information regarding the manufacture is as under.

	Process I Rs.	Process II Rs.	Process III Rs.
Sundry material	2,000	1,600	1.200
Direct Labour	10,000	8,000	10,000
Direct Expenses	400	400	800
Cost of Boxed		8,216	
Cost of packing		—	1,744
Normal wattage	5%	10%	5%
Actual Output (units)	900	800	670
Sale of wastage (per unit)	4	8	10

Prepare process accounts and ascertain the cost of the product at the end of each process.

[Ans: output of Process

I- Rs. 30,505 (900 Units)

II- Process II - Rs. 47,408 (800 Units),

III- Process III - Rs. 52,500(900 Units)

NOTES

Output costing:

It is usually employed by organizations producing a single product on a large scale by a continuous process.

Lesson -17

Output Costing

17.1 Introduction:

Output costing is also known as 'Unit* or 'Single' or 'Single output' costing. Output costing refers to the cost procedure, which is ideally used in the case of industries producing single article on a large scale by a continuous process of manufacture, and all the units produced are identical and homogeneous. Sometimes this method is used where two or more products of the same kind but of varying grades or quality is produced. Unit costing is a variant of the process costing. In unit costing, the results are not the result of continuous processes. This marks the difference between unit costing and process costing.

"The industries where output-costing methods are used are collieries, quarries, brick making and breweries. The unit of cost is the unit in which the ultimate production is measured. In the case of concerns producing articles such as, cameras, radios, bricks, slates, pencils, etc; the unit of costing may be one unit, 1,000 slates. 1,000 bricks; a dozen or gross pencils, but in the case of breweries, collieries, cement, sugar, textiles etc. the cost unit will be fixed according to" convenience, as for example, a liter, a tonne, a bale, a bag, a kilogram and so on.

The cost per unit is determined by dividing the total cost during a given period by the number of units produced during that period. The output costing is a period cost and the cost sheet is prepared every month giving the cost of production for the month. The cost is collected element wise and the cost of each element is divided by total production to determine the cost per unit of each element. The statement of cost, which is prepared under this method, shows total costs for production and cost per unit. This statement may also include figures for previous period to provide comparison and 'control.

17.2 Collection of Cost

The following procedure is adopted for collecting the data for various

elements of cost:

1. Material

Since there will be only one product and the process of manufacture is also simple, the raw material is directly charged to the production of tfte period in total. If however, the production in batches, the raw material will be issued and accounted for separately for each batch. An analysis of the requisitions will give us the quantity of direct and indirect materials issued for productions and their values also, assuring the prevalence of a suitable method of valuing material issues. Material wastages are also considered. The normal loss is adjusted by raising the issue price of materials. Abnormal losses should be charged to the costing profit and loss account. The items of stores issued for maintenance and other purposes are analysed by cost centres through the requisition slips. In industries where the product is extracted from natural resources there will be no raw material cost.

2. Labour

The labour costs are collected periodically through pay rolls, which are prepared separately for each department. If the concern has more than one production department or a cost centre, a separate pay roll may be prepared for each in order to identify the labour cost with each one of them and affect a labour cost control.

3. Overhead

These are collected under the usual expense heads and are charged to the cost period to which they pertain. Each item of overhead expenses is divided-directly by the total production to give the cost per unit of each item of expense. In case the cost statement is prepared before the expenses are known, the predetermined rates are used.

4. Treatment of Scrap

Materials drawn from the stores but rendered useless for production or the

residue in the course of manufacture are called scrap. The material scrap returned to the stores or sold will go to reduce the cost of materials consumed.

The cost of scrap arising in the course of manufacture is deducted from the works cost on the basis of the sales value.

17.3 Cost Sheet, Production Statement and Production Account

1. Cost Sheet

ost Sheet:

he expenses of a oduct are alysed under fferent heads in e form of atement. This atement is alled cost sheet.

Under unit costing, a statement is prepared at a given interval of time. If the information obtained from the records were set out in the form of a statement, it would be known as cost sheet. It is a document that provides for the assembly of detailed cost of a cost centre or cost unit. It can be prepared at regular intervals weekly or monthly. This cost sheet presents the total as well as cost per unit of products manufactured during the period. It is often considered good to prepare a cost sheet with cost data of previous periods. This facilitates comparison and promotes cost control.

A Cost Sheet or Statement of Cost can be prepared to present total cost by different stages. A cost sheet appears as under:

Particulars	Total Cost Rs.	Per unit Cost Rs.
Direct Material Consumed	XXX	XXX
Direct Wages	XXX	XXX
Direct Expenses	XXX	XXX
1)Prime Cost	XXX	XXX
Add: Factory or Works Overheads	XXX	XXX
2)Works Cost	XXX	XXX
Add: Administrative Overheads	XXX	XXX
3)Cost of Production	XXX	XXX
Add: Selling and Distribution Overheads	XXX	XXX
4) Cost of Sales	XXX	XXX

From the above statement of cost. It may be gathered that

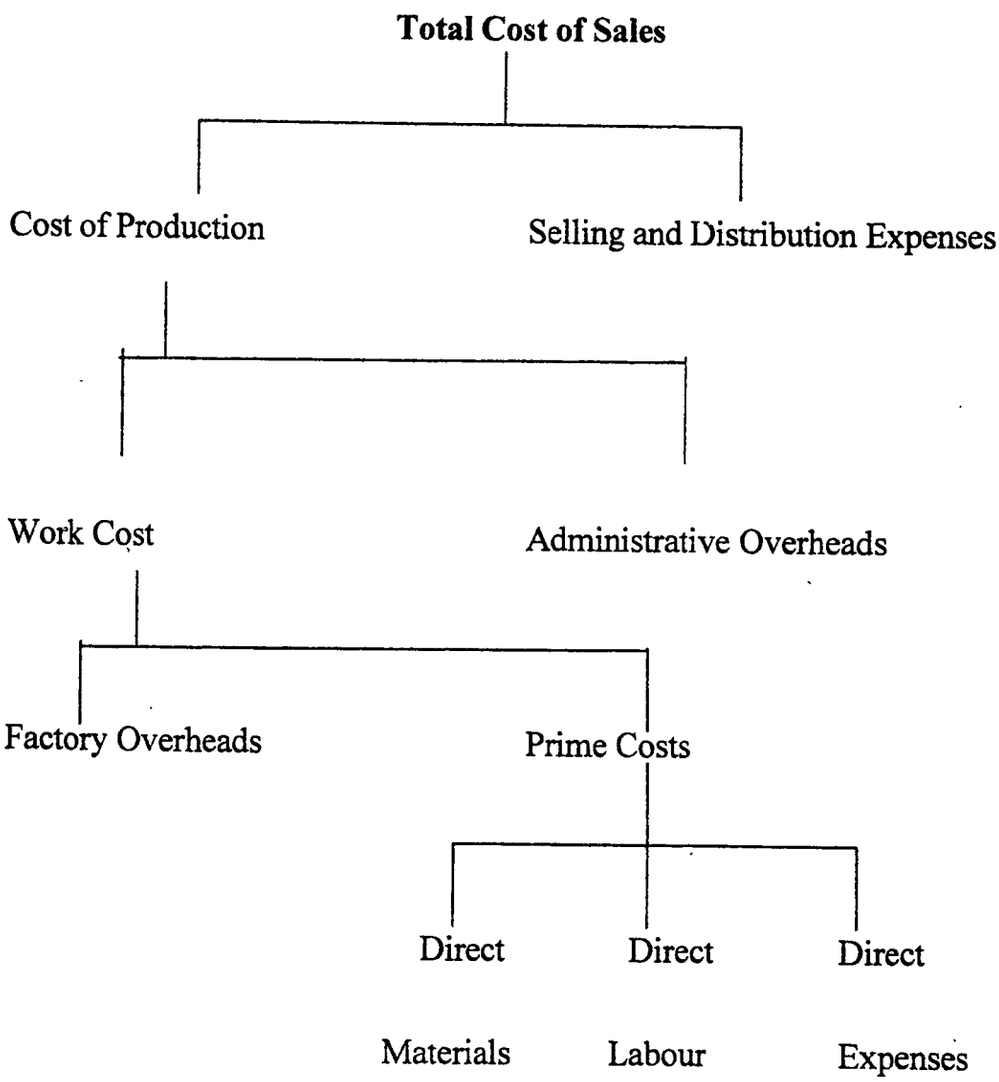
1) Prime Cost is the aggregate of all direct costs namely direct materials, direct labour and direct expenses.

2) Works (Factory) Cost is the total of prime cost and factory overheads.

3) Cost of Production is the sum total of factory cost and administrative overheads.

4) Cost of sales is the sum total of cost of production and selling and distribution overheads,

* Note the difference between Works (Factory) Cost and Works on Cost.



17.4 Purpose of Cost Sheet

A cost sheet serves the following purposes:

1) It gives total cost and cost per unit for a particular period.

2) It facilitates comparative study of costs with previous cost sheets to know the cost trends and also with standard costs to check the variations from actual costs.

3) It provides data for planning production, fixing sale price and submitting tenders and quotations.

4) It enables close watch over the cost for control.

Pro-forma Cost Sheet

Month ending..... Units produced....

Particulars	Rs.	Total Rs.	Per unit Rs.
Direct Materials:			
Opening stock of materials	xxx		
Add: Purchase of materials	xxx		
	xxx		
Less: Closing stock-of materials	xxx	xxx	
Material Consumed			xxx
Direct Wages		xxx	xxx
Direct Expenses		xxx	xxx
1) PRIME COST		xxx	xxx
Factory (Works) Overheads:			
Fuel - Power and water	xxx		
Lighting and heating	xxx		
Indirect materials	xxx		
Wages of foremen	Xxx		
Factory rent, taxes and insurance	xxx		
Depreciation on factory land, buildings and plant	Xxx		
Drawing office and works expenses	xxx		
	xxx		
Less: Scrap value & Defective works		xxx	
			xxx
Add: Work in progress (opening)		xxx	xxx
		xxx	xxx
Less: Work in progress (closing)		xxx	xxx
2) WORKS COST		xxx	xxx

	Rs.	Total Rs.	Per unit Rs
Administrative Overheads:			
Office rent, insurance and cleaning	Xxx		
Office Salary	Xxx		
Telephone law expenses and audit expenses	Xxx		
Depreciation on office building and furniture	Xxx		
Director's remuneration	xxx		
Printing, and Stationary	xxx	xxx	xxx
3) TOTAL COST OF PRODUCTION		xxx	xxx
Add: Opening stock of finished products		xxx	xxx
		xxx	xxx
Less: Closing stock of finished products			
		xxx	xxx
Selling and Distribution Overheads:			
Show room expenses	xxx		
Salesmen's salary and commission	xxx		
Bad debts	xxx		
Discount to Distributors	xxx		
Carriage outwards	xxx		
Warehouse rent and other expenses	xxx		
Advertising	xxx		
Delivery expenses	xxx	xxx	xxx
4) COST OF SALES		xxx	xxx

Notes :

1. In computing cost, the value of material, actually consumed should be taken.

2. Valuation of work-in-progress should preferably be-at works cost. If it is in quite initial stage, it may be valued at prime cost and adjusted to direct costs before arriving at prime cost. Nevertheless, students are advised to take it at works cost unless stated otherwise.

3. Adjustment in respect of stock of finished product should be made after /ascertaining the total cost of currents production

2. Production Statement

A production statement is a statement, which shows all the costs, incurred selling price of goods and profits earned (loss incurred) during a period. It includes selling and distribution expenses besides the elements making up the cost of production. The difference between the cost-of sales and selling price reveals the profit and loss.

The production statement is the extended form of cost sheet, "if the costing cable is confined to a record of expenses incurred during the period is termed as cost sheet or cost statement. If the statement is extended to include sales, stocks and profits it is usually termed as "production or output statement."

Pro-forma of production statement Production statement				
Particulars	Previous period		Current period	
	Total Rs	*Per* unit Rs.	Total Rs.	Per unit Rs.
Material				
Direct Wages				
Direct Expenses				
Prime cost				
Factory Overheads				
Works Cost				
Office and Administrative Overheads				
Cost of Production				
Add: Opening Stock of finished goods				
Less: Closing Stack of finished goods				
Selling and Distribution overheads				
Cost of Sale				
Profit Selling Price				
Selling price				

3. Production Account

If the details of cost sheet or production statement are shown in the form of a ledger account, it is known as "Production Account", it is, thus a particular form of manufacturing account prepared in conjunction with financial accounts in order to show the cost of manufacturing the goods produced during the particular period. Like cost sheet, it is also drawn up periodically viz., monthly, quarterly etc.

Pro-forma of Production Account

Production Account

Particulars	Amount Rs.	Particulars	Amoun Rs.
To Direct materials used		By Prime cost c/d	
To Direct labour			
To Direct expenses			
To prime cost b/d			
To Works overheads			
Add: Opening stock of W.I .P.			
Less: Closing stock of W.LP.			
Less: Scrap ol by -product			
To Works cost b/d			
		By Cost of Production c/d	
To Administrative overheads			
To cost of production b/d		By Closing stock of finished goods	
To Opening stock of finished goods		By Cost of goods sold c/d	
To cost of goods sold b/d			
To Selling and Distribution overheads			
To Profit		By sales	

Illustration: 1

The Accounts of Jeyanth Manufacturing Company for the year ended 31st December 2003 shows the following:

	Rs.
Direct material	1,00,000
Direct wages	18,000
Direct expenses	5.000
Carriage and Cartage outwards	4,500
Bad debts	3.000
Repairs of plants, machinery and tools	5.800
Oil and Waste	1.200
Foremen's Salary	8.000
Supervisor's salary	9,000
Electricity expenses	1,300
Rent. Rate. Taxes and Insurance • Factory	4,200
Office	3,000
Depreciation - Plant and machinery	3,000
Furniture	300
Gas, water and heating - Factory	800
Office	200
Drawing office expenses	3.250
Director's fees	5.250

Manager's salary (factory 3/4 office 1/4.)	4,000
Legal expenses	400
Office telephone	1500
Postage and telegrams	100
Salesmen's commission and salaries	1,750
Travelling expenses	1,250
Rent of warehouse	250
Advertisement	600
Consumable stores	000
General expenses	1,100
Counting house salary	2,000
Income tax	500
Dividend	1.000
Sales	2.25.000

Prepare a Cost Sheet showing the cost of Production and also the profit made.

Solution:

JEYANTH MANUFACTURING COMPANY Cost Sheet for the year ended 31st December 2003

	Rs.	Rs.
Direct Material	1,00.000	
Direct Wages	18,000	
Direct expenses	5,000	
Prime Cost		1,23,000
Factory overheads:		
Repairs of plant, machinery and tools	5,800	
Oil and. waste	1.200	
Foremen's Salary	8,000	
Supervisor's salary	9,000	
Electricity expenses	,300	
Rent, Rate, Taxes and Insurance (Factory)	4,200	
Gas, water and heating (factory)	800	
Depreciation on plant and machinery	3.000	
.Drawing office expenses	3,250	
Manager's salary (factory)	3.000	
Consumable stores	900	40,450
Factory Cost		1,63.450
Administrative overheads:		
Rent, Rate, Taxes and Insuran i (office)	1,000	
Gas, water and heating (office)	.200	
Depreciation on furniture	300	
Director's fees	5,250	
Manager's salary (office)	1,000	
Legal expenses	400	
Office Telephone	500	
Postage and telegrams	100	
General expenses	1.100	
Counting house salary	2000	.11,850
Cost of production		1,75.300
Selling & Distribution Overheads		
Carriage and cartage outwards	4,500	
Bad debts	3.000	
Salesmen's commission and salaries	1,750	
Travelling expenses	1.250	
Rent of warehouse	250	
Advertisement	600	11,350
Cost of Sales		1,86,650
Profit (balancing figure)		38,350
Sales		2,25,000

Note: Income tax and Dividends being appropriation of profits are non - cost items.

Illustration -2

The following figures are collected from the books of an iron foundry close of the year.

Raw material	Rs.
Opening stock at the beginning of the year	7,000
Purchases during the year	50,000
Closing stock at the end of the year	5,000

Stores overhead on materials 10% on the cost of materials Works overhead is 50% of direct Wages and direct wages is Rs. 10,000. 10% of the castings were found to be defective in manufacture and were rectified by expenditure of additional overhead charges to the extent of 20% on proportionate direct charges. The total gross output during the year was 1,000 tones. Find out the manufacturing cost per unit.

Solution

Statement of cost for the year ended .... Output 900 units

Particulars	Rs.	Amount Rs.
Opening stock of raw material	7,000	
Add: Purchases	50.000	
	57,000	
Less: Closing stock of raw material	5.000	
Cost of raw material consumed		52,000'
Direct wages		10,000
		621000
Works overhead (50% of wages)		5,000
Stores overhead (10% on cost of material)		5.000
		72,000
Less: Sale of rejected casting (100 tonnes)		200
Total cost of finished casting (900 tonnes)		71,800
Additional works overhead		180
Manufacturing cost of saleable castings		71,980

Note: Out of gross output of 1,000 tonnes, 10% were rejected and sold as scrap and 90% of the remaining (finished casting) i.e., 90 tonnes were rectified.

Illustration: 3

The following extract of costing information relates to a commodity for the year ending 31st December 2002.

	Rs
Purchase of raw materials	2.00,000
Direct wages	2,00,000
Stock on 1-1-2002	
Raw materials	40,000
Finished goods (2.000 units)	16,000
Stock on 31-12 2002	
Raw materials	2.000
Finished goods (4000 units)	?
Works on cost	84.000
Work in progress on.1-12-2002	9,600
Work in progress on 31-12-2002	32,000.
Office and Administrative overheads	27,400
Sale of finished goods	6.00,000

Advertising, discount and selling cost is Rs. 0.40 per unit. During the year 62,000 units were produced. Calculate cost of production and extend the cost sheet to include profit also, so that it may also be called production statement.

Solution

Cost Sheet for the year ending 31st December, 2002

	Rs.	Rs.
Raw materials used:		
Opening stock	40,000	
Add: Purchase	2.00.000	
	2.40.000	
Less: Closing stock	2,000	2.38,000
Direct Labour		2.00.000
Prime Cost		4.38,000
Works on cost		54.000
		5.22.000
Add: Work in progress on 1-1-02		9.600
		5,31.600
Less: Work in progress on : 1-1-02		32.000
Works Cost		4.99.600
Office and Administrative Overheads	62,000 units	27.4 00
Cost of Production		5.27.000
Add: Opening stock of finished goods	2.000 units	18.000
	64.000 units	S. 43,000
Less: Closing stock of finished goods	4,000 units	34.000
Cost of goods sold	60.000 units	5.09.000
Selling expenses at 40 paise *per* unit		24.000
Cost of sales		5.33.000
Profit		67,000
Sales		6,00.000

Cost of production for 62,000 units Rs. 5, 27,000

Cost of production for 4,000 units Rs. 34,000

$$\frac{5,27,000}{62,000} \times 4,000 = 34,000$$

Illustration: 4

In a factory two types of articles are manufactured viz., No.1 and No.2. From the following particulars prepare a statement of cost showing total cost of each variety and ascertain the total profit. There is no opening or closing stock.

	No.1	No.2
	Rs.	Rs.
Materials	30,000	50,000
Labour	60,000	70,000

Works on cost is charged at 40% of works cost and office on cost is taken at 20% on total cost.

No. 1 articles sold during the period are 180 at Rs. 1,200 each and No. 2 articles sold are 200 at Rs. 1,500 each.

Solution:

Statement of Cost

	Art. No. 1	Art. No. 2 Rs.
Materials	30,000	50.000
Labour	60,000	70,000
Prime cost Works on cost i.e., 40% of works cost	90,000 60,000	1,20.000 80,000
Works cost Office on cost I.e., 20% of the total cost	1.50,000' 37,500	2.00,000 50,000
(Cost of Production) Total cost	1,87,500	2.50,000
Sales:		
Article 1 = 180 © Rs. 1,200 each	2,16,000	
Article 2 = 200 © Rs. 1,500 each		3,00,000
Profit	28.500	50,000

Working Notes

Works on cost is worked out as follows:

Works on cost is 40% of works cost. Therefore, where works cost Rs, 100, works on cost should be Rs. 40 and Prime cost should be Rs. 60.

(Prime Cost + Works Overheads = Works Cost)

Thus, Works on Cost is 40/60 ie., 2/3 of Prime Cost.

Illustration : 5

The following information is given for a factory in 2002.

	Rs.
Direct material used	2,00,000
Direct Wages	1,50,000
Factory expenses	90,000
Office and administrative expenses	88,000

On the basis of the above particulars ascertain the cost of a job to be done in 2002. Materials required will be Rs.1,000 and wages amounting to Rs. 2,000 will be spent on the job. What wilt be the quotation if a profit of 20% on selling price is desired.

Solution

Cost sheet of .....during 2002

	Rs.
Direct material	2,00,000
Direct wages	1,50,000
Prime cost	3.50,000
Factory expenses	90.000
Works cost	4,40,000
Office and Administrative expenses	88,000
Cost of production	5,28.000

Quotation for Job No .....

	Rs.	
Direct Materials	1.000	
Direct wages	2.000	
Prime cost	3.000	
Works Expenses (60% of Direct Wages)	1,200	(1)
Works cost	4.200	
Office Expenses (20% of works cost)	840	(2)
Cost of Production	5,040	
Expected Profit (20% on sales i.e., 25% on cost)	1.260	(3)
Selling-price	6,300	

Working Notes

1) Works Expenses has been charged on of percentage of factory expense to direct wages in 2002.

$$\text{This works out 60\% i.e.} = \frac{90{,}000}{1{,}50{,}000} \times 100$$

2) Office Expenses has been charged as a percentage to works cost based on 1990 figures.

$$\text{This is 20\% le.,} = \frac{88{,}000}{4{,}40{,}000} \times 100$$

3) Profit required is 20% on sales figure, which is not given. If sales profit will be 20 leaving cost to be 80.'So profit is 25% of cost.

Illustration: 6

Mr. Robit has a small furniture factory He specializes in the manufacture of small tables of standard size of which he can make 15,000 a year. The cost per tables worked out as under for the year 2001-2002, when, he made and sold 10,000 tables,

	Rs.
Material	30
Labour	10
Overhead (fixed) recovered @ 50% of material cost	15
	55

Prices are fixed by adding & standard margin of 10% to the total cost arrived at as above, on 2002-2003 due to fall in the cost of materials, total cost worked out as under.

	Rs
Material	20
Labour	10
Overhead recovered % 50% of material Cost	10
	40

Mr. Robit maintained this standard margin of 10% on the cost of saies were at the same level as in 2001-2002. You are asked to:

a) Determine profit or loss for the year 2001-2002

b) Complete the price which should have been charged in 2002-2003 to yield the same profit or loss in 2001-2002

Solution

a) Statement showing the Profit for the year 2002-2003

Production and Sale: 10,000 tables

	Total Rs.	Per unit Rs.
Material (30 x 10.000)	3.00.000	30.00
Labour (10 x 10,000)	1,00,000	10.00
Prime cost	4,00,000	40.00
Overhead (50% on material)	1,50,000	
Total cost	5.50,000	55.00
Profit (10% of Total cost)	56.000	5.50
Selling price	6,05,000	60.50

Statement showing profit or loss for the year 2002-2003

Production 10,000 tables

		Total Rs.	Per unit Rs.
Total cost given (40 x 10,000)		4.00.000	40.00
Profit 10%		40,000	4.00
Selling price		4,40,000	44.00
Revised total cost treating overhead as fixed charges			
Material (20x10,000)	2,00,000		
Labour (10x10,000)	1,00,000		
Overhead (Fixed)	1,50,000	4,50,000	45.00
Loss		10,000.	1.00

b) Computation of price to be charged in 2002-2003 to yield the same profit as in 2001-2002.

	Total Rs.	Per unit Rs.
Cost	4,60,000	45.00
Profits in 2001-02	56,000	5.50
Selling Price	5,05,000	50.50

Illustration: 7

A Factory manufactured and sold 1,000 Typewriters in the year ending 31st December 2002. The summarized accounts are set out below.

Manufacturing Trading and Profit & Loss Account for the year ending 31st December 2002.

	Rs.		Rs.
To tot of materials	1,60,000	By sales	**6,00.000**
„ Direct wages	2,40,000		
„ Works expenses	1,00,000		
„ Gross profit	3,00,000	By Gross profit	
	8,00,000		8,00.000
To Management staff salaries	1,20,000		3,00.000
„ Rent & Rates	20,000		
„ Selling expenses	60,000		
„ General expenses	40,000		
„ Net profit	60,000		
	3,00.000		3,00,000

For the year ending 31st December 2003 it is estimated that:

a) Price of materials will rise by 20% on the previous year's level.

b) Wages will rise by 5%

c) Factory expenses will be up by 25%

d) Selling expenses per unit will remain unaltered.

e) Other expenses will remain unaffected by the rise in output.

Prepare a cost sheet and show the price at which the Typewriters should be marketed so as to show a profit of 10% on the selling price.

NOTES

Solution

Statement of Cost

		Total Cost Rs.	Per unit Cost Rs.
Direct materials		1.92.000	192
Direct wages		2.52.000	252
Prime Cost		4.44,000	444
Factory expenses		1,25,000	125
Works cost		5,63.000	569
Office overhead			
Salary	1,20.000		
Rent & Rates	20,000		
General expenses.	40.000	1.80.000	180
Cost of production.		7,49.000	749
Selling expenses		60.000	
Cost of Sales		8,09.000	809
Profit @ 10% on sales		89.899	89.89
Selling price		8.98,899	898.89

Workings:

1. Raw materials	60,000
Add: 20%	32,000
Raw materials in 2003	1,92,000
2. Direct wages	2,40,000
Add: 5%	12,000
Direct wages in 2003	2,52,000
3. Factory expenses	1,00,000
Add: 25%	25,000
Factory expenses in 2003	1,25,000

4. Profit @ 10% or1/10 on sales is equal to 1/9 on cost

Illustration : 8

Following are the particulars of 1,000 machines of Everest Company Ltd., for the year 2002.

Cost of materials	1,00,000
Salaries	1,40,000
Wages	70,000
Factory expenses	60,000
Rent, Rates and Insurance	20,000
Sales expenses	30,000
General expenses	30,000
Sales revenue	5,00,000

The sales manager of the company estimates that the sales during 2003 will be 2,000 machines. Prepare a statement showing the estimated cost for 2,000 machines and the price per machine to earn 20% profit on selling price.

The following changes have been anticipated.

a) Rise in price of raw materials by 20%

b) Wages will be up by 5%

c) Factory expenses will rise in proportion to the combined cost of materials and wages.

d) Selling expenses per unit will remain the same

e) Other exposes will remain unaffected by the rise in output.

Solution

EVEREST COMPANY LTD.,

Statement of cost and profit for the year 2002.

	Total Rs.	Per Machine Rs.
Materials	1,00,000	100
Wages	1,40,000	140
Prime cost	2,40,000	240
Factory expenses	60,000	60
Works Cost	3,00,000	300
Administrative expenses		
Salary	70,000	70
Rent, rates & insurance	20,000	20
General expenses	30.000.	30
Cost of Production	4,20,000	420
Sales expenses	30,000	3.0
Cost of Sales	4,50,000.	450
Profit	50,000	50
Selling Price	5,00,000	500

Estimated for 2000 machines during 2003

	Rs.	Per machine Rs.	Total Rs.
Materials	100		
Add: rise of 20%	20	120.00	2.40.000
Wages	140		
Add: rise of 5%	7	147.00	2.94,000
Prime Cost		267.00	5,34,000
Works expenses	60.00		
Add: rise of 11.25% .	6.75	66.75	1,33,500
Works Cost		333.75	6,67,500
Administrative expenses			
Salary		35.00	70,000
Rent, rate & insurance		10.00	20,000
General expenses		15.00	30,000
Coat of Production		393.75	7,87,500
Sales expenses		30.00...	60,000
Cost of Sale's		423.75	8,47,500
Profit @ 20%.on safes i.e., 25% on cost		105.94	2,11,875
Selling price		529.69	10,59,375

Note: Combined cost bacterial and wages in 2002 Rs. 2.40

Estimate during 2003 Rs. 267

Difference (267 - 240) Rs. 27

$$\% \text{ Increase in factory expenses:} \frac{27}{240} \times 100 = 11.25\% \times 100 = 11.25\%$$

Illustration: 9

"A" Ltd. manufactures fans, which are sold at Rs. 400 per piece. The cost of sale is composed of 40% of direct material, 30% of wages and 30% of overhead.

An increase in material price by 25% and in wage rate by 10% is expected in the following year; as a result of which the profit at current selling price may dwindle by 39% of present gross profit.

With the above information, you are required to (a) prepare a statement showing current and future cost and profit at present selling price and (b) determine the future-selling price if the present rate of gross profit is to be maintained.

Solution

Suppose present cost of sales = x

	Present Rs.	Future fls.
Materials	0.40 x	0.50 x
Wages	0.30 x	0.33 x
Over head	0.30 x	0.30 x
	x	1.13x
Profit	(400-x)	(400- 1.13 x)
Sales Price	400	400

It is given in question that increase in material price and wage rate will decrease the present gross profit by 39%.

Present Profit - Future Profit = 39% of present profit.

(Rs. 400- X) - (Rs. 400-1,13x) » 39% (Rs. 400 - x) 400

400 – x - 400 + 1.13x= 15600.39 x

0x +1.132= 156 -0.39x

- 0.13 x + 0.39 x» 156 i.e., 0.52 x= 166

$$X = \frac{156}{0.52} = \text{Rs. } 300$$

Therefore, cost under present condition is Rs. 300.

a) Statement showing the Current and Future Cost and Profit at Present Selling Price of Rs. 400

	Present Rs.	Future Rs-
Direct material 40% of Rs. 300	120	[125% of Rs.120] 150
Direct wages 30% of Rs. 300	90	[110% of Rs.90] 99
Prime cost	210	249
Over head 30% of Rs. 300	90	90
Total Cost	300	339
Profit	100	61
Selling price	400	400
Profit as % of selling price	25%	15.25%
Profit as % of cost of sales	331/3%	

b) Future selling price if the present of profit (25% of sale .*or* 331/3% of cost of sales) is maintained:

Future Cost	Rs. 339
Profit @ 331/3% of cost	Rs. 113
Future selling price	Rs.452

Model Questions

1. Define output Costing. Give examples of undertakings to which this method is most suitable.
2. What is cost sheet? What purposes it serves?
3. Distinguish between a cost sheet and Production Account.
4. From the following particulars you are required to prepare a statement showing.

    a) The cost of materials consumed
    b) Prime cost
    c) Works cost
    d) Total cost and
    e) Cost of sales and profit

Stock of Finished goods on 31.12.2003	70,000
Stock of raw materials on 31.12.2003	38,000
Purchase of raw materials	7.60,000
Productive wages	5.00,000
Chargeable expenses	10,000
Stock of finished goods on 31.12.2003	82,000
Stock of raw materials on 31.12.2003	34.000
Sate of finished goods	16,00,000
Works overhead charges	1,30.000
Office and general charges	71,000

[Ans: Cost of materials consumed: Rs.7,64,000; Prime Cost : Rs.22,74,000; Works Cost : Rs.14,04,000; Total Cost: Rs.14,75,00.0; Cost of Sales: Rs.14,63,000; and Profit: Rs.1,37,000]

Lesson-18

Joint Products and By-Products

18.1 Introduction

NOTES

Joint Products:

Two or more products separated in processing, each having a sufficiently high saleable value to merit recognition as a main product.

In certain industries two or more products are simultaneously produced from a common set of inputs by a single process. We call them "Joint Products" if they are of equal importance. If they are not of the same importance then the products of lesser importance are known as "By-Products". The importance may depend upon the policy of management, market for the products, the profit earning capacity of the products etc. Joint products and By-products are frequently found in basic industries (Extractive Industries, Chemical Industries, Agricultural product industries) that process natural raw materials.

Examples

In dairy industry the production of skimmed milk, butter and cream are joint products. If this production is accompanied by the production of buttermilk, then buttermilk is the by-product.

In the petroleum industry, crude oil is refined. From that joint product like gasoline, Kerosene, fuel oil, lubricating oil etc., and a number of by-products like Sulphur, Wax etc., are produced.

The simultaneous production of joint products and by-products creates a difficult problem ' gamely the allocation of all production costs up to the point each product is separately identifiable. The point at which joint products and/or by products become separately identifiable is called the "split-off point". Production costs incurred prior to the split-off point -are called joint costs. These joint costs are apportioned among the individual members of the product group.

The joint products are sometimes referred to as "major" or "co-products" to differentiate them from "by-products" and "Scrap" or "waste". While there are no hard and fast rules to make a clear-cut distinction between the joint products and by-products, the followings are some of their differences.

NOTES

By-Products:

A secondary product obtained during the course of manufacturing, having a relatively small importance as compared with that of the chief product or products.

1. When compared with each other, "joint products" have high relative total sales value and "by-products" have low relative total sales value. This may be due to low unit values or a small output.

2. Joint products are produced altogether in a process, while by-products are produced from the scrap or discarded materials of the main product. Scrap is left over bits and prices of raw materials that enter into a joint process. By-products are residues resulting when the physical characteristics of the original materials are charged.

3. Joint products are not produced just incidentally. Their production is definite. But by products are incidental items that accompany production of the major products. The process would not be carried on to product the by -products alone.

4. Joint products require further processing to place them in salable form. But byproducts generally do not require to be processed any further scrap is sold "as is".

The distinguishing feature between "Joint products" and "by products" is the economic value. An item regarded as a "by product" by one firm may be regarded as a "joint product" by another firm.

A product which be of less-significance and value today may gain importance tomorrow. So, what was the by-product yesterday may be wailed a joint product tomorrow. The value basis is used for making a distinction only where it is difficult to distinguish between them.

Though the classification of products into joint products and by-products is a matter of degree of importance of the products, it is very significant because the treatment in account is different as between joint products and by-products.

18.2 Accounting for Joint Products

Accounting for joint products implies the assignment of joint cost to each of the joint product. If the joint costs are not apportioned properly and reasonably to different joint products produced, the cost of the joint produce will vary considerably. This will affect the valuation of inventory, pricing of products and profit or loss on sale of different products. Therefore, the basic problem in respect of joint products is that of apportioning the joint costs incurred up to the point of separation. After this point, they may become individual products and if there are any further processing costs they can be directly allocated.

The following methods of apportionment of total cost before separation point are available for application.

1. Physical Unit Method

Under his method the joint cost is apportioned to the joint products on the basis of, some suitable physical co-efficient contained in the products. The physical co-efficient may be expressed in weight, volume, calories etc. For example, if there is 40% meat in product 'A' and 6.0%meat in product 'B' the joint cost up to separation will be apportioned in the ratio of 4:6.

This method is technically sound, simple and easy to use. However, this method is not suitable where there; is no common co-efficient i.e., where one product is liquid, other is solid and another is gas and so there is no common physical unit. Secondly, where there is little relationship of cost to physical unit. Secondly, where there is little relationship of cost to physical contents, this method is not to be advocated.

Illustration: 1

The following data have been extracted from the books of South India Coke Co Ltd.,

Joint products	Yield lbs. of recovered Products Per ton of Coal
Cock	1.420
Coal tar	120
Benzol	22
Sulphate of ammonia	26
Gas	412
	2,000

The Price of coal is Rs, 80 per ton. Direct labour and overhead costs to point of split off are Rs. 40 and Rs. 60 respectively per ton of coal. Calculate material, labour, overhead and total cost of each product on the basis of weight.

Solution

Apportionment of total Cost on the basis of weight of the material up to the point of separation

Joint Products	Yield per ton of coal	Percentage to total	Coal .Rs.	Direct Labour Rs.	Over head Rs.	Total Rs.
coke	1.420	71.0	56.80	28.40	42.60	127:80
Coal tar	120	6.0	4.80	2.40	3.60	10.80
Benzol	22	1.1	0.88	0.44	0.66	1.98
Sulphate	26	1.3	1.04	0.52	078	2.34
Gas	412	20.6	16.48	8:24	12.36	37.08
Total	2,000	100	80.00	40.00	60.00	180.00

2. Average Unit Cost Method

Under this method the total per-separation cost is divided into the total units of all the products. This gives the average cost per unit of the output as a whole. This method is good, for application where the units are uniform and standardised. It fails if ail-the products cannot be expressed in the same physical unit.

Illustration: 2

Apportion the joint cost of joint products A.B, and C from the following data under Average unit cost method.

Pre-separation cost is Rs.90,000; total production 6,000 units and average cost per unit Rs.15. The average unit method is used to cost the various products in proportion to their quantities.

Product	Units per' unit	Rate	Joint cost Apportioned
A	3,000	15	45,000
B	2,000	15	30,000
C	1,000	15	15,000
Total	60,000		90,000

3. Survey Method or Point Value Method: This Method is based on the idea that the difference in the costs of joint products causes due to certain factors affecting the quantity and quality contents of the products. The important factors such as volume, selling price technical difficulties, labour operations performed, time taken for the operations, quality of materials used, marketing process etc. are ascertained by means of extensive survey. Point values or percentages are given to each products depending upon the factors contained in it. Costs are apportioned on the basis of these point values. These point value ratios should be revised from time to time depending upon the factors affecting production and sales.

Illustration : 3

In a factory the total pre separation costs to the split off point during a period amounted to Rs. 10,000 with the following production.

Product X = 200 units .

Y = 400 units

Z = 700 units

The points of value assigned to x, y and z products are 5,2 and 1 respectively. Apportion the joint cost.

Solution

Product	Units	points of Value	Total Value (2x8 (Equivalent Units)	Joint cost . apportioned (10:8:7) Rs.	Cost per unit 5+2
1	2	3	4	5	6
X	200	5	1,000	4,000	20
Y	400	2	800	3,200	8
Z	700	1	700	2,800	4
Total	1,300	-	2.500	10.000	--

4. Sales value Method or Market value Method

Under this method, the joint cost is apportioned in the proportion to the total sales value of each product. Sales Value is determined by multiplying the selling price and quantity sold of the products. This method is simple but it is difficult to ascertain the sales value at the split off point when the produces are in the semi-finished state. Secondly, the market prices are subject to rapid fluctuations in several cases. The Market value or Sales Value may be any of the following.

a) Selling Price or Sales Value at the split off point.

b) Sales Value after further processing and

c) Net Value

d) Sales vales at the split off Point:

The sales value of the joint products at the separation point is ascertained and total cost is ascertained in the ratio of these values. Suppose, product A and B are jointly produced in a factory. The values at separation point are known to be Rs.100 and Rs.120 respectively.

The cost will be apportioned to $\frac{5}{11}$ to A and $\frac{6}{11}$ to B

This is subject to giving weight to the quantities produced. This method is useful where further processing of products incurs disproportionate costs. But it is difficult to ascertain the sales or market value at this stage.

Illustration: 4

The joint costs of malting 3,000 units of X, 2,000 units of Y and 1,000 units of Z are Rs.44, 000.

The selling prices of products X, Y and Z are Rs. 10, Rs. 20 and Rs. 40 respectively. The products did not require further processing costs after split off point.

You are required to apportion joint costs on the basis of

a) Selling price and
b) Sales value

NOTES

Solution

a) At Selling Price Basis

Product	Units of Output	Selling price per unit Rs.	Apportioned Joint cost (Selling Price Ratio) (1:2:4) — Rs.	Cost per unit (4/2) Rs.
	(2)	(3)	(4)	(5)
X	3000	10	6,286	2.095
Y.	2.000	20	12,571	6.285
Z	1,000	40	25,143	25.143
Total	6,000	—	44 000	—

b)At Sales Value Basis

Product	Units of Output No.	Selling price per unit Rs.	Total Sales Valie (23) Rs.	Apporttoned Joint cost (Ratio 3:4:4) Rs.	per Unit 5/2 Rs
	(1)	(2)	(3)	(4)	(5) (6)
X	3,000	10	30.000	12,000	4.00
Y	2,000	20	40,000	16,000	8.00
Z	1,000	40	40,000	16,000	16.00
Total	6,000	---	1,10,000.	44,000	----

C) Sales Value after further Processing

Determination of sales value at the split-off point may be difficult. But the ascertainment of sates values of the product at the final stage after further processing is easy. Under this method the joint cost is apportioned in the ratio of market value after further processing. For example, the sale of A and B are 10,000

and 8,000 units at price Rs.10 and Rs. 8 respectively. The pre separation costs are Rs. 82,000. The pre-separation costs will be apportioned thus.

$$A = \frac{82,000 \times 1,00,000}{1,64,000} = Rs.50,000$$

$$B = \frac{82,000 \times 1,00,000}{1,64,000} = Rs.32,000$$

This method cannot be called a fair method by any norm. The processing cost of completing the individual joint product will not be the same in all cases. Then, the sales values of individual joint manufacture up to the point of separation.

Illustration: 5

A company manufactures two joint products. X and Y. During the year 600 units of X and 400 units of Y were manufactured and sold in the market at Rs. 8 and Rs. 10 per unit respectively. The point cost of these products at the split off point was Rs. 6,400 and further processing costs were, Rs.300 and Rs.500 respectively. Apportion the joint cost

Product	Output Units	Selling Price	Sales (2x3) RS,	Further Processing	Net Sales Value (4-5)	Ratio (7)	Joint cost Apportioned Rs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
X	600	8	4,800	300	4,500	9/16	3,600
y	400	10	4,000	500	3,500	7/16	2.800
Total	1.000	-----	8.800	800	8;000	-----	6,400

c) Net Value Method

From the selling price of the finished products, the estimated net profit and all costs incurred after the separation point are deducted. On the basis of figures arrived a ratio is established. On this basis, the total costs before separation point is apportioned.

Illustration: 6

A factory produces' three products A, B & C, which originate from a joint process. The joint expenses of these products are as follows: Material Rs.8,000; Labour Rs.7,500 and overhead Rs:4,500.Subsequent Processing costs are as follows:

	A	**B**	**Rs.**
	Rs.	**Rs.**	
Materials	1,500	1,000	1200
Labour	1,000	800	600
Overhead	500	200	200
	3000	2000	2000
Total Sales	20,000	15,000	8,000
Estimated profit on sales	30%	20%	25%

Prepare a statement showing apportionment of joint costs

Solution

Statement of Apportionment of Joint Costs

Particulars	Product A Rs.	Product B Rs.	Product C Rs.
Sales Value	20,000	15,000	8,000
	(30%)	(20%)	(25%)
Less: Estimated profit	6,000	3,000	2.000
Estimated Total Cost	14,000	12,000	6.000
Less: Further processing cost (Cost incurred after separation)	3,000	2,000:	2,000
Estimated individual costs up to split off point	11,000	10,000	4,000
Ratio of apportionment on the above basis	11	10	4
Apportionment of joint cost of Rs.20,000 in the ratio of estimated joint cost	Rs.8,800	Rs.8,000	Rs.3.200

Note: The estimated joint cost is Rs.25,000 while actual joint cost is Rs.20,000 only. The difference of Rs.5,000 is assumed owing to Selling and Distribution cost made up as follows: (11:10:4)

A Product	2,200
B Product	2,000
C Product	800
Total	5,000

The above selling cost have no relationship with sales but have been determined as follows.

Selling cost = Sales Value - (Cost of Production + Profit)

18.4 Accounting for By-Products

The accounting method of by-products can be classified into (A) Non cost methods or sales value methods and (B) Cost methods

(A) Non-Cost Methods

The non-cost methods are not based on the cost of products but on sales values. These methods are given below:

1) Other Income Method

This method is also called "Miscellaneous Income Method". Under this method the sales value of by-product is treated as other income and credited to P & L Account. Therefore, entire cost of the process is borne by main products. Value of closing stock of by-product is considered at nil value (Zero Value) for the purpose of Balance Sheet. This method is good where.

a).The value of the by-product is not important or the value cannot be ascertained without incurring much clerical expenditure and it is assumed that the clerical expense incurring would be much more than the value of the by- products.

b) Non-crediting the value of the by-products to the main product would not affect the cost of the main product.

This method is highly defective and is also known as 'Zero cost Method'. It does not reduce the cost of the main product and also value the closing stock at Zero price. Accounting of by products by this method is also inaccurate as there is a time lag between the sales and production. There is also a possibility that by-products may arise in one period may be accounted in another period and thus, it affects the profits of two periods. So it is not a popular method.

2) By-Product Sales added to Main Product Sales

Under this method, all costs of main product and by-product are deducted from the sales value of the main product and by-products. This method is similar

to the previous method. So this method is generally adopted in those cases where the value of by-products is very small. Here also the closing stock of the by-products is valued at nil prices for balance sheet-purposes.

3) Total cost less sales value of by-products

Under this method, the sales value of by- products is deducted either from the cost of production or cost of sales. This method is favored because the revenue from products reduces the cost of major products. The defect with this method is that the fluctuate prices offered for the cost of the main products. The closing stock of by-products under this method is shown at the sales price or cost of sales or total cost basis.

Illustration: 7

In a factory 500 units of main product are produced and 400 units are sold Rs.50 per units. The by-products emerging from the main product is sold at Rs. 1,000/- the total cost of production 500 units is Rs. 15,000. Calculate the amount of gross profit after crediting by product value (a) to total cost of production (b) to cost of sales.

Solution

a) By-Product value credited to cost of production

		Rs.
Sales value of main product during the period (400 units x Rs. 50)		20,000
Cost of sales		
	Rs.	
Total cost of production of 500 units @ Rs.30	15,000	
Less: Value of by-products	1,000	
Cost of production of main products	14,000	
Less: Closing stock of 100 units @ Rs. 28	2,800	
		11,200
Gross Profit		8,800

b) By-product value credited to cost of production

Sales value of main product during the period (400 units x Rs. 50)		20,000
Cost of sales		
Total cost of production of 500 units @ Rs.30	15,000	
Less: Closing stock of 100 units @ Rs.30	3,000	
	12,000	
Less: Value of by-products	1,000	
	11,000	
Gross Profit		9,000

Note: The difference in the value of stock. It is Rs.2,800 in a) method as against Rs.3,000 in b) method That is why, there is a difference of Rs.200 in the gross profit.

4) Total cost less Sales value of by-products, minus Selling arid distribution overhead

Under this method, Selling and distribution cost incurred ,for selling the byproducts are deducted from the sales values of by-product and the net sales value is deducted from the total cost or credited to Process Account. The closing stock of by-products is valued at selling priceless an estimate of the costs likely to be incurred in selling the stock of by-products.

Illustration: 8

In the manufacture of main product, 400 units of certain by-products were produced. The market value of the by-products was Rs.20 per unit. The byproduct required further processing cost amounting to Rs.2,800 and selling and distribution costs amounting to Rs.700 are Incurred. Calculate the amount to be credited to he Process Account in respect of the by-product.

Solution:

	Rs.	Rs.
Sales Value of 400 units @ Rs. 20		8.000
Less: Further processing cost	2,800	
Selling & Distribution Cost	700	3,500
Amount to be Credited to Process Account		4,500

5) Total cost less selling and distribution cost and post split off cost on by-products

Under this method, selling and distribution costs and further processing cost incurred after the split off point (the point of separation) of by - products are deducted from the sales value of by products. The net realization is deducted from total cost of the main products or credited to the process account. The closing stock of by products is valued at selling price less estimates the costs likely to be incurred in selling and processing the stock of such by - products.

Illustration: 9

A factory is engaged in the production of a chemical "x" and in the course of its manufacture a by-product 'Y' is produced which has a commercial value after a separate process. For the month off June 2003, the following are the summarised costing data:

	Joint Expenses .	Separate Expenses	
		X	Y
	Rs.	Rs.	Rs.
Materials	38.400	14,720	1.560
Labour	2,34.000	15,360	5,284
Overhea(	6.900	3,000	1.088

NOTES

The output for the month was 142 tons 'X' and 49 tons of 'Y' and the selling price of 'Y' averaged Rs.560 per ton. Assuming that the profit on 'Y* is estimated at 50% of the selling price, prepare cost accounts of X and Y.

Solution:

Statement of cost estimate for by-Product Y

Output:49 tons

	Rs.	Rs.
Sales value of by products Y (Rs. 56- x 49 tons)		27,440
Less: Estimated profit @ 50% on sales		13,720
Estimated Total cost		13,720
Less: Cost after separation		
Material	1,560	
Labour	5.284	
Overhead	1,088	
		7,932
Estimated cost up to the-point of separation		5,788

Statement of Cost For Main Product X

Output: 142 tons

Joint expenses	Rs.	Rs.
Material	38,400	
Labour	23,400	
Overhead	6,900	
Less: cost of by-product		68,700
Y up to the point of Separation		5,788
Cost up to Separation		
Add; Separate cost of X.		62,912
Material	14,720	
Labour	15,360	
Overhead	3,000	
		33.080
Total cost of 142 tons		95,992

6) Reverse Cost Method

Under this method, an estimated profit from sale of by-products, selling and distribution expenses and the post-split off processing cost are deducted from the by-products. The net amount thus arrived at is deducted from the byproduct starting with the sales value. Accordingly, it is called Reverse Cost Method.

Illustration: 10

In manufacturing the main product 'A' a company processes the resulting waste material into two by-products B and C. Using the reversal cost method of by-products, prepare a Comparative Profit and Loss statement of the three products from the following data.

Total cost up to separation point Rs.60,000

	A	B	C
	Rs	Rs	Rs.
1.Sales	1,00,000	10,000	20,000
2. Cost after separation		3,000	6,000
3. Estimated not profit as a percentage to sales value	20%	30%	
4. Estimated selling expenses as a percentage to sales value	20%	20%	20%

Solution

In Order to ascertain comparative profit and Loss, the total cost up to separation point should be apportioned to main product A any by-products B and C. Here Reverse Cost method is to be used.

Apportionment of Joint Costs

	By Product B		By Product C	
	Rs.	Rs.	Rs.	Rs.
Sales		10,000		20,000
Less:				
Estimated net profit	2,000.		6.000	
Selling Expenses	2,000		4,000	
Cost after Separation	3,000	7,000	6,000	16,000
Share of joint costs		3,000		4,000

Cost to be apportioned after split off point i.e., Rs.60,000 - (3,000 + 4,000) = Rs.53,000. Therefore the main Product will be a Rs.53,000.

Comparative Profit And Loss Account

Products	Rs.		Rs.	Total
1. Sales	1,00,000	10,000	20,000	1,30,000
2. Cost of Sales;	53.000	3,000	4,000	60,000
Pre-Separation cost		3,000	6,000	9,000
Post-Separation cost				
Cost of production	53,000	6,000	10,000	69,000
Selling expenses	20,000	2,000	4,000	26,000
Total cost of sales	73,000	8,000	14,000	95,000
3. Profit (1,2)	27,000	2,000	6,000	35,000
4. Profit as a% of sales value	27%	20%	30%	26.9%

B) **Cost Methods**

Under these methods, the valuation of closing stock of the by-product is done on the basis of cost. So the total cost of production is required to be apportioned between main product and the by-product. The cost methods are as follows.

1) Replacement cost method (opportunity cost method)

Where by product have no market value or their market values are very low, they may be used within the factory itself as raw material. The replacement cost method is used in those industries where the by-product in the same factory. In this case, the product is valued at a price, which would have been paid to purchase the raw material from the market. The value of raw material arrived at is called "replacement cost or opportunity cost". This is credited to the cost of production account or process account.

NOTES

For instance, in converting coal into coke, the coal gas obtained may be used within the plant for heating purposes. When this is done,-gas is valued at ost, at which it could be purchased from outside. The cost is credited to the cost of production of coke. When the price or coal gas is not readily available in the market, the price of an alternative material is taken into account.

2) Standard cost method

Under this method, the standard cost is established for each by-product produced. The standard cost of by-product is credited to the process account of the main product. Since standard, costs are steady over a period, a steady credit figures are available in respect of by-products. So the control on the cost of main product and the by-product can easily be exercised.

3) Joint Cost proportion method

If the total value of by-product is more significant the actual cost should be ascertained by apportioning the joint cost (perspiration cost) between main products and by-, products on most suitable and acceptable basis. The apportionment methods are already discussed.

Illustration: 11

Two by products M and N are produced in the course of manufacture of product "X" Their expanses are as follows.

	Joint Expenses	Subsequent X	Separate M	Expenses N
	Rs.	Rs.	Rs.	Rs.
Materials	800	200	100	80
Labour	1,000	300	50	100
Overhead	600	300	100	190
	2,400	800	280	370

Selling prices are X Rs.3,000; M Rs.1,000 and N Rs.800.The estimated profit is 20%, 17.5% and 16% on the turnover respectively. Prepare a statement showing the apportionment of joint expenses over the different products.

Solution:

Apportionment of Joint expenses

Particulars	X	M	N
	Rs.	Rs.	Rs.
Selling Price	3,000	1,000	800
Profit on turnover	600	175.	128
	(20%)	(17.5%)	(16%)
Total cost	2,400	825	672
Less: Separate Expenses	800	325	372
Share in Joint Expenses	1,600	500	300

Illustration: 12

A Factory producing article X also yields Y and Z as by-products. The joint cost of manufacture for a period were Rs.20,000. It was estimated that the profit on each product as a percentage on sales would be 30%, 25% and 20% respectively. The subsequent manufacturing expenses were as follows:

	x	y	Z
	Rs.	Rs.	Rs.
Materials	1,500	1,300	1,000
Labour	200	150	100
overhead	800	550	400
Total	2,500	2,000	1,500
Sales value	20,000	15,000	10,000

Assuming that selling and distribution expenses are in proportion to sales values. Prepare a. statement showing the apportionment of joint expenses of manufacture of over the different products.

Solution:

Apportionment of Joint Costs

Particulars	X	Y	Z
Sales values	20.000	15,000	10,000
Less: Profit	6,000	3,750	2,000
	30%/	25%	20%
Cost of Sales	14,000	11,250	8,000
Less: Subsequent Costs	2,500	2,000	1.500
Cost at the stage of separation Less: Selling and Distribution cost	11,500	9,250	6.500
	3,222	2,417	1,611
(Total Cost 27,250 Less: Joint cost 20,000			
7,250			
Apportioned in the sales value ratio i.e.			
Joint Costs	8,278	6,833	4,889

Illustration: 13

A chemical process yields 75% of materials introduced as main product 20% as by - product requires double the material required for a unit of byproduct. Further, one unit of main product needs ' 1Y2 times the time needed for one unit of by-product. Overheads are absorbed in the ratio of 3:1.

During a week 1,000 units of raw materials at a cost of Rs. 17,000 were introduced. Labour totaled Rs.5,300. Overheads came to Rs.2,700, Wastage realised Rs.300. Ascertain the cost of two products.

Solution:

Total units produced:	=	1,000 units.
Main Product 75% if 1,000 units	=	750 units
By - Product 20% of 1,000 units	=	200 units
Wastage 5% of 1,000 units	=	50 units
Total	=	1,000 units.

Statement of Apportionment of Joint Costs

Particulars	Ratio	Total Cost Rs.	Main Product		By-Product	
			Amount Rs.	Cost Per unit Rs.	Amount Rs.	Cost per. unit Rs.
Material	15:2	17.000	15,000	20.00	2,000	10.00
Labour	45 : 8	5,300	4,500	6.00	800	4.00
Overhead	3 : 1	2,400	1,800	2.40	600	3.00
		24,700	21,300	28.40	3,400	17.00

Notes

1) Wastage realised Rs.300 have been deducted from the overheads,
So overheads are Rs.2,700 - Rs.300 = Rs.2,400.

2} Material ratio between Main and By-product is 2:1.

So 2x750: 1 X 200 =1,500:200 = i.e. 15: 2

3) Labour ratio between Main and By-Product is 5:2. So 3x750: 2x200 = 2,250: 400 = i.e. 45:8.

Further Processing

Sometimes, at the Point or separation the joint products and or by products do not have and realisable value or fetch only a small value. In such case, they are brought to salable condition by further processing. Again further processing is made in order to make these products more profitable. The management will take the decision regarding further processing by considering so many factors related to profitability including non-dost factors.

Illustration: 14

A factory producing joint products of varieties, the following data are extracted from the books:

	Total Rs.
Sale of product	7,50,000
Direct Material	2,25,000
Direct Labour	1,10,000
Variable overhead (150% of Labour)	1,65,000
Fixed overhead	2,00,000

The analysis of sales reveals that the Percentage of sate of product 'X' is 66 2/3 percent.

Management contemplates to process further the joint products so that they could be sold at higher rates. Facilities for this are available. The additional

expenditure for the further process and total sales anticipated at higher selling prices are given below. Make recommendation presenting y the effect of the proposal.

	Product X	Product Y	Total
	Rs.	Rs.	Rs.
Sales after further processing	6,00,000	3,00,000	9,00,000
Additional Material	50,000	20,000	70,000
Additional Direct Labour	20,000	8,000	28,000

Solution:

Apportionment of Joint Costs on Sales Value Basis

Particulars	Total	Product X	Product Y
	Rs.	Rs	Rs
Sales (1)	7,50,000	5,00,000	2.50.000
Direct Materials	2.25,000	1.50,000	75,000
Direct Labour	1.10.000	73,333	36,667
Variable overhead (150% on Labour)	1,65,000	1,10,000	55,000
Fixed overhead	2,00.000	1,33,333	66,667
Joint Cost (2)	7,00,000	4,66.666	2.33,334
Profit (1-2) (before further processing)	50.000	33,334	16,666

Particulars	Product X Rs.	Product Y	Total
Sales after further processing (1)	9,00,000	6,00.000	5,00,000
Additional Material	70.000	50,000	20,000
Additional Labour	28,000	20:000	8,000
Variable overhead (150% of labour)	42.000	30.000	12,000
Total Additional cost	1.40,000	1.00,000	40,000
Add: Joint cost share	7,00,000	4.66,666	2,33,334
Total Cost (2)	8,40,000	5,66,666	2:73,334
Profit (1-2)	60,000	33,334	26.686
(after further processing)	50,000	33,334	16,666
Net additional profit	10.000	-----	10,000

As Y product-will yield additional profit of Rs. 10,000 the proposal should be accepted.

Model Questions

1) Define and explain the terms 'joint product and by - product'. Enumerate the methods, which may be employed in costing joint products'?

2) What are by products? How are they valued in cost accounting?

3) Distinguish between joint products and by-products. What methods a e generally used in accounting for these products?

4) From the common process two joint predicts A and B come our. Expenses after separation for A and B are Rs.5 and Rs.8 respectively per unit. Total expenses in the common process amount to Rs.1,87.000.

Selling prices of A and B *are* Rs.25 and Rs.38 respectively per unit. Output of A and B are 4,00 and 5,000 units respectively. Find the cost of A and B after separation

(Ans: A Rs.22 per unit: B Rs. 33.50 per unit; assuming net value as the basis of apportionment)

5) The following figures have been extracted from the books of Messrs. East India Refinery Company Ltd.

The cost of 100 litres of Crude oil and processing it into different products is Rs.120/-The Standard yield per 100 litres of Crude oil and its market value per litre are indicated below

	Standard yield per 100 litres of Crude oil	Market Value per litre
		Rs.
Petrol	32.0	1.20
Lubrication oil	5.0	2.00
Fuel oil	50.0	0.50
Kerosene	8.0	0.75
Gas oil	3.0	0.30
Loss	2.0	Nil

Compute the unit cost of each product

(Ans: Cost apportioned on sales value basis - Cost per litre: Petrol Rs.1.79, Lubricating oil Rs.299; Fuel oil. Re, 0.7472; Kerosene Rs.1.12; Gas oil Re. 0:6725)

6)In a manufacturing concern the joint cost of manufacture of A.B and C are as follows.

	Rs.
Material	8,500
Labour	9,000
Overhead	7,500

Subsequent expenses are as follows:

	A	B	C
Material	2,500	1,200	1,400
Labour	1,900	1,600	2,000
Overhead	1,500	900	1,050
	5,900	3,700	4,450
Sales value	30,000	20,000	15,000
Percentage of profit on sales	40%	30%	25%

Show how you would apportion the joint cost of manufacture.

(Ans: Apportionment on net value basis in the ratio of 121 : 103 : 68; A Rs.10,359; B: Rs.8,819; C: Rs.5,822)

7)A certain chemical process yield 75% of the material introduced as main product, 20% as a by-product and 5% being lost. The percentage of material consumed by main products and by product is 80:20 Time taken to produce one unit of by product is half the time taken by main product. Overheads have been allocated at 200% of wages of each product. **Cost data**

	Rs.	Units
Raw material	10,000	2,000
Labour	8,500	
Overheads	17,000	
	35,500	

Ans: Cost per unit- Main product Rs.20.33; By-product Rs.12.50)

Lesson - 19

NOTES

Operating Costing

19.1 Introduction:

There are many concerns which have specialised themselves in providing service rather than manufacturing a product. Services rendered may be internal or external. If the services are rendered to the different departments in the same organization, these are referred to as internal. For example, services rendered by the repairs and maintenance department or canteen or internal transport in a factory. When the services are rendered to the community as a whole, these are termed as external. For instance, transport companies gas and water works, hospitals, theatres, schools, libraries, etc., provide service of special type to the public at large. It is necessary to know the cost of providing a service so that it is charged correctly to the service rendered.

The cost of providing a service is known as an operating cost. The method used for ascertaining the cost of a service is referred to as operating costing. Operating costing is a method of cost accumulation, which is designed to determine the cost of services. Hence it is called Service Costing. According to I.C.M.A., London, and Service Costing is that form of operation costing which applies where standardized services are provided either by an undertaking or by a service cost centre within an undertaking. According to Weldon, operating costing is actually unit costing as applied to the costing of services. Operating costing is just a variant of unit or output costing that adopted for ascertaining the manner of a product mainly because of the cost units selected, the manner of assembling cost data and their allocation to the cost units selected. Operating costs are generally period costs. So they are also collected periodically like process cost. The operating cost per unit is computed by dividing the total cost of rendering the services for a particular period by the number of service units produced during the period. In certain cases however, the operating cost can be terminal costs, e.g., when a bus is chartered out for specific trips, the cost of each trip is worked out separately as if they were specific jobs.

Operating costs are necessary to be ascertained not only in case of services rendered to the public, but also of those that are provided to the production departments of a concern. While the object of the former is the same as that of costing in general, the object of latter is only with a view to apportioning the costs to the production departments. However, sometimes, it may also become necessary to compare the cost of such a service with the cost of an outside service for deciding whether it is profitable to buy the service from outside rather than make the same available from within.

Following two points should be noted for introducing operating costing, i) Determination of unit of cost, ii) Collection of cost data.

Cost Unit:

It is a unit of product, service or time in relation to which costs may be ascertained.

1) Cost Unit

The system of operating costing requires the selection of a suitable unit of cost, depending upon the nature of the service or operation. The cost unit selected may be simple, i.e., per bed in a hospital per student in a school, per mile or per tone or per passenger in a transport company and per cup of tea sold in a canteen. In certain cases, a composite unit is used. In these cases more than one unit are combined together. The following are some of the examples of composite cost unit.

Name of the Service Undertaking	Cost Unit
1. Transport	- Per passenger - kms. or per tonne - kms.
2. Hospitals	- Per patient bed or per patient day or per patient week.
3. Electricity Supply	- Per kilowatt - hour
4. Canteens	- Per meal – persons
5. Cinema	- Per man - show
6. Hotels	- Per room day or per person per bed
7. Gas works	- 1000 cubic feet produced
8. Steam production	- 1000 Ib. raised.

2) Collection of Costing Data

After determining the unit of cost to which the total expenditure is to be allocated, the cost relating to the service rendered is collected. The collection of costs under the operating cost method depends upon whether the service is merely rendered, or whether the service rendered is first produced before being rendered. A works canteen may buy cooked food and do only, the catering. In the alternative, the canteen itself may do both the cooking of the food and catering thereof. There are also certain services, which do not at all involve any manufacture, e.g., hospital services, transport services. Where the service has to be produced before it is rendered, the costing method for the production side of it could either be process costing or any other method depending upon the nature of the industry. As regards the rendering of the services, operating cost method is applied. In building up the operating cost, the costs are accumulated under the following three heads both for the purpose of control and for the purpose of building the services.

a) Cost of providing the services (Standing Charges): The standing charges comprise of expenses, which are more or less fix in nature.

b) Cost of maintaining the services in a readily available condition (Maintenance charges): The maintenance charges are those expenses which are semi variable in nature.

c) Cost of actually rendering the services (Running Charges): The running charges include the variable expenses.

To take an example say a Hospital - the depreciation expenses pertaining to the cost of buildings, equipment, beds etc., and the insurance on these are examples of standing charges; salaries of hospital staff and nurses and expenses incurred in the laboratory are examples of maintenance expenses; the cost of medicines: diet, laundry etc., will represent the running charges.

A careful distinction between capital and revenue expenditure is an important factor in operating costs. For example, in the transport services, the expenses incurred in repairing the existing vehicle is a revenue expense whilst

buying a new vehicle is a capital expenditure.

19.2 Characteristics of industries Where Operating Costing is used:

Industries where operating costing is used have the following characteristics.

1) The number of persons travelling does not affect a high production of costs of service undertakings are fixed in nature e.g., cost of running a bus.

2) The distinction between fixed cost and variable cost is of special significance in the case of operating costing because economics and scale of operation have a considerable effect on the cost of service per unit.

3) Service industries provide regularly a uniform service to the consumers.

19.3 Cost Control and Operational Efficiency

The operational efficiency of service industries can be judged with the help of certain ratios. In the case of transport services, the number of available tonne- km provides such a ratio or passenger km at the optimum capacity and the number actually utilised. Thus, the utilisation ratio may be obtained as under.

Number of tonne km (or passenger-km) used Number of available tonne-km (or passenger-km) at optimum capacity.

$$\frac{\text{Number of tone – km (or passenger km) used}}{\text{Number of available tone – km passanger km at optimum capacity}}$$

Having computed this ratio, the causes of any fluctuation in it may be examined and suitable action taken to correct it.

In the case of electric supply and water supply works, the efficiency ratio is computed as follows:

$$\frac{\text{Total quantity billed Total}}{\text{Total quantity generated (pumped)}}$$

A similar ratio is given by

$$\frac{\text{Total quantity billed}}{\text{Total quantity distributed}}$$

Any decline in these ratios would given, an. indication of leakage or wastage. Of course, the periodical ratios must be compared against ratios computed with optimum conditions in view.

Operating costing with Reference to selected Types of undertakings

19.4 Transport Costing

Transportation of goods and passengers happens to be one of the major economic activities in every country. Railways and Waterways are run by private and public transport agencies. Of these motor transport by road is considered as more important and costing of transport service is discussed, hereafter in detail.

In transport operating company, costing consists of the determination of the operating cost of each vehicle, and the application of the cost thus determined to find out the cost per unit of service rendered by a vehicle. The costs are related to the unit, 'passenger-km' in the case of passenger transport and 'tonne-km' in the case of goods transport. The cost unit is a composite or compound unit and if

related to the distance traveled and to the number of passengers or the tonnage carried. Thus, a load of 3 tonnes is carried for 10 kms, the service rendered would be 30 tons-kilometers. The passenger-km or tonne-km is calculated as follows:

No. of vehicles x capacity x distance traveled x days x passenger / weight actually carried.

This can be explained with the help of the following example.

A transport company has 3 buses running between two places 50 kms apart. These vehicles makes 2 round trips daily, the carrying capacity is 60 passengers and 75% of this capacity is actually used. The vehicles are working on an average of 25 days a month.

Passenger km. = No. of buses x distance x trips x 2 x capacity x days x passengers actually carried.

In actual practice, when a bus travels through two or more stations carrying passengers during the trip, there are two possible methods of calculating the total passenger - kms of the services rendered. One is called the absolute passenger - km and the other is called, the commercial passenger km. The example below illustrates the difference in the working of these two methods.

A bus leaves station A and carries passengers to three other stations B, C and D. Distance between A, B, C and D is AB = 10 km; BC = 6 km; CD 10 km; and DA = 4 km. The passengers carried between these stations are 40,50,60 and 30 respectively. The absolute passengers kms will be 10 x 40 + 6 x 50 + 10 x 60 + 4 x 30 = 1,420 passenger kms. The commercial passenger - kms will be the average passengers carried over the trip by the total kms travelled, i.e.,

$$\frac{40+50+60+30}{4} x \frac{75}{100} x 30 = 1{,}350 \text{ passanger - kms}$$

The latter is commonly adopted for the reasons that it is very convenient to calculate and is more equitable in application.

19.5 Objectives of Transport Costing

The objectives to be served by transport costing are:

a) Providing useful information to check whether vehicles are run most efficiently.

b) Providing data to compare the cost of maintaining one vehicle with another or one group of vehicles with another group of vehicles.

c) Making available data whereby the costs of using motor vehicles owned and alternative forms of transport may be compared.

d) Providing a basis for charges to be quoted to hire and for fixing rates

e) Providing a oasis for allocating transport costs to different departments.

f) Providing data to ensure that the costs of maintaining and repairs are not too heavy as compared with the charges of external agencies.

19.6 Cost Classification

As already stated, the operating costs of a transport company are classified under the three following categories.

1) Operating and Running Charges

These include, petrol or diesel oil, lubricating oil, grease and salaries and wages of drivers conductors and cleaners. These expenses are variable in nature because they are dependent upon the distance covered and the trips made. These costs may be easily allocated to each vehicle.

2) Maintenance Charges

These are semi variable in nature and include the cost of tires and tubes, repairs and maintenance, spares and accessories, overhauls etc.,

3) Fixed or Standing Charges

These include garage rent, insurance, road license, depreciation, interest on capital, general supervision, vehicle tax, salary of operating manager and establishment expenses of the workshop and head office. While some of these costs can be allocated to specified vehicles, the rest may be suitably apportioned to each vehicle.

19.7 Cost Accumulation Procedure

Under transport costing, the accumulation procedure is identical to the cost accumulation procedure under job costing. Each vehicle has a distinct number. Daily log sheets are prepared for each vehicle. The driver of the vehicle generally records the details of each vehicle's running in this sheet. This logbook is the primary document, which facilitates cost ascertainment, and cost control under transport costing; The log book contains the full description of the vehicle, its purchase and initial costs, the standing expenses to be incurred on it, the cost of maintaining the services and the expenses incurred in the actual rendering of the service. This record covers details of kilometers run, the load carried, the expenses incurred on petrol and oil, the running hours lost and the extent format of log book is given below.

JEYANJH & CO.

Daily Log Sheet

Vehicle No. Time of Departure:

Licence No. Arrival:

Registration No. Date:

Route No.

Trip No.	From	To	Goods/Package Carried		Km	Time		Remark
			Out	Collected en route		In	Out	

Total Supplies	Time of Worker	Analysis of Lost Time
Petrol	Driver	Loadings delays
Oil	Conductor	Traffic delays
Grease	Cleaner	Accidents
etc..	Mechanics	Others

Based on information available in daily log sheets, managers can prepare monthly vehicle log sheet and performance statements. These statements contain useful data regarding costs, maintenance and performance of each vehicle.

19.8 Operating Cost Sheet or Cost Statement

The cost accounting department maintains a separate cost sheet for each vehicle. It is said, "A well designed cost sheet is heart of transport costing". The cost sheet has been analysed into three parts standing charges, maintenance charges and running charges. It also shows a comparison between the actual cost and the budgeted cost.

NOTES

Details regarding petrol and oil, distance travelled, weight carried etc., are taken from the daily log sheet. Wages of drivers, cleaners and assistants etc., are taken directly from wages analysis. Type and spare parts- are posted from purchase summary. If repairs are arranged en route by driver, this is noted on the daily log sheet and is posted to respective cost sheet.

HEMA & CO

Operating Cost Statement
January 2003

Vehicle No. Stationed at
Carrying Capacity. Route No.

	Budget		Actual	
	Total	Per Tonne Km.	Total	Per Tonne Km.
A. Standing Charges				
1. Depreciation				
2. Insurance				
3. Road Tax				
4. Licence Fee				
5. Interest-				
6.Administration				
Total				
1. Staff Salaries				
2. Other Expenses				
3. Repairs and Renewals				
4. Spare parts and components				
5.Routine Servicing				
Total				
1. Petrol				
2. Oils and Greases				
3. Salaries of running staff				
4. Depreciation				
1) Tyre				
ii) Battery				
5.Insurance on Transit goods				
Total				
D.Total Operating Costs				
E. Revenue Earned				
F. Net Profit				
G. Tonne Kms. carried				
H. Cost per Tonne Km.				

Comments Cost Accountant.

The cost sheet thus prepared can be used to measure the efficiency of operating the vehicle. For this purpose the following three ratios are worked out.

1) Vehicle utilisation ratio both in respect of the load carried and the hours run.

2) Ratio between revenue per tonne - km, and the cost per tonne-km and

3) Percentage of build up cost.

These ratios should be studies and compared between vehicle and vehicle and between one route and another.

Efficient utilisation depends upon whether the vehicle has been in service for the budgeted hours and whether it carried the tonnage it should carry during these hours. Separate ratios are worked out in respect of these so that it can readily be known whether the under utilisation was due to a drop in the kilometers run or in the tonnage carried. Ratio of costs to revenue per tonne-km is necessary to know whether it is profitable to "run the vehicle, should the ratio reveal variations in-revenue from period to period, and from vehicle to vehicle.. The contributory factors to be ascertained and attempts should be made to reduce the cost of service either by reducing the frequency or giving up unremunarative routes or increasing the frequency on remunerative routes. The profitability ratio can be improved by ensuring an economic utilisation of petrol and oil. (It is also necessary to compute the percentage of build-up cost to provide a comparative cost both for tariff fixation and cost control. Policy decisions such as, whether! to extend the activity in a particular route or reduce the frequency can be formulated by making the cost benefit analysis in relation to the additional fixed and variable costs and additional revenue.

Illustration: 1

A transport service company is running 4 buses between two towns 40 kms apart. Seating capacity of each bus is 50 passengers. The following particulars were obtained from their books:

Wages of drivers, conductors & cleaners	-	2,400
Salaries of office and Supervisory staff	-	1,000
Diesel and other oil	-	4,000
Repairs and? Maintenance	-	800
Taxation,' Insurance etc.,	-	800
Depreciation	-	1600
Interest and other charges	-	2600
		14,400

Actual passengers carried were 75% of the seating capacity. All the four buses ran on all days of the month. Find out cost per passenger km.

Solution

Operating Cost Statement

Particulars	Amount
Standing Charges	Rs.
Wages of drivers, conductors & cleaners	2,400
Salaries of office and supervisory staff	1,000
Taxation insurance etc.,	1,600
Interest and other charges	2,000
	7.000
Running Charges	
Diesel and other oil	4,000
Repairs and maintenance	800
Depreciation	2.600
	7,400
Total Cost	14,400

$$\text{Cost per passenger km} = \frac{\text{Total Cost}}{\text{Total passenger kms}}$$

$$\text{Cost per passenger km} = \frac{14,400}{3,60,000} = 0.04$$

Calculation of passenger - kms

Passenger kms = No. of buses x capacity x. distance of round trip x days x passengers carried

=4x50x40x2x30x75/100=3,60,000

Illustration: 2

From the following data relating to two different vehicles. A and B compute the cost per tonne - km.

	A	B
Kilometers run (Annual) Tonnes per km (Average)	15,000	6.000
Cost of vehicle	6	4
Road Licence (Annual)	Rs.	Rs.
Insurance (Annual)	25,000	15,000
Garage Rent (Annual)	750	750
Supervision and Salaries (Annual)	700	400
Drivers wages per hour	800	700
Cost of petrol per litre	2,500	2,500
Kms run per litre	3	3
Repairs and maintenance charges per km	3	3

Tyre allocation per km	20 kms	15 kms
Estimated life of vehicles	1.65	2.00
	0.40	0.60
	1,00,000 kms	75,000 kms

You are required to charge interest on cost of vehicle at 5% per annum. The vehicle runs 20 kms per hour and average.

Solution:-

Operating cost Statement

Particulars	Cost per annum Rs. Vehicle A	Vehicle 8
A) Standing Charges		
kms x cost	3,750	
Depreciation Estimated life		1,200
Interest 5%	1.250	750
Road Licence	750	750
Insurance	700	400
	6,450	3,100
B) Maintenance Charges		
Garage Rent	800	700
Supervision and Salaries	2.500	2,600
Repairs and maintenance (Rs. 1.65 x 15.000 and 2.00 x 6,000,	24,750	12,000
	28,050	15,200
C) Running Charges		
Driver's wages		
$3x\frac{15,000}{20}$ & $3x\frac{8,000}{20}$	2,250	900
$3x\frac{15,000}{20}$ & $3x\frac{6,000}{15}$	2,250	1,200

Tyre cost (0.40 x 15.000 and 0.60 x 6,000)	6,000	3,600
	10,500	5,700
Total Cost (A + B + C)	45,000	24,000
Total Tonne Kms x Tonnes		
= 15,000 x 6 and 6,000 x4	90.000	24,000
	0.50	1.00

Illustration: 3

The following were the expenses incurred by a company in operating two Lorries (for the conveyance of raw material) and a bus (for the conveyance of staff) during a month.

	Lorry A	Lorry B	Bus
	Rs.	Rs.	Rs.
Driver's Salaries	330	345	360
Cleaner's Wages	360	360	180
Petrol	940	980	620
Oil	36	50	40
Repairs	150	150	100
Depreciation	330	220	350
Supervision	210	210	210
Garage Overhead	260	220	150
Road and other tax	40	40	30
Other Overheads	35	40	20

The above vehicle carried the following raw materials and passengers during the month.

Lorry A - 200 tonnes of Raw Materials.

Lorry B - 240 tonnes of Raw materials.

Bus - 25 passengers daily for 25 days.

At the same time the respective distance covered during the same period was: -

Lorry A - 2,000 km; Lorry B - 3,000 km; Bus - 1,500 km.

From the above statistics prepare an operating cost sheet in summary from for the three vehicles.

Solution:

Statement of Operating Cost

Particulars	Lorry A		Lorry B		Bus	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Fixed Expenses						
Depreciation	330		220		350	
Supervision	210		210		210	
Road and other taxes	40		40		30	
Other Overheads	35	615	40		20	
				510		610
Maintenance Cost						
Repairs	150		150		100	
Carriage overhead	260		220		150	
		410		370		250
Operating Cost						
Drivers Salaries	330		345		360	
Cleaner's salaries	360		360		180	
Petrol	940		980		620	
Oil	150		150		100	
		1,780		1,835		1,260
Total Cost		2,805		£715		2,120
Ton km. / Passenger km.		16,000		28,800	37,500	
Cost per ton km.		0.175		0.094	0.056	
Passenger km..		(17.5paise)		(9.4 paise)	(5.6 paise).	

Illustration: 4

Ramakrishna owns a luxuary bus, which runs from Bangalore to Chittoor and back for 10 days in a month. The distance from Bangalore to Chittoor is 200 kms. The bus completes the trip from Bangalore to Chittoor on the same day. The bus goes another 10 days in a month towards Mysore. The distance from Bangalore to Mysore is 130 kms. The trip also completes the same day. For the rest 4 days of its operation in a month it runs in the local city. The daily distance in the local city is 70 kms. Calculate the rate that Ramakrishna should charge per

passenger when he wants to earn a profit of 25% of his takings. The other information is given below.

	Rs.
Cost, of Bus	Rs .50,000
Depreciation rate (per annum)	15%
Salary of Driver (per month)	500
Salary of Conductor .(per month)	500
Salary to part time Accountant (per month)	250
Insurance (per year)	1,800
Diesel consumption 6 km-per-litre costing	1.50
Token tax (per annum)	800
Lubricant oil (per 100 km)	20
Repairs and main tenable (per month)	1,000
Permit fees (per month) ..	560
Normal Capacity (persons)	.50

The bus is generally 60% of the capacity when it goes to Chittoor and 80% when it goes to Mysore. It is always full when it runs within the city. The passenger tax is 25% of the net takings.

Solution:

Operating Cost Statement

Particulars	Per month Rs.	
Fixed Charges		
Depreciation	1,875	
Salary to Driver	500	
Salary to" Conductor	500	
Salary to part time Accountant	250	
Insurance	150	
Token Tax	67	
Repairs and maintenance	1,000	
Permit fees	560	
		4,902
Variable Charges		
Diesel	1,720	
Lubricant Oil	1,376	
		3,096
Total cost for the month		7,998
Add: Profit 25% on takings (or 33i/3% on		2,666
Total Net takings		10,664
Add: Passenger tax 25% takings		2,666
Total cost		3,330

Total passenger kilometers 2.98,000

Rate per passanger km $\frac{13,330}{2,98,000}$ = Re. 0.045 (4.5 paise)

Charge per passenger

Chittoor trip 200km & 0.045 = Rs. 9.00

Mysore trip -130 km @ 0.045 = Rs. 5.85

Total Distance

Bangalore to Chittoor	=	10 Days x200 km x 2	4.000
Bangalore to Mysore	=	10 days x 120 km x 2	2,600
Local 4 days	=	4 days x 70 km	200
			6,800

$$\text{Diesel} = \frac{\text{TotalKms}}{\text{Kmperlitre}} \times \text{Costperlitre}$$

$$= \frac{6,880}{6} \times 1`.50 = \text{Rs. } 1.720$$

$$\text{Lubricant off} = \frac{20}{100} \times 6.880 = Rs.1.376$$

Calculation of passenger Kilometers

Bangalore to Chittor

$$10 \text{ days} \times 200 \text{ km} \times 2 \times 50 \text{ persons} \times \frac{20}{100} = 1,80,000$$

Balgalore to Mysore

$$10 \text{ days} \times 200 \text{ km} \times 2 \times 50 \text{ persons} \times \frac{20}{100} = 1,04,000$$

Local 4 days x 70 km x 50 persons = 14,000

2,98,000

Illustration: 5

Iron ore is transported from two mines A and B and unloaded at plots in a railway station. 'A' is at a distance of 10 kms and 'B' is at a distance of 15 kms from the railway station. A fleet of lorries of 5 tonne carrying capacity is used for transport of ore from the mines. Records reveal that the lorries average; a speed of 30 kms. per hour when running and regularly take 10 minutes to unload at railhead. At mine 'A' loading time average 30 minutes per load while at mine 'B' loading time average 30 minutes per load.

Driver's wages, depreciation, insurance and taxes are found to cost Rs.9 per hour overhead. Fuel, oil, tyres repairs and maintenance cost Rs.1.20 per km; Draw up a statement showing the cost per ton-km of carrying iron ore form each machine;

Solution:

Operating Cost Statement

	Mines A		Mines B	
Distance (km)	10		15	
Tonne - kms (5x10 and 5 x 15)	50		75	
Time involved per trip (mts)				
Loading	30		20	
Unloading	10		10	
Running (including empty return)				
(20 x 2 and 30 x 2)	40		60	
		80		90
Costs		Rs.		Rs.
Drivers wages Depreciation $\frac{80}{60}$x9 and $\frac{90}{60}$x9		12		13.5
Fuel		24		36
Oil (20 km x 1.20 and 30 km x 1.20)				
Tyre				

Repair & maintenance				
Total Cost		36		49.5
Cost per ton 3n - km		0.72		0.66

Illustration: 6

Janatha Transport Company has been given a route 20 KM long to run a bus. The bus costs of the company amounted to Rs. 5.00.000. It has been insured at 3% p.a. and the annual tax will amount to Rs. 10.000. Garage rent is Rs. 1,000 p.m. Annual Repairs will be Rs. 10,000 and the bus likely to lost for 5 years.

The driver's salary will be Rs. 1,500 p.m. and the conductor's salary will be Rs.1,000 p.m. in addition to 10% takings as commission (to be shared by the driver and conductor equally).

Cost of stationary will be Rs.500 p.m. Manager cum accountant salary Rs.3,500 p.m.

Petrol and oil will be Rs.250 per 10 km. The bus will make three round trips carrying, on an average, 40 passengers on each trip. The bus will run on an average 25 days in a month.

Assuming 15% profit on takings, calculate the bus fare to be charged from each passenger.

Solution:

Statement showing the Fare to be charged for a passenger km.

Particulars	Per annum	Per Month
Standing Charges	Rs.	Rs.
Insurance (3% of Rs. 5,00,000)	15,000	
Tax	10,000	
Garage rent	12,000	
Drivers salary	18,000	
Conductors salary	12,000	
Stationary	6,000	
Manager - cum - Accountant salary	42,000	
Variable Charges	1,15,000	9,583.33
Depreciation (5,00,000 ~ 5)	1.00,000	8,333.33
Repairs	10,000	833.34
Petrol & Oil		7.500.00
Total cost before commission		26,250.00
Add: Commission*		3,500.00
Add: Profit **		5,250.00
Total takings		35,000.00
Fare per passenger KM		29.16 paise or say 30 paise
Total takings 35,000 / Passenger Kms 1,20,000		

Note:

* The driver and conductor are entitled for a commission takings. Let us assume that the Takings = X

Commission © 10%= xx $\frac{10}{100} x 9$ and $\frac{x}{10}$

Profit to be charged 15% of taking =X x 15/100=15x/100

Total cast per month without commission = Rs. 26,250

Takings = Total cost without commission + Commission to driver and conductor

+ profit

$$x \quad 15x$$

Takings i.e., x = Rs. 26,250 +------- +---------

$$10 \quad 100$$

$x = 26,250 + 0.1 x + 0.15x$

$x = 26,280 + 0.25 x$

x -0.21x 26,250

$0.75 x = 26,250$

$X = \frac{26,250}{0.75} = 35,000$

Takings = Rs. 35,000 *

Commission @ 10% of takings = Rs. 3,500

** Profit 15% of takings = Rs. 5,250

Passenger kilometers, i.e., Total effective kilometer per month

-20 km x 2 (return trip) x 3 trips x 25 days x 40 passengers.

= 1,20,000 passenger kms. per month.

19.9 Operating Costing and Management Decisions

Whenever conveyance facilities of staff or in respect of carriage of goods are to be provided, management is required to take decisions on the basis of operating costs. When the total units do not change under different alternatives, the decision will be taken on the basis of unit operating cost i.e., lower the cost per unit the more profitable is the proposal and vice versa. Where units change from alternative to alternative, the decision will be taken on the basis of total operating cost.

19.10 Boiler - House Costing

A boiler house produces steam, which is used for power generation, air compression and air conditioning. The main purpose of Boiler house costing is to ascertain the cost of steam produced. Cost unit is in term of pound of steam. The costing department's accountants and the information given by the engineering department helps in ascertaining the cost of steam produced and used. The total cost given by monthly cost sheet divided by the pounds of team produced gives us the cost per unit.

Pro-forma of Boiler House Cost sheet

Cost sheet for the period of

Total Steam produced Total steam consumption.....

Previous year		Particulars	Current Year	
Total	Per 1000 lb		Total	Per 1000 lb
		a) Fixed Overheads		
		Rent, rates etc.		
		Depreciation		
		Insurance		
		Int. on capital etc.		
		b) Labour Charges		
		Wages of coal handlers and as removers etc.		
		c) Fuel Charges		
		Fuel handling		
		Electric Power		
		d) Water Charges		
		Water purchases		
		Water softening		
		e) Indirect Materials		
		Sundries		
		f) Maintenance Charges		
		Furnace Repairs		
		g) Supervision		
		Wages of foreman		
		Proportion of works Engineer's Salary General Labour etc.		

Illustration : 8

The following cost data pertaining to the year 2002-2003 are collected from the books of ABC Power Co Ltd. Prepare cost sheet showing, the cost of generation of power per unit of kwh. Total units generated -15,00,000.

Operating Labour	16,500
Plant Supervision	5,250
Lubricants and Supplies	10,500
Repairs and maintenance	21,000
Administration overheads	9,000
Capital cost	1,50,000

Coal consumed per kwh for the year is 1.5 lbs and the cost of coal delivered to the power station is Rs. 33.06 per metric tone. The depreciation rate chargeable is 4% per annum and the interest on capital is to be taken as 1% higher than the Reserve Bank rate' of 6% p.a.

Solution:

ABC Power Co Ltd.,

Cost Sheet for the year 2002-2003

Units generated-15.00,000

	Total	Per unit
	Rs.	Re.
Variable Cost		
* Coal - (1020.6 tonnes @ Rs. 33.06)	33,741	
Operation Labour	15,500	
Repair and maintenance	21,000	
Lubricant and suppliers	10,500	
	81,741	0.54
Fixed Cost		
Plant Supervision	5,250	
Depreciation (@ 4% on Rs. 1,50,000)	6.000	
interest on Capital (6 + 1 = 7% on Rs. 15,000)	10,500	
Administration overhead	9,000	
	30,750	0.21
Total Cost	1,12,491	0.75

Coal Consumed: At 1.5 lb. kwh.

15,00,000 x 1.5 = 22,50,000 lbs. 2204 lb make one ton.

Hence, 22,50,000 lb come to 1,021 tons. At Rs. 33.06 per ton, the cost of coal will be Rs. 33,741.

19.11 Canteen Costing

Many industrial undertakings run canteens within the factory premises and supply food at subsidised rates. Canteen operating cost statement is prepared to record the expenses under appropriate headings such as materials purchases, wages, and salaries, and other items of overhead for the current as well as the previous month. From the cost thus collected, the amount of subsidy is deducted, and the amount realised from sale is compared with the cost to find out the net operating profit or loss.

NOTES

Pro-forma of Canteen Operating Cost Statement

Canteen Operating Cost Sheet

Period : No. of Meals:

Particulars	Total Cost		Cost per meal	
	Current period	Previous	Current period	Previous period
Cost of material consumed Coffee Tea				
Milk				
Soft drinks				
Bread				
Wages and Salaries Supervisor Cooks				
Counter clerks				
Utensil cleaners				
Fuel and Power Coal				
Gas				
Electricity				
Lightening				
Steam				
Miscellaneous Maintenance				
Rent				
Insurance				
Total				
Less Subsidy				
Profit or Loss				

9.12 Hospital Costing

NOTES

Many organizations maintain hospital to provide effective and timely medical facilities to their workers. Main purpose of hospital costing is to ascertain the cost of providing medical services. Hospitals are divided into different departments on the basis of functions. Unit of cost is different for different department. For costing purposes the hospital service can be divided into the following categories.

1. Out - patient department

2. Wards

3. Medical service departments such as Radio - Therapy, Diagnostic, X-ray and pathology etc.,

4. General services, such as boiler house, power, heating, lighting, catering, laundering and administration.

5. Other service departments such as dispensary, transport clearing etc., Costs relating to category (5 are apportioned to first four departments. Cost for first three departments are ascertained separately using convenient units of cost which are given below: -

Out patient Department	- per patient attended
Wards	- per patient - bed per day.
X - ray department	- per 100 units weighted point value
Radiotherapy	- per course of treatment per day
Pathology	- per request test

Catering	-per person per day
Heating & Lighting	- per 1000 cubic feet.

For ascertaining cost figures a Hospital operating cost sheet is prepared. Normally it gives different expenses under two heads viz., standing expense and maintenance expense. Maintenance expenses concerned with running of an hospital are staff uniforms `patient clothing's drugs and dressing, medical and surgical appliances and equipments and laundry etc.,

Model Questions

1. Define Operating Costing. To what industries is this method of costing applicable?
2. Write short note on units used in Operating Costing.
3. What are main objects of transport costing? Describe briefly a system of operating costing which would you recommend for use by a passenger taxi service.
4. Draw up a Pro-forma cost sheet for a transport company showing distinctly the operational and maintenance costs.
5. Draw a Pro-forma cost statement for a canteen subsidised by the company, serving a firm of 1,500 employees. On what basis the canteen prices would be fixed.
6. Draw up a Pro-forma cost statement of a power house and insert imaginary figures.
7. Give the units of cost to be used for principal departments of hospital.
8. A bus runs between two points at a distance of 15 km. It is not on road for 5 days a month on an average. It runs 5 upward and downward journeys per day. Its capacity is 50 and an average 80% is full. The expenses are:

	Rs.
Driver's Salary p.m	300.00
Salary of conductors and cleaners p.m.	500.00
Petrol etc., p.m.	3,50,00
Cost	80.000.00
Estimated life	5 years
Insurance Taxes p.a.	3,000.00
Repairs and Renewals p.a.	4,000.00

From the above details calculate cost passenger per km.

(AnsRe. 0.041)

9. Mr. Jaidka owns fleet of taxis and the following information is available from the records maintained by him

Number of Taxis	- 10
Cost of each taxi	- Rs. 20,000
Salary of Manager	- Rs. 600 p.m.
Salary of Accountant	- Rs. 500 p.m.
Salary of Cleaner	- Rs. 200 p.m.
Salary of Mechanic	- Rs. 400 p.m.
Garage Rent	- Rs. 800 p.m.
Insurance premium,	- 5% p.a.
Annual Tax	- Rs. 600 per taxi
Driver's Salary	- Rs. 260 p.m. per taxi
Annual Repair	- Rs. 1,000 per taxi

Total life of a taxi is about is 2,00,000 km. A taxi runs in all 3,000 km in a month of which 30% it runs empty. Petrol consumption is one litre for 10 km at Rs. 1.80 per liter. Oil and other sundries are Rs. 500 per 100 km.

Calculate the cost of running a taxi per km. (Ans: Re. 0.779)

Lesson - 20

Cost Ledger Control Accounting

(Non - Integral Accounting)

20.1 Introduction:

Since cost accounting has developed as a separate branch of accounting, it has become essential that it should have separate accounting system of its own so that necessary information for cost ascertainment and cost analysis can be obtained. In some firms the cost accounts will be kept independently as financial accounts, In others, the cost accounts form part of the accounting system. Thus, there are two methods of keeping cost accounts. They are,

1. Non - integral or Cost control accounting and

2. Integral or Integrated accounting

Where cost and financial transactions are kept separately, the system is referred to as non-integral or cost ledger and control accounting. Where both financial and costing transactions are recorded in one set of books it is referred to as integral or integrated accounting. While non-integrated system of accounting necessitates reconciliation between financial and cost Recounts, no reconciliation between two sets of accounts is required under integrated accounting. The integrated accounting method is the more satisfactory because it avoids duplication of effort and reconciliation problems. However, both are in use under Non - Integrated Accounting System, there are separate sets of books for cost accounts and financial accounts. While cost accountant is responsible for recording cost ledgers, financial accountant is responsible for financial ledgers. The cost accountant must use a great deal of the information, which is also available to the financial accountant. E.g., Purchases day book, Expenses day book, Pay roll, Main journal, Sales day book etc., In addition, various abstracts and analyses are required for Materials requisitions / returns / transfers, time sheets, purchase analysis, expenses analysis, overhead distribution by cost centre, sales analysis, etc., The structure of the cost accounts will be framed according to the complexity of the business and will often include accounts for cost elements,

cost centre, overhead (works, selling and administration), job costs {Production, repairs, capital) and stock (raw material, component, finished goods.)

20.2 Cost Accounting Ledgers

The cost department is mainly concerned with the income and expenditure of the business and all nominal accounts like wages, salaries, rent etc., and to some extent the real accounts such as plant and machinery and buildings, to be maintained by the cost department. The cost department has nothing to do with personal accounts. The following are the ledgers, which are usually maintained by cost department.

1. Cost Ledger

This is the principal Ledger of costing department'. This ledger is similar to the General Ledger of the financial accounts. Separate accounts for each element of cost are opened such as Stores Control Account, Wages Control Account, Factory Overhead Control Account etc., In order to make cost ledger self - balanced, the General Ledger Adjustment Account is opened in the Genera! Ledger.

2. Stores Ledger

In this ledger ail accounts relating to different stores are maintained. This ledger shows therein the debits, the credits and stock balances against each item. In order to make this ledger self-balanced Stores Ledger Control Account is opened in the Cost Ledger.

3. Work - in - progress Ledger

The main object of this ledger is to record production and cost incurred thereon. In this ledger, separate accounts are opened for each job number, process, operation or 'department according to the nature of the industry. These separating accounts are debited with the expenses charged to each one of them under stores, wages, overheads etc; and are credited with the values transferred to the finished goods ledger as and when the production of a particular job or process is completed.

4. Finished goods Ledger

This is similar to the stores ledger and has an account for each item of finished product manufactured in the factory. The debits come through from the work - in - progress account; and the credit is through a transfer to the cost of sales account, i.e., the cost of the finished goods sold.

5. Overhead Ledger

This is a subsidiary ledger containing detailed accounts of various overheads viz., works overhead, selling overhead, Distribution overhead and Administration overhead. This ledger is controlled by the overhead control account in the principal ledger. The accounts in this ledger are arranged analytically, having regard to the, main functions of the business to the cost centres and to the different types of overhead cost.

It should be noted that the year-end balances in the stores ledger, work-in-progress ledger, and the finished goods ledger are the balances which ultimately figure in the profit and loss account and the balance sheet. As such, these ledgers are an important link between the cost accounts and the financial accounts.

20.3 Cost Ledger Control Accounts

It has been mentioned earlier that there are five important ledgers. The cost ledger is the principal ledger and other four ledgers are subsidiary ledgers. The cost ledger has control accounts for the purpose of controlling the subsidiary ledgers. Each control account represents a subsidiary ledger. The transactions, which are recorded in detail in individual accounts within the subsidiary ledger, are entered in summary form in the control account. The balance of the account should always equal the total balances of each individual accounts in the subsidiary ledger.

These control accounts aim at: (a) referring in total all accounts in cost ledger (b) enabling the financial ledger to be balanced independently of the cost ledger and (c) the balance on the cost ledger control account must be equal to the net balance in the cost ledger as a whole.

The cost ledger maintained by the cost department will include the following control accounts -

1) Cost Ledger Control Account

This account is also known as Financial Ledger Control Account or General Ledger Adjustments Account. This account is opened with the main object of completing the double entry in the cost ledger. All receipts on account of sales and other credit items given in the financial books are debited to this account and transactions related to materials purchases, miscellaneous expenses and wages and salaries are credited to this Accountant. In short transactions, which appear in financial accounts, must be entered into this account. That is why, transfer from stores ledger control account to work - in - progress control account, transfer from work in progress control account to finished goods control account - which have no financial implications, will not appear in the Cost Ledger Control Account The balance of this account at the end of a particular period represents the total of all balances of impersonal accounts.

2) Stores Ledger Control Account

This account is debited for purchase of materials and credited for issue of materials. The balance of this account indicates the total balance of stores, which should agree with aggregate of balances of individual account in the stores ledger Entries are recorded on the basis of Goods Receipt Notes and Stories Requisition Notes.

3) Work - in - Progress Ledger Control Account

This account is debited with cost of production i.e., direct material, direct labour, direct expenses and production overhead recovered. This account is credited with the value of finished, goods completed and transferred. The balance of this account will show total balances of job / works in progress as per various individual job accounts.

4) Finished Goods Control Account

This account is debited with the value of goods transferred from Work in progress account. Administration overhead recovered is also debited to this account. This account is credited with cost of sales account. The balance of this account will represent the value of goods lying at hand.

5) Wages Control Account

To this account total wages paid, (direct and indirect) will be debited. Direct wages will then be transferred *to* Work in Progress Account and indirect wages to Productions overhead, or Administrative overhead or Selling and Distribution overhead Account as the case may be.

6) Productions / Works / Manufacturing overhead Account

Production indirect costs, such as indirect material, labour and expenses are debited to this account. This account is credited with the amount of overhead recovered. Any balance of this account represents balance of under or over absorbed overhead which is transferred to Overheads Adjustment Account.

7) Administration Overhead Account

This account is debited with administration overhead incurred. Administration overhead recovered is credited to this account and debited to Finished Goods Ledger Control Account. Any balance in this account represents over / under absorbed administration overhead which is transferred to Overheads Adjustment Account.

8) Selling and Distribution Overhead Account

This account is debited with cost of goods sold. Difference, if any, is transferred to Overheads Adjustment Account.

9) Cost of Sales Account

This account is debited with cost of goods sold and selling and distribution

overhead recovered. This account will then be transferred to Sales Account or to Costing Profit and Loss Account.

10) Costing Profit and Loss Account

This account is debited with cost of goods sold, under absorbed overhead and abnormal, losses. This account is credited with sales value, over absorbed overhead and abnormal gains. The balance of this account shows profit or loss as per cost books, which is reconciled with financial profit and loss account. If there is profit, Costing Profit and Loss Account is credited and General Ledger Adjustment Account is debited. If there is loss, Costing Profit and Loss Account is credited and General Ledger Adjustment Account is debated.

20.4 Journal Entries in Cost Ledger.

While operating cost control accounts in the cost books, the principles of double entry book - keeping system are to be followed. The different accounting entries may be summarised as follows.

I) Accounting Entries for Material

Transactions relating to purchase for material and purchases returns are journalized both in cost ledger and financial ledger. Other internal transactions are journalized in cost ledger only.

1. When materials are purchased:

Stores Ledger Control A/c	.....	Dr.
or		
Material Control A/c	.....	Dr.
To General Ledger Adjustment A/c		

2. When materials are purchased for a special job:

Work-in - progress Ledger Control A/c ...		Dr
To General Ledger Adjustment A/c	-	

3. When materials are returned to suppliers

General Ledger Adjustment A/c .... Dr.

To Stores Ledger Control A/c

4. When materials are issued to production

Work - in - progress Ledger Control A/c .... Dr.

To Stores Ledger Control A/c

5. Issue of indirect materials to production

Production overheads A/c -... Dr.

To Stores Ledger Control A/c

6. Materials returned from production to stores

Stores Ledger Control A/c . .. Dr.

To Work - in - progress A/c

7. When materials are transferred from one job to another job

Job No.1 A/c Dr.

To Job No.2 A/c

II) Entries Relating to Labour

1. When gross wages are paid

Wages Control A/c .... Dr.

To General Ledger Adjustment A/c

2. When direct wages are identified

Work - in - progress control A/c .... Dr.

To wages control A/c

3. When indirect labour expenses relating to production administration and selling and distribution are transferred

Production Overheads Control A/c .... Dr.

Administration Overheads Control A/c .... Dr.

Selling & Distribution Overheads Control A/c Dr.

To Wages control A/c.

III) Entries rotating to overheads

1. When indirect expenses are incurred

Production Overheads Control A/c . . Dr.

Administration Overheads Control A/c . Dr.

Selling and Distribution Overheads Control A/c Dr

To General Ledger Adjustment A/c

2. When production overheads are absorbed by production

Work - in - progress Ledger Control A/c .... Dr.

To Production Overheads Control A/c

3. When there is difference between the Overheads incurred and Overheads absorbed.

a) In the ease of over - absorption

Production Overhead A/c ... Dr.

To Overheads Adjustment A/c

b) In the case of under-absorption

Overhead Adjustment A/c .... Dr.

To Production Overhead A/c

4. When administration overheads are absorbed by production of finished goods

Finished Goods Ledger Control A/c ... Dr.

To Administration Overheads Control A/c

5. If there is a difference between administration overhead absorbed and overhead incurred.

a) In the case of over-absorption

Administrative Overhead A/c .... Dr.

To Overheads Adjustment A/c

b) In the case of under-absorption

Overheads Adjustment A/c .... Dr.

To Administrative Overhead A/c

6. When selling and distribution overheads are recovered on goods sold

Cost of- sales A/c .... Dr.

To Selling and distribution overheads control A/c

7. When there is over or under absorptions of selling and distribution overheads

a) In the case of over - absorption

Selling and Distribution overheads A/c. . . . Dr.

To Overheads Adjustment A/c

b) In the case of under - absorption

Overheads Adjustment A/c ...: Dr.

To selling and distribution overheads A/c

8. The balance in the Overhead Adjustment A/c is transferred to Costing Profit and Loss Account.

IV. When Improvements are made to assets by Company's own workers

Capital Order A/c .... Dr.

To Work in progress Ledger Control A/c

V. When at the end of the year the asset is transferred from Cost Account to Financial Account

General Ledger Adjustment A/c .... Dr.

To Capital Order A/c

VI. When special repairs and maintenance work is done by the factory workers themselves

Special Repairs and Maintenance A/c .... Dr.

To Work-in-progress Ledger Control A/c

VII. At the end when special repairs and maintenance accounts are closed

Production Overheads A/c ... Dr.

Administration Overheads Control A/c .... Dr.

Selling and Distribution Overheads A/c .... Dr

To Special Repairs and Maintenance A/c.

Illustration -1

The AB Company has the following balances in its cost ledger on 1.1.2003

	Rs.	Rs.
Work in Progress Account	4,000	
Finished Goods Account	3,000	
Stores Control Account	4,250	
Cost Ledger Control Account		11,250
	11.250	11,250

Transactions for the year-ended 31st December 2003 were:

	Rs.
Wages - Direct	21,800
Wages - Indirect	1,200
Stores issued to production	25,000'
Stores purchased	24,000
Stores issued to repair orders	500
Goods finished in the period at Cost	50.000
Goods sold in the period at sales vaiue	70,000
at cost	51,000
Works overhead costs recovered	10,000.
Administration costs	2,500
Selling & Distribution costs	3,000
Works overhead Costs	8,400

Write up the accounts in the cost ledger and take out a trial balance. The administration costs are to be written off to the profit and loss account.

Solution:

Cost Ledger of AB Co., LTD

Work - In - Progress A/c

Dr. Cr.

2003		Rs..	2003		Rs.
	To Balance b/d	4,000	Dec 31	Finished Goods a/c	50,000
Jan 1	To wages control a/c	21,800		By Balance c/d	10,800
	To Stores control a/c	25,000			
	To Works overhead control a/c	10,000			
2004	To balance b/d	60,800			60,800
Jan1		10,800			

Finished Goods A/c

2003		Rs.	2003		Rs.
	To balance b/d	3,000	Dec 30	By cost of sales a/c	53,500
Jan 1	To work in progress	50,000			
Dec 31	To Administration cost A/c	2,500		By Balance c/d	2,000
		55,500			55,500
2004					
1991 Jan	To Balance b/d	2,000			

Stores control A/c

2003		Rs.	2003		Rs,
Jan 1	To Balance b/d	4,250	Dec. 31	By work in progress a/c	25,000
Dec 31	To Cost Ledger Control a/c	24,000		By Works overhead control A/c	500
				By Balance c/d	2,750
		28,250			28.250
2004 Jan 1		2,750			

Selling and Distribution Cost A/c

2003		Rs.	2003		Rs.
Dec 31	To Cost Ledger Control a/c	3,000	Dec 31	By Cost of sales a/c	3,000
		3,000			3,000

Wages Control A/c

2003		Rs.	2003		
Dec 31	To cost ledger control a/c	23,000	Dec. 31	By work in progress	21,800
				By works overhead control a/c	1,200
		23,000			23,000

Works Overheads Control A/c

2003		Rs.	2003		Rs,
Dec. 31	To Cost Ledger Control a/c	8,400	Dec. 31	By Work in progress a/c	10,000
	To Wages control a/c	1,200		By Overhead Adjustment a/c	100
	To Stores Control a/c	500			
		10,100			10,100

Cost of Sales A/c

2003		Rs.	2003		Rs.
Dec. 31	To Finished goods a/c	53,500	Dec. 31	By Cost Ledger control a/c	70,000
	To Selling and Distribution cost a/c	3,000			

	To Costing P & L a/c	70,000		70,000

Administration Cost A/c

2003	To cost ledger control a/c	Rs.	**2003**	By Finished goods a/c	Rs.
Dec.31		2,500	**Dec. 31**		2,50
		2,500			2,500

Cost Ledger control A/c

		Rs.			Rs.
2003			**2003**		
Dec.3	To cost of sales a/c	70,000		By balance b/d	11,250
	To Balance c/d	15,550	Jan. 1	By Wages control a/c	23,000
			Dec. 31	By Stores Control a/c	24,000
				By Administration cost a/c	2,500
				By Selling and Distribution cost a/c	3,000
				By Works overhead control a/c	8,400
				By Profit and Loss a/c	13,400
		85,550			85,550
			2004		
			Jan. 1	By Balance b/d	15,550

Costing Profit and Loss A/c

2003	To overhead Adjustment a/c To Cost Ledger Control a/c	Rs.	2003	By Cost of sales a/c	Rs.
Dec. 31		100	Dec-31		13,500
		13,400			
		13,500			13,500

Overhead Adjustment A/c

2003	To works overhead control a/c	Rs.	2003	By Costing profit and loss a/c	Rs.
Dec. 31		100	Dec. 31		100
		100			100

Trial Balance of AB Co., Ltd., as on 31.12.2003

	Dr.	Cr.
	Rs.	Rs.
Work in Progress A/c	10.800	
Finished Goods A/c	2,000	
Stores Control A/c	2,750	
Cost Ledger Control,A/c		- 15,550
	15,550	15,550

Illustration: 2

The following information was available in respect of Hema Manufacturing Co., for year ended 31st December 2003.

	Rs.	Rs.
Stores on hand	3,200	4,506
Stock of finished goods	4,870	5,124
Work in progress	6,200	4,962
Purchases		15,000
Carriage inwards		226
Stores issued		13,800
Wages - Direct Labour		13,320
Wages - Indirect Labour		4,680
Works Expenses - including rent, power etc.,		13,400
Repairs to materials in store		120
Cost of completed production		49,254
Cost of finished goods sold		49,000
Selling expenses.		1,134
Office and Administration Expenses		2.650

The cost journal shows that Rs.18,266 and Rs.2,630 were allocated to Work-in-progress in respect of works overheads and office overheads respectively. You are required to show how the above transaction would be recorded in the various Cost Ledger Accounts and to extract a Trial balance as at December, 2003.

Solution

Cost Ledger Control Account

	Rs.		Rs.
To balance c/d	64,800	By balance c/d	14,270
		By Stores Ledger control a/c (15,000 + 226+ 120)	15.346
		By Wages control a/c (13,320 + 4,680)	18,000
		By Works Expenses	13,400
		By Office and administration expenses a/c	2.650
			1,134
	64,800		64,800
			64,800

*This is the total of opening balances of stores finished goods and Work -in progress.

Stores Ledger Control A/c

		Rs.		Rs.
To balance b/d		3,200	By Work in progress a/c	
To General Ledger Control A/c		15,346	By works overhead wastage By balance c/d	13,800
Purchase	15,000			240
Carriage inwards	226			
Repairs to materials	120			4,506
		18,546		18,546
To balance b/d		4,506		

Works Overhead A/c

To General Ledger Control a/c	Rs. 13,400		Rs.
To Stores Ledger Control a/c	240	By Works in progress a/c	18,266
	4,680 .		
To Wages Control a/c (Indirect Labour)		By Overhead Adjustment a/c	54
	18,320.		18.320

Wages Control *Ale*

To General Control Ledger a/c	Rs.	By Work in progress a/c	Rs. 13,320
Direct Labour 13,320		By Works overhead a/c	4,680
Indirect Labour 4,580	18,000		
	18,000		18,000

Office and Administration Overhead A/c

Rs Rs.

To General Ledger Control a/c	.2,650	By Finished goods a/c	2.630
		By Overhead Adjustment a/c	20
	2,650		2,650

Selling Expenses A/c

To General Ledger Control a/c	Rs, 1,134	By Cost of Sales a/c	Rs. 1.134

Work in Progress A/c

	Rs.		Rs.
To Balance b/d	6,200	By finished goods a/c	46,624
To Stores ledger control a/c	13.800	By Balance c/d	4,962
To Wages control a/c	13,320		
To Works overhead a/c {Balancing figures)	18,266		
	51,586		51,586
To balance b/d	4,962		

Finished Stock a/c

	Rs.		Rs.
To Balance b/d		By Cost of sales a/c	49,000
To Work in progress a/c	4,870		
		By Balance c/d	5,124
To Office and Administration Overfiead.a/c	46,624		
	2.630		
	54,124		54,124 .
To Balance b/d	5,124		

Cost of Sales A/c

	Rs.		Rs..
To Selling Expenses a/c		By balance c/d	50,134
	1,134		
To finished stock a/c			
	49,000		
	50,134		50,134
To balance b/d	50.134		

Overheads Adjustment A/c

	Rs.		Rs.
To Works overhead a/c	54	By balance c/d	74
To office and administration a/c	20		
	74		74
To Balance b/d	74		

Trial Balance

	Dr. Rs.	Cr. Rs.
General Ledger Control A/c		64,800
Stores Ledger Control A/c '	4,506	
Work in progress a/c	4,962	
Finished stock a/c	5,124	
Cost of sales a/c	50,134	
Overheads Adjustment a/c	74	
	64,800	64,800

Illustration: 3

The following balances have been extracted from the books of M/s Jeyanth Ltd., as at 1.1.2003.

General Ledger Adjustment a/c	-		81,228
Stores Ledger Control a/c	-	40,852	
Work in p.rogress Ledger Control a/c	-	9,690	
Finished Goods Ledger Control a/c	-	30,686	
		81,228	81,228

The summary of transactions during the year 2003 is as follows.

	Rs.
Stores purchased for stock	2,51,846
Purchases against specific jobs	28,402
Stores returned to suppliers	22.187
Stores issued - Direct materials	1,80,642
Stores issued - Indirect materials	65,813
Wages to Direct work	1,42,682
Wages to Indirect work	41,841
Salaries to sales office staff	31,832

Warehouse salaries	26,419
Head Office Salaries	8,100
Work Overhead Expenses	1,28,132
Sales Office and show room expenses	61,432
Warehouse and Delivery Expenses.	48,919
Head office expenses	28,602
Overhead absorbed in costs - Works	2,22,690
Overhead absorbed in costs - Selling	90,742
Overhead absorbed in costs - Distribution	79,108
Overhead absorbed in costs - Administration	35,819
Cost of finished goods produced during the year	5,78,412
Value of finished goods sold (at cost)	6,13,826
Value of finished goods sold (at selling price}	8,45,400

You are required to enter these transactions in the accounts of the cost ledger.

COST LEDGER General Ledger Adjustment A/c

	Rs.		Rs.
To. Stores Ledger Control a/c	22,187	By Balance b/d	81,228
To sales a/c	8,45,400	By Stores ledger control a/c	2,51,846
To balance c/d	60,841	By Work in progress ledger	28,402
		By Wages control a/c.	2,50,874
		By Works overhead control a/c.	1,28,832
		By Selling overhead control a/c	61,432
		By Distribution overhead control	48,919
		By Administration overhead control	28,802
		By Costing P & L A/c	48,293
	9,28,428		9,28,428
		By Balance b/d	60,841

Stores Ledger Control A/c

	Rs.		Rs.
To balance b/d	40.852	By General Ledger Adjustment a/c	22,187
To General Ledger Adjustment A/c	2,51.846	By Working in progress Ledger - control a/c	1.80,642
		By Works Overhead Control a/c	65,813
		By Balance c/d	24,056
	2,92.698		2,92,698
To balance b/d	24,056		

Wages Control A/c

To General Ledger Adjustment a/c	Rs. 2,50,874	By Work In progress ledger control a/c	Rs. 1,42,682
		By Works overhead control a/c	41,841
		By Selling overhead control a/c	31,832
		By Distribution overhead control a/c	26,419
		By Administration overhead control a/c	8.100
	2,50,874		2,50,874

Works Overhead Control A/c

To General Ledger Adjustment a/c	Rs. 1,28,832	By Work in progress Ledger control a/c	Rs. 2,22,690
To Stores Ledger Control a/c	65,813	By Overhead Adjustment under absorption	13,796
To wages ledger control a/c	41,841		
	2,36,486		2.36,486

Selling Overhead Control A/c

To General Ledger Adjustment a/c	Rs. 61,432 31,832	By Cost of Sales a/c	Rs. 90.742
	93.264	By Overhead Adjustment a/c	93.264

Distribution Overheads Control A/c

	Rs.		Rs.
To general Ledger Adjustment a/c	48,919	By cost of sales a/c	79,108
To wages control a/c	26,419		
To overheads adjustment a/c	3,770		
	79,108		79,108

Admission Overhead control A/c

	Rs.		Rs.
To general ledger adjustment a/c	28.602	By finished goods ledger control a/c	35,819
To wages control a/c	8.100	By Overhead Adjustment a/c	883
	36,702		36,702

Work Progress Ledger Control A/c

To balance b/d	Rs.		Rs.
To General Ledger Adjustment a/c	9,690	By finished goods control a/c	5.78,412
To Stores Ledger Control a/c	28,402	By balance c/d	5,694
To Wages Control a/c	1,80,642		
To Works Overhead Control a/c	1,42.682		
	2,22.6.90		
	5,84,106		5,84,106
To Balance b/d	5.694		

Finished Goods Ledger Control A/c

To balance b/d	Rs. 30,686		Rs.
To Administration overhead	35.819	By cost of sales a/c	6,13.826
control a/c	5,78,412	By balance c/d •	31.091
To Work in progress Ledger			
	6,44,917		6.44,917
To balance b/d	31,091		

Cost of Sales A/c

	Rs.		Rs,
To Selling overhead control a/c	90,742	By Costing P & L a/c	7,83,676
To Distribution overhead control a/c	79,108		
To finished goods ledger control a/c	6,13,826		
	7,83,676		7,83,676

Overhead Adjustment A/c

	Rs.		Rs.
To Works overhead control a/c	13,796	By Distribution control a/c	3,770
To Selling overhead control a/c	2,522		
To Administration overhead control a/c	883	By balance c/d	13,431
	17,201		17,201
To balance b/d.....	13,431		

Costing Profit & Loss Account

	Rs.		Rs.
To Cost of Sates a/c	7,83,676	By Sales	8,45,400
To Overhead adjustment a/c	13,431		
To General Ledger Adjustment (Profit)	48,293		
	8,45,400		8,45,400

Trial Balance as at 31.12.2003

	Rs.	Rs.
General Ledger Adjustment A/c		60,841
Stores Ledger Control A/c	24,056	
Work in Progress A/c	5,694	
Finished goods A/c	31,091	
	60,841	60,841

Model Questions

1. Define Cost Control Accounts and give examples. What purpose do control accounts serve? What accounts would you institute and from what sources would the entry be derived?

2. "Control accounts are maintained on the basis of Self Balancing Ledger System". Do you agree, justify by explaining how control accounts are kept in cost accounts.

3. The Modern Co. Ltd., has the following balances in its Cost Ledger on 1st April, 2003:

	Rs.
Stores Ledger Control Account	18,000
Work in progress Control Account	15,000
Finished Goods Control Account	20,000
	53,000

The transactions for the six months ended 30th September 1990 are:

	Rs.
Wages paid, Direct	80,000
Indirect (production)	10,000
Stores Purchased	1,00,000
Purchase issued to production	1,07,000
Production indirect expenses	5,000
Production overhead recovered	10,000

Goods finished during the period	2,00,000
Finished goods sold (at cost)	2,10,000
Sales	2,87,000

Write up the necessary accounts in the Cost Ledger to record the above transactions. Also take out a Trial Balance as at 30th September 1990.

(Ans: Total of T/B Rs. 72,000; under absorption has been transferred to costing P & L A/c)

4. From the following information, prepare Work in Progress Control Account, Cost of Sales Account and Costing Profit and Loss Account.

Cost Ledger Control Account

	Rs.
Opening Balance:	
Work in progress	3,800
Materials	22,000
Finished stock	17,000

		42,800
Materials Purchased		58,000
Direct labour wages		21,000
Electricity charges		27,000
Factory overhead expenses incurred		26,000
Factory overhead expenses applied to production		28,000
Selling, distribution and administration expenses charged to finished stock sold		29,000
Sales		1,86,000
Closing Balance:		
Work in progress	2,500	
Materials	15,000	
Finished stock .	32,000	49,500

(Hints - Materials issued = opening stock + purchases - closing stock

NOTES

Integrated Accounting:

It is a set of accounting records which provides both financial and cost accounts using a common input data for all accounting purposes.

Lesson - 21

Integrated Accounting

21.1 Introduction:-

Integrated or integral accounting is single accounting system whereby cost and financial accounts are kept in the same of books. However, more than one ledger may be maintained in practice for the sake of convenience. Even then, all the accounts constitute parts of one set. this naturally eliminates duplication of entries for cost and financial accounting.

ICMA, London defines integral accounting system as "a set of single accounts, which provides both financial, and management accounting information."

The Institute of Charted Accountants of India defines "integrated accounts as "a single system of double entry book - keeping, which combines both cost and financial accounts".

21.2 Objectives

The Institute of Charted Accountants of India in their bulletin assumes the basic objectives of integral accounting system up "Integrated system of Cost and Financial Accounts" as under:

1. To determine how much money is being earned or loss during each month/quarter, year, not only in aggregate, but also by job, product, product group or services rendered.

2. To provide for adequate control over inventories, to ensure their accuracy, to minimise wastages and to keep to the optimum volume of inventory carried.

3. To provide for the control of fixed assets to replacement, insurance, and tax purposes and over all other assets to maxim, s their utility; and

4. To determine the degree of performance for each operating and operating department in the enterprise and for the enterprise as a whole.

21.3 Difference between Cost Ledger Control Accounts and Integrated Accounts System

Under integral accounting system only one set of accounts is maintained. It is distinct from cost control accounting system since under cost control accounting two separate sets of books of accounts are maintained.

Under non-integrated accounting system, control accounts are maintained so as to provide a link between the financial and cost accounting records. Except for the control accounts, the books are maintained for financial and cost records, are independent of each other. So there is a need for reconciliation of cost and financial accounts. Under integral system there is no need to reconcile two sets of account since it eliminates the duplication of entries and the maintenance of unnecessary accounts. .

Under the integral system of accounts all transactions are entered in one set of books and only one profit and loss account for financial and costing purpose is prepared. Integrated accounts can be more economically maintained because this system minimise the clerical work and save considerable expenditure of time and effort. But the integrated system is difficult to organize in large manufacturing enterprises. A separate costing department with non-integrated accounts is often necessary to set up in large concerns due to the significance of cost records for management control and decision making purposes.

21.4 Requisites of good integral accounting system:

The accounting system introduced must be able to collect accurate accounting information and present these in proper perspective. The accuracy here does not mean the arithmetical accuracy but means that all transactions are properly recorded, classified and summarised and the final statements reflect the 'true and fair' state of the business.

b) The accounting system should present data timely, speedily and promptly.

c) The accounting system must provide for effective internal control

d) The cot of installation and operation of the accounting system should commensurate with the result.

21.5 Essential Features of Integrated System

1. The extent of integration must be decided well in advance. Some firms may like to integrate up to the stage of prima cost or factory cost while the other firms may integrate the whole of the records.

2. The integrated system records, besides internal costing trans actions, other financial items not normally required for cost accounting. Accounts for capital expenditure, sundry creditors and debtors, share capital, cash and bank transactions, and prepayments and accruals are opened.

3. Store transactions are recorded in the Stores Control Account. The cost of stores purchased is debited to the Stores Control Account and credit is given to Cash or Sundry Creditors Account. Correspondingly materials issued are debited to the Work - in - Progress Account and credited to the Stores Control Account. Indirect materials issued are debited to the relevant overhead accounts.

4. Wages paid are debited to the Wages Control Account and credited to Cash or Bank Account. The work in progress accounts are debited with the amount of direct wages and the overhead accounts are debited with the wages paid to indirect labour, the corresponding credit entries being made in wages control accounts,

5. As and when overhead expenses are incurred, they are debited to the Factory, Office and Administrative and Selling and Distribution Overhead Accounts. The amount of expenses involved is credited to Cash or Bank Accounts. The work in progress account is debited with the applied overhead charges and the

Factory overhead and Office overhead accounts are credited with the same. The selling and Distribution overheads are charged to the Profit and Loss Account.

6. The debit balances of the Work - in - Progress Accounts are transferred to the Finished Stock Control Account on competition of production. This represents the cost of goods produced and held in stock. The cost of goods sold Is transferred to the Profit and Loss Account, unsold stock being shown as a debit balance in the Finished Stock Control Account.

7. The balances of the personal and real accounts and those relating to assets and liabilities appear with yearend balances as under the financia[1] system of accounting.

8. All accruals are debited and advance payments are credited to the respective[1], control accounts by contra entries in the actual and prepayment accounts.

9. Sometimes a separate 'Cost Control Account' is opened to record cost transactions. In this case all the transactions relating to the material issued, wages and overhead are entered in the Cost Control Account. At the end of the period totals of Cost Control Account are posted to the Work - in - Progress Account.

21.6 Advantages of Integral Accounting

1. The need for separate sets for financial and cost accounts ledgers does not exist and the necessity for reconciliation between the two is obviated. This saves the clerical expenditure.

2. The cost data provided by integrated accounts are more reliable as there is automatic check on the correctness of records in a single set of books.

3. Farmer accounts and records are required, and duplication in accounting and analysis is avoided. So it is more economical.

4. Cost data can be obtained more promptly under the integral system as cost records are made directly from the books of original entry.

5. As it involves centralization of accounts management, there is considerable scope for greater economy as well as better co-ordination of activities than in the non-integrated accounting system.

6. Integral system offers an additional advantage from the psychological point of view. It shows the complementary status of cost and financial accounting, which need not be considered, as two separate watertight compartments.

7. In integral accounting, there is no need to open a cost ledger control account because it is possible to post each transaction on double entry basis without necessary for opening a balancing system.

8. Integrated accounts facilitate mechanisation of the accounting procedure.

9. The knowledge of financial and cost accounting may be pooled together.

10. Integrated accounting widens the outlook of the accountant and his staff who are placed in a better position to appropriate the entire accounting system.

21.7 Journal Entries Under Integral System

The entries to be passed for various transactions under integral system are summarised below.

Transactions	Journal ,Entries
1. Material Purchased: a) For Stock	Stores Control A/c Dr. To Sundry Creditors A/c or Cash A/c or Bank A/c

b) For Job	Work in Progress A/c Dr. To Sundry Creditors A/c or Cash A/c or Bank A/c
2. Materials Issued: a) Direct Material b) Indirect Material	Work-in-progress A/c Dr. To Stores Control A/c Relevant Overhead A/c Dr. To Stores Control A/c
3. Material returned from shop floor	Stores Control A/c Dr. To Work - in - Progress A/c,
4. Material Returned to supplier	Creditors A/c Dr. To Stores Control A/c
5. Material transferred from one job to another job	Transferee Job A/c Dr. To Transferor Job A/c
6. Salary and Wages paid Direct and Indirect	Wages Control A/c Dr. To Cash A/c or Bank A/c
7. Wages charged a) Direct	Work - in - Progress A/c Dr. To wages Control A/c
b) Indirect	Relevant Overhead A/c Dr. To wages Control A/c
8. Direct Expenses	Work - in • Progress A/c Dr. To Cash A/c
9. Overhead incurred	Relevant Overhead A/c Dr. To Cash A/c

10. Overhead Recovered	Work - in - Progress A/c Dr. (For production overhead recovered) Finished Stock A/c Dr. (For administration overhead recovered) Cost of Sales A/c Dr. (For selling and distribution overhead recovered) To Relevant Overhead A/c
11. Overhead on work in progress	Work - in - Progress A/c ..... Dr. To Production overhead A/c
12. Finished goods produced	Finished goods A/c Dr. To work-in - progress A/c
13. Good sold (at cost)	Cost of Sales A/c Dr. To finished goods A/c
14. For Sales	Debtors A/c Dr. To Sales A/c
15. Sales Returned	Sales A/c Dr. To Debtors A/c
16. Capital Work	Sundry Assets A/c Dr. To work in progress A/c
17.. Repair Work	Relevant Overhead A/c Dr. To Work-in - Progress A/c
18. Under absorbed overhead	Profit and Loss A/c Dr. To Relevant over head :A/c
19. Over absorbed overhead	Relevant overhead A/c Dr. To Profit and Loss A/c

Illustration : 1

Following transactions took place in Bharat & Co- during the month of March 2003.

	Rs.
1. Raw material purchased on credit	40,000
2. Direct material issued to production	30,000
3. Direct wages paid (30% direct)	24,000
4. Manufacturing expenses incurred (cash)	16,800
5. Manufacturing overhead charged to production	16,000
6. Selling and Distribution Cost (cash)	4,000
7. Finished products at cost	40,000
8. Sales	58,000
9. Receipts from Debtor	13,800
10. Payments to creditor	22,000

You are required to journalise the above transactions presuming that integrated system of accounting is followed in followed in Bharat & Co.,

Solution:

BHARAT & CO., Journal

	Dr. Rs.	Cr. Rs-
1. Stores control A/c. Dr.	40,000	
To creditors A/c (Being raw material purchased on credit)		40,000
(Being raw material purchased on credit)		
2. Work - in - Progress A/c . . . . Dr.	30,000	
To Stores Control A/c		30,000
(Being the material issued to jobs)		
3. Wages A/c ..... Dr.	24,000	
To Cash A/c		24,000
(Being the entry for wages paid)		

4.	Work - In -Progress A/c .... Dr. Production Overhead A/c .... Dr. To wages A/c (Being the entry for direct arid indirect wages)	16,800 7,200	 24,000
5.	Production Overhead A/c Dr. To Cash A/c; (Being the production overhead incurred)	16,800	 16,800'
6.	Work in progress A/c Dr. To production overhead A/c (Being the overhead charges to production)	16,000	 16,000
7.	Selling and distribution overhead A/c. Dr. To ash A/c (Being selling and distribution expenss incurred)	4,000	4,000
8.	Finished goods A/c. Dr. To work in progress A/c (Being the cost of production of finished goods)	40,000	40,000
9.	Debtors A/c.... To Sales A/c (Being the amounded of sale)	58,000	58,000
10.	Bank A/c .... Dr. To Debtors A.c (Being the receipt from debtors	13,800	13,800
11.	Sundry creditors A/c. Dr. To cash A./c (Being the amount paid to creditore)	22,000	22,000

Illustration : 2

NOTES

ABC Company Ltd., has the following balances in its integrated ledger on 1.1.2003.

	Rs.
Share Capital	2,00,000
Reserves	50,000
Sundry Debtors	40,000
Plant and Machinery	2,50,000
Sundry creditors	60,000
Bank overdraft	80,000
Raw materials	1,00,000

Transactions during the year ended 31.12-2003 we're as follows:

	Rs.
Raw materials purchased on credit	1,60,000
Raw materials issued to production	2.00,000
Raw materials on hand	52,000
Direct wages - incurred	1,90,000
Charged to production	1,86,000
Manufacturing expenses -incurred	1,75,000
Charged to production	1,86,000
Selling and Distribution expenses	20.000
Finished Stock production (at cost)	3,92.000
Sales (at selling price)	5,72,000
Payment to creditors	1,70,000
Receipts from Debtors	6.00,000

You are required to

a) Write up and close off the ledger accounts.

b) Prepare a trial balance of closing balances and

c) Prepare profit and loss account and a balance sheet.

Solution:

ABC Co., LTD.

a) Integrated Ledger

Stores Control A/c

To balance b/d	Rs...		Rs.
	1,00,000		
To Creditors A/c	1.60.000	By Work in progress A/c	2,00,000
		By Inventory Adjustment A/c	8,000
		By Balance C/d.	52,-000
	2,60,000		2,60.000
To Balance b/d	52,000		

Work - in - Progress A/c

To Stores Control A/c	Rs.		Rs.
	2,00,000		
To Wages Control A/c	1,86,000	By Finished good A/c	3,82,000
	1,86,000		
To Productions Overhead A/c		By Balance c/d	1,90,000
	5,72,000		5,72,000
To Balance b/d	1,90,000		

Finished Goods A/c

To Work in progress A/c	Rs.	By Cost to sales A/c	Rs.
	3.82,000		3.82.000
	3.82.000		3.82.000

Wages Control A/c

	Rs.		Rs.
To Bank	1,90,000	By W.I.P. A/c	
		By Balance c/d	1.86,000
	1,90,000		1.90,000
To Balance b/d	4,000		

Production Overhead A/c

	Rs.		Rs.
To Bank	1.75,000		1,86.000
To Balance c/d	11,000	By W.I.P, A/c	
	1,86,000		1.86,000
			11,000.
		By Balance	

Selling and Distribution Overhead A/c

	Rs.		Rs.
To Bank	20,000	By Cost of sales A/c	20.000
	20,000		20,000

Cost of Sales A/c

	Rs.		Rs.
To Finished Stock A/c	3,82,000	By Balance c/d	4,02,000
To Selling and Distribution Overhead A/c	20,000		
	4,02,000		4,02,000
To Balance b/d	4,02,000		

Sales A/c

To Balance c/d	Rs.		Rs.
	5,72,000	By Debtors	5,72,000
	5,72,000		5,72,000
			5,72,000
		By Balance b/d	

Share Capital A/c

To Balance c/d	Rs.		Rs.
	2.00,000	By Balance b/d	2,00.000
	2,00,000		2,00,000
		By Balance b/d	2.00,000

Reverse A/c

To balance c/d	Rs.		Rs. 50,000
	50.000	By balance b/d	
	50.000		50,000
		By balance b/d	
			50.000

Plant and Machinery A/c

To balance b/d	Rs.	By balance c/d	2,50,000
	2.50,000		
	2,50.000		2,50,000
To balance b/d	2,50.000		

Sundry Debtors A/c

	Rs.		Rs.
To balance b/d	40.000	By Bank A/c	6,00,000
To Sales	5,72.000		
		By Balance c/d	12,000
	6,12,000		6.12,000
To balance b/d	12,000		

Sundry Creditors A/c

To Bank	Rs.		Rs.
To balance c/d	1,70,000	By Balance b/d	60,000
	50,000	By Stores Control A/c	1,60,000
	2,20,000	By balance b/d	2,20.000
			50,000

Bank A/c

	Rs.		Rs.
To sundry Debtors	6.00,000	By balance b/d	80,000
A/c	35,000		
		By Wages control A/c	1,90,000
To balance c/d			
		By Production overhead A/c	1,75,000
		By Selling & Dist. A/c	20,000
		By Sundry Creditors A/c	1,70,000
	6,35,000		6,35,000
		By Balance b/d	35,000

NOTES

Inventory Adjustment A/c

	Rs.		Rs.
To Store ledger control A/c	8,000	By Balance c/d	8,000
	8.000		8,000
To balance b/d	8,000		

b) Trial Balance as on 31st December 2003

Particulars	Dr.	Cr.
	Rs.	Rs.,
1. Share capital		2,00,000
2. Reserve Account		50,000
3. Sundry Debtors	12,000	
.4. Sundry Creditors		50,000
5. Plant & Machinery Account	2,50,000	
6. Bank Account		35,000
...7. Stores Ledger Control Account -	52,000	
8. Work in progress Account	1,90,000	
9. Wages Control Account	4,000	
10: Production Overhead Account	—	11,000
11. Inventory Adjustment A/c	8,000	....
12. Cost *of* Sales A/c	4,02,000	...
13. Sales A/c		5,72,000
	9.18.00	9,18,000

C) Profit and Loss Account for the year ended 31-12-2003

	Rs.		Rs.
To cost' of sales A/c	4,02,090	By sales	5,72,000
To Inventory Adjustment a/c	8,000	By Production overhead	11,000
To wages control a/c	4,000		
To profit	1,69,000		
	5,83,000		5,83,000

Balance sheet as at 31st December 2003

Liabilities	Amount Rs.		Assets		Amount Rs.
Share capital	2,00,000		Plant arid Machinery		2,50,000
Reserve	50,000		Stock of:		
Profit	1,69,000		Finished goods	52,000	
		419 000	WIP	1,90,000	
Sundry Creditors		50.000			2,42,000
Bank overdraft		35,000	Sundry Debtors		12.000
		5,04,000			5,04,000

Cost Control Account

Theoretically speaking a single ledger should be in use under the system of integral accounts. For practical convenience, however, the ledger is often sub-divided into two parts. Double entry records are made in various accounts of two ledgers as parts of a single system sometimes, the ledger accounts are also classified on the basis of then relevance to financial and cost records. Thus a financial ledger is maintained which contains financially significant ledger accounts, while the accounts required for costing purposes are opened in cost ledger. Under these conditions, an additional account known as cost control account is opened in the financial ledger so as to make it self-financing. The cost control account records the aggregate of all amounts, which are entered in the cost ledger, i.e. the balance of the Cost Control Account, is equal to the net balance in the cost ledger as a whole. The control Account helps in balancing the financial ledger independent by the cost ledger.

Third Entry System

A variant of the integral accounting system is known as Third Entry System. Under this system cost are first entered in aggregate following double entry method. The additional accounts known as 'Third Entry' accounts are opened to record the elements of cost analysed by their nature and functions. The Third Entry' Accounts are outside the double entry system, which is restricted to the aggregate of entries made through cost control accounts- Evidently, this

system attempt to analyse costs with the help of special accounts instead of depending on analytical records in subsidiary books.

Illustration: 4

From the following information. Prepare the accounts in integrated ledger of' GM Ltd.,

Particulars	Dr. Rs.	Cr. Rs.
Cash account	3,000	
Finished goods account	4.000	
Stores control account Work in progress account Creditors control account	6,000 6.500	
Debtors control account Fixed assets account	1,02.000	2,000
Depreciation Reserve account		2,500
Capital account		1,10,000
Profit and Loss account		8,000
	1.22,500	1,22,500

Transaction for the period are	Rs.
Material purchased	10,000
Payment to creditors	6,000
Materials issued to production	8,000
Wages paid	12,000
Finished goods produced	30,000
Cost of finished goods sold	32,000
Sale value of finished goods sold	40,000
Receipt from customers	35,000
Overheads expenses paid	8,000
Depreciation	500

Third Entries Analysis

	Factory		Administration	
	Direct	Indirect		Selling and Distribution
	Rs.	Rs.		
Materials	7.000	1,000	1,000	1,000
Wages	10.000	2,000		
	17,000	9,500	.1,000	1.000

Solution:

The Integrated ledger entries will be follows:

Stores Control Account

	Rs.		Rs.
To balance b/d	6,000	By Cost control account	8.000
To Creditors control A/c	10,000		8,000
		By balance c/d	
	16,000		16,000
To balance b/d	8,000		

Cost Control Account

	Rs.			Rs.
To Cash (wages)	12.000	By Work in progress a/c		
To Cost (factory overhead)	6,000	Direct	17,000	
To stores control a/c	8,000	Indirect;	9,500	
To Depreciation	500			26,500
	26,500			26,500

Work in progress account

	Rs.		Rs..
To balance b/d	4,000	By Cost of sales a/c	32,000
To cost control a/c	30,000	By Balance c/d	2,000
	34,000		34,000
To balance b/d	2,000		

Finished Goods Account

	Rs,		Rs.
To balance b/d	4.00	By Cost of sales a/c	32,000
	30,000		2000
To work in progress a/c		By balance c/d	
	34,000		34.000
To balance b/d	2,000		

Cash Account

	Rs.		Rs;
To Balance b/d	3.000	By Cost control a/c (wages)	12,000
To Debtors control a/c	35,000	By Cost control a/c (factory overhead) ...	6,000
		By Administration overhead a/c	1,000
		By Selling and Distribution overhead	1,000
		By Creditors control a/c	6,000
		By balance c/d	12,000
	38,000		38.000
To balance b/d	12,000		

Creditors Control Account

	Rs.		Rs.
To cash a/c	6,000	By balance b/d	2.000
To balance c/d	6,000	By Stores control a/c	10.000
	12,000		12,000
			6,000

Debtors Control Account

To balance b/d	Rs.	By Cash a/c	Rs.
	1,000		
To Sales a/c		By Balance c/d	35,000
	40,000		
			6.000
	41,000		41,000
To balance b/d	6,000		

Depreciation Reserve Account

To balance c/d	Rs.		Rs.
	3.000	By balance b/d	2,500
		By cost control a/c	500
		Bv balance b/d	
	3,000		3,000
			3,000

Cost of Sales Account

To finished goods a/c	Rs.	By profit and loss a/c	Rs. 33,000
To selling and distribution overhead a/c	32,000		
	1.000		
	33,000		33,000

Selling and Distribution Overhead Account

To cash a/c	Rs. 1.000	By Cost of Sales a/c	Rs. 1,000
	1,000		1.000

Administration Overhead Account

To Cash A/c	Rs. 1.000	By Profit and Loss a/c	Rs. 1,000
	1,000		1.000

Sales Account

To. Profit & Loss a/c	Rs. 40,000	By Debtors Control a/c	Rs. 40,000
	40,000		40,000

Fixed Assets Account

To balance b/d	Rs. 1,02,000	By balance c/d	Rs. 1,02,000
	1,02,000		1,02,000
To balance b/d	1,02,000		

Capital Account

To balance c/d	Rs. 1,10,000		Rs. 1.10,000
	1,10,000	By balance b/d	1,10,000
			1,10,000
		By balance b/d	

Profit and Loss Account

	Rs.		Rs.
To Cost of sales a/c	33,000	By balance b/d	8.000
To Administration overhead a/c	1,000	By sales	40.000
To balance c/d	14,000		
	48,000		48.000
		By balance b/d	14,000

Trial Balance of GM Ltd.,

Particulars	Dr. Rs.	Cr. Rs.
Cash account	12,000	
Finished goods account	2,000	
Stores control account	8,000	
Work in progress account	3,000	
Creditors control account		6,000
Fixed assets account	1,02,000	
Depreciation Reserve account		3,000
Capital account		1,10,000
Profit and Loss account		14,000
Debtors control account	6,000	
	1,33,000	1,33,000

NOTES

Model Questions

1. What do you understand by 'Integrated Accounts' and what are the principles involved?

2. What is integrated accounting? Briefly describe the advantages of integration.

3. How do you distinguish between the system of 'Inter locking' and Non - integration of cost and financial accounts?

4. Discuss in detail the Third entry method of integrating the cost and financial accounts.

5. From the following information journalise the transaction in integrated books.

Lesson - 22

Reconciliation of Cost and Financial Accounts

22.1 Introduction:-

We have already stated that small concerns producing a single product may not have a separate set of books for cost accounting. Cost information is extracted in their case from financial records, which are suitably designed. But where as in large concerns, there is a financial accounting system; discrepancies often arise due to a number of factors. The cost accounts and financial accounts have a different order of recording revenue and expenditure. In the financial ledger expenses are recorded in a subjective form i.e., according to their nature, whereas in cost ledger, expenses are analysed and classified in an objective form i.e., according to their purpose. As these two sets of accounts are maintained in different forms, it is quite natural that their results may also differ. Invariably, there is a difference in profits shown by two sets of accounts. Therefore, it becomes necessary that these two accounts should be reconciled. This also enables to test the reliability of cost accounts.

Reconciliation of cost and financial accounts means tallying the profit revealed by the two set of books. Reconciliation is a process whereby comparison between the two profits is made. In the words, of Eric L. Kohser, "Reconciliation is the determination of the items necessary to bring the balances of two or more related accounts or statements into agreement. Efforts are also made to judge arithmetical accuracy of the profits revealed by two different sets of books". Process employed in reconciliation of the two profits is almost that same as employed in preparing the bank reconciliation statement.

22.2 Factors responsible for discrepancies

Reconciliation is aimed at ascertaining the reasons for disagreement of the two profits. The various items, which are likely to cause a difference between these two profits figures, should be recognized and the amounts against them should be ascertained for reconciliation purposes. The principal factors are as follows.

NOTES

1. Items included only in Financial Records

The items, which appear in the financial accounts but not in the cost accounts, either reduce the financial profits (if they are expenses items) or increase the financial profits (if they are income items).

a) Financial Charges

1. Interest on loans
2. Loss on sale or exchange of capital assets.
3. Loss on sale of investments.
4. Expenses such as stamp duty, discount etc., on issue of shares, debentures etc.,
5. Fines and penalties payable
6. Compensation payable
7. Capital losses arising out of accident, fire etc.,

b) Financial incomes

1. Interest received on bank deposits, loans and invesuments.
2. Dividends and Rent received
3. Profit on sale of fixed assets
4. Share transfer fee received
5. Profit on sale of stores.

b) Apportionment of Profits

Apportionment is made out of the following profits in financial accounts while such transactions do not affect profits revealed by costing books.

1. Contribution towards donations
2. Writing off goodwill

3. Taxes paid
4. Dividends paid
5. Preliminary expenses
6. Under writing commission
7. Amount transferred to reserves and sinking funds for redemption of loans, debentures, etc.
8. Additional provision for depreciation on assets and bad and doubtful debts

However, these appropriations appear only in Profit and Loss Appropriation Account in the case of companies and the financial Profit and Loss Account is not affected.

2. Items Included only In Cost Records

These include notional or imported costs like interest on capital employed even when it is not actually paid, rent of freehold premises etc., They do not affect the financial accounts. This results into showing of less profit in Cost Books and more profit in Financial Books.

3. Under or over - absorption of overheads in Cost Books

The recovery of overhead expenses, in cost accounts may either fall - short of, or exceed the actual expenses incurred and recorded in the financial books of accounts. If overheads are not fully recovered (absorbed) the short fall known as under-absorbed overhead. If, on the other hand, overhead expenses are more than fully recovered the recovery is in excess of the actual expenditure is known as over absorbed overhead. The under absorption or over-absorption of overhead makes the difference between costing and financial results.

4. Under or Over - Valuation of inventories

The inventory of materials, work-in - progress and finished goods as appearing in cost records may differ in value from the corresponding figures in

financial accounts. This is due to application of different methods of valuation of inventories in financial accounts and costs accounts. In cost accounts, the basis of inventory valuation is invariably the actual cost.

5. Under or Over - charging depreciation

Basis of providing depreciation may be different in the two sets of book. In cost accounts, depreciation may be provided on the basis of straight line method while in the financial accounts it may be on the of diminishing balance method. In practice, one of methods based on technical requirement or usage, e.g., production hours or units may be used in cost accounts.

6. Abnormal items of expenditure and income, which, if inclined in cost of production, would vitiate cost. Such expenses, which appear in financial accounts as well as cost accounts, are excessive or avoidable rejections, defective work and spoilage, heavy losses of stores, losses due to theft, pilferage or acts of nature, abnormal idle time, abnormal gain etc.,

7. Some concerns adopt the method of charging direct wages to costs of products at predetermined rates. These results in a difference between the predetermined amount charged to cost accounts and the actual wages booked in the financial accounts.

8. Another major point of dissimilarity between the cost and financial ledgers is that many of the accounts in the financial ledger such as Personal Accounts and Capital Assets Accounts do not find a place in the cost ledger.

22.3 Steps in Reconciliation

In order to prove the correctness of the figures shown in the two sets of accounts there is a need to reconcile the profit shown in the cost ledger with that of the financial ledger. The following steps should be taken to reconcile the two profits so as to indicate the causes, which brought about the difference in the results.

1. Determine

   a) Items, which affected the financial results but were not included in cost accounts.

   b) Items, which affected both, cost accounts but not occurs in financial accounts.

   c) Items, which affected both cost and financial accounts but different in value in the two cases.

2. Start with the profits shown by the accounts.
3. Add income items and deduct expense items as per (1 .a) above.
4. Deduct income items and add expense as in (1.b) above.
5. For items in (1.c above).

i) Deduct the difference in expense items over charged in financial accounts

ii) Add the different in expense items undercharged in cost accounts.

iii) Add the amount by which opening stock of inventory is under-estimated in cost accounts; deduct the amount by which it is over - estimated in cost accounts as compared with financial accounts.

iv) Add the amount by which closing stock of inventory, is over -estimated in cost accounts; deduct the amount .by which it is under estimated in cost accounts.

v) In case excess depreciation has been charged in cost accounts, adding the amount of depreciation over-charged should increase costing profits. In

case amount of depreciation has been under charged deducting; the amount of depreciation under should reduce costing profits accordingly charged.

vi) To costing profit the amount of over absorption will be added back and from it amount of under - absorption will be subtracted.

6. Having adjusted the costing profit as above, the resulting profit should now agree with the amount shown in the financial accounts.

If the profit shown in the financial accounting is taken as the basis, the treatment as explained above will be reversed. The most important point to be noted while preparing reconciliation statement is that the profits with which we start can only be amended and the profit, which is to be found out, will not be disturbed. The rule is what has not been done earlier should be done now and what has been done earlier in the books with the profit of which we start be reversed to reconcile two profits.

A pro-forma of a Reconciliation statement is given below

Reconciliation Statement	Rs.
Profit as per cost accounts	
1. Income items taken in the financial, ledger only.	
2. Notional items of expenses taken in cost ledger but not taken in financial ledger.	
3. Over - valuation of opening stock in Cost Accounts.	
4. Under • valuation of closing stock in Cost Accounts.	
5. Over charge of depreciation in Cost Accounts.	
6. Over - absorption of. overheads	
1. Expenses items taken in the financial ledger only.	
2. Appropriations shown in the financial ledger only.	
3. Under valuation of opening stock in cost accounts	
4. Over valuation of closing stock in copt accounts	
5. Under charge of depreciation in cost accounts	
6. Under absorption of overheads	
Profits as per financial accounts.	

The following examples illustrate how the cost and financial results are reconciled with the help of a Reconciliation statement.

Illustration: 1

A Company's Net Profit as per the Cost book was Rs. 23,063 whereas the audited final accounts showed a profit of Rs. 16,624. With the help of the following data, you are required to prepare a reconciliation statement and explain the reasons for the difference between the two figures.

Profit and Loss Account year ended 31st March 2003.

	Rs.	Rs.		Rs.
To Opening stock	2.47,179		By Sales	3.46,500
To Purchase	82.154			
	3,29,333			
To Closing Stock	75,121			
		2,54,212		
To Direct Wages		2H33		
To Factory Overhead		20,826		
To Gross Profit		48.329		
		3,46.500		3.46.500
To Administration expenses		1845	By Gross Profit	48,329
To Selling expenses		22,176	By Miscellaneous income	316
To Net Profit		16,624		
		48,645		,48,645

NOTES

The costing records show:

a) Stock balance of Rs.78,197

b) Direct wages absorbed during the year - Rs.24,867

c) Factory overhead absorbed Rs.19,714

d) Administration expenses charged @ 3 percent of selling prices.

e) Selling expenses charged @ 5 percent of value of sales.

f) No mention of miscellaneous income.

Solution

Reconciliation Statement

	Rs.		Rs.
Profit as per cost accounts			23,063
Less:			
Difference in valuation of closing stock	79,197 75,121	3,076	
Factory overhead under - absorbed	20,826 19,714	1,112	
Selling expenses under - absorbed	22,176 17,325	4.851	
			9,039
Add: Wages over - absorbed	24,867 23,133	1,734	1,024
Administration overhead over absorbed	10,395 9,845		
Miscellaneous income		316	2,600
Profit as per Financial Accounts			16,624

Illustration: 2

The following is a summary of the Trading and Profit and Loss Account of M/s Alpha manufacturing company Ltd., for the year ended on 31st December 2002

Dr. Cr.

	Rs.		Rs.	Rs.
To Material Consumed	27,40,000	By Sales (1,20,000 units)		60,00,00
To Wages	15.10,000	By Finished Stock (4,000		1,60,000
To Factory Expenses	8,30,000	By Work in progress		
To Administration Expenses	3,81,400	Materials	64,000	
To Selling and Distribution	4,50,000	Wages	36.000	
To Preliminary Expenses {written	40,000	Factory Expenses	20,000	
				1,20,000
To Goodwill (written off)	20,000	By Dividends Received		18,000
To Net Profit	3,26,600			
	62,98,000			62,98,00

The company manufactures a standard unit. In the Cost Accounts:

i. Factory expanses have been allocate to the production at 20 percent on prime cost.

ii. Administration expenses at Rs. 3.00 per unit on units produced, and

iii. Selling and Distribution expenses at Rs. 4.00 per unit sold. -

You are required to prepare a Costing Profit and Loss Account of the company and to reconcile the profit disclosed with that shown in the Financial Account.

Solution:

In the Cost Accounts

Factory Expenses : 20% of Prime Cost

: 20% of Rs. 42,50,000/-

: Rs. 8,50;000/--

Administration Expenses : Rs. 3 per unit on unit produced

: Rs. 3 x 1 ,24,000/-
: Rs. 3,72,000

Selling and Distribution Expenses : Rs. 4 per unit on unit sold

: Rs. 4x1,20.000

:Rs.4,80,000

Costing Profit and Loss Account

			Rs.
To Materials consumed	27.40,000	By Sales	60.00.000
To Wages	15,10,000	By Finished Stocks	1,60,000
To Factory Expenses ,	8,50,000	By Work in progress	1,20,000
To Administration Expenses	3.72.000		
To Selling and Distribution	4,80.000		
To Net Profit	3,28,000		
	62,80,000		62,80,000

Reconciliation Statement

		Rs.
Profit as per Cost Books		3,28,000
Add: Income not affecting Costs Dividends received		18,000
		3,46,000
Deduct: Expenses not affecting Costs:		
Preliminary Expenses written off Goodwill written	40.000	
off	20,000	
		60,000
		2,86,000
Adjustment for difference in overhead charged .		
Factory Expenses (+) Administration	20,000	(+)40,600
Expenses (-) Selling and Distribution Expenses		
	9400	
	30,000	
Profit as per Financial Books		3,26,600

Illustration: 3

From the following particulars prepare

a) A statement of cost of manufacture for the year

b) A statement of profit as per cost account and

c) Profit and Loss account in the Financial books and a reconciliation of the difference in the 'profit as shown by (b) and (c) above:

Opening stock of raw material	1,00,00
Closing stock of Raw material	1,50,000
Opening stock of finished product	2,00,000
Closing stock of finished product	50,000
Purchase of raw materials	6,00,000
Wages	2,50,000

Calculate factory overhead at 25% of prime cost. Office overhead will believed at 75 percent of Factory Overhead. Actual Works Expenditure amounted to Rs. 1,93,750 and actual Office expenses amounted to Rs. 1,52,500. The Selling Price was fixed at 25 percent above cost price.

NOTES

Solution

a) Cost of Manufacture

		Rs.	Rs.
Raw Materials			
Opening stock	1,00,000		
Purchased	6,00,000	7.00.000	
Less: Closing stock		1,50,000	
			5,50,000
Wages			2,50.000
Factory overhead (25% on prime'cost)			2,00,000
Office overhead (75% on factory overhead)			1,50,000
Cost of Manufacture			11,50,000

b) Statement of profit (Cost Accounts)

	Rs.
Opening stock Cost of manufacture	2.00,000 '11,50,000
	13,50,000
Less Closing stock	50,000
Cost of Safes Profit	13,00,000
(25% on cost)	3,25.000
Sales	16,25,000

c) Profit and Loss Account

	Rs.	Rs.		Rs.
To. Opening Stock		2,00,000	By Sales	16,25,000
To Raw materials			By Closing Stock	50,000
Opening stock	1,00,000			
Purchase	6,00.000			
	7,00,000			
Less Closing stock	1,50,000	5,50,000		
To Wages		2,50,000		
To Factory		1,93,750		
To Office Overhead		1,52,500		
To Profit		3,28,750		
		16,75,000		16.75,000

D)Reconciliation Statement

	Rs.	Rs.
Profit as per Cost Account :		3,25,000
Add Over - absorption of	2,00,000	
Factory overhead (-)	1,93,750	6,250
		3,31,250
Less Under - absorption of	1,52,500	
Office Overhead (-)	1,50,000	
		(-) 2,500
Profit as per financial accounts		3,28,750

Illustration ; 4

In a factory two types of radios are manufactured, viz 'Popular' and 'Deluxe' models. From the following particulars, prepare a statement showing cost per radio and profit per radio sold. There is no opening or closing stock

	Popular	Deluxe
	Rs.	Rs.
Labour	46,800	62,920
Materials	81,900	1,08,680

Works overhead is charged at 80% on labour, and office overhead taken at 15% on works costs. 'Popular' radios sold during the period 234 are at Rs. 1,000 each and 'Deluxe' radios sold during the period 286 are Rs. 1,100 each. Ascertain the total profit as per cost books from the above particulars.

If the works expenses are Rs. 87,000 and office expenses Rs. 58,000, find out the actual profit made and prepare a reconciliation statement to reconcile the cost profits disclosed by the financial books.

NOTES

Solution

Statement of cost

	Popular		Deluxe	
	Per Radio Rs.	Total Rs.	Per Radio Rs.	Total Rs.
Materials Labour	350.00	81.900	38.00	1.08,680
	200.00	46.800	220.00	62,920
Prime Cost	550.00	1,28,700	600.00	1.71,600
Works Overheads (80% on wages)	160.00	37,440	176.00	50,336
Works Cost	710.00	1.66,140	776.00	2,21.936
Office Overhead (15% on works cost)	106.50	24.921	116.40	33,290
Cost of production	816.50	1.91,061	892.40	2,55,226
Profit	183.50	42,939	207.60	59,374
Sales	1.000.00	2,34,000	1,100.00	3,14,600

		Rs.
Total Profit as per Cost Books	Popular	42,939
	Deluxe	59,374
		1,02,313

Profit and Loss Account

	Rs.		Rs.
To Materials :		By Sales	
Popular	81.900	Popular	2.34,000
Deluxe	1.08.680	Deluxe	3,14,600
To Labour:			
Popular	46,800		
Deluxe	62,920		
To Works Overheads	87.000		
To Office Overheads	58.000		
To Profit	1,03.300		
	5,48,600		5,48,600

Statement of Reconciliation

		Rs.	
Profit as per Cost Accounts			1,02,313
Add:			
Over absorption off		37.440	
Work overhead	(+)	50,336	
		87,776	
	(-)	87,000	776
Over absorption off		24,921	
Office Overhead	(+)	33,290	
		58,211	
		58,000	211
Profit as per Financial / Accounts			1,03,300

Illustration ; 5

The following figures are available for year ended 31st December 2002

	Financial A/c Rs.	Cost A/c Rs.
Opening Stock:		
Raw materials	12,000	10,000
Work in progress	14,000	13,000
Finished Stock	10,000	9,000
Closing Stock		
Raw materials	8,000	8,600
Work in progress	6,000	7,400
Finished stock	11.800	12,000
Purchases	80,000	-
Direct Wages	40.000	-
Indirect wages	6,000	
Factory Expenses	34.000	42,000
Sales	2,20,000	-
Administration Expenses	6,000	4,600
Selling Expenses	8,000	9,000
Financial Expenses	2,000	-
Interest and dividends received	3,200	-
Transfer to Reserve	8,000	-
Dividends	18,000	-

You are required to compute Profit in Financial Accounts as well as in cost Accounts. Prepare a Memorandum Reconciliation Account. Last years profit was Rs. 15,000.

Solution

Manufacturing Account

Particulars	Amount Rs.	Particulars	Amount Rs.
To opening inventory		By Closing inventory	
Raw materials	12,000	Raw materials	8,000
Work in progress	14,000	Work in progress	6,000
To Purchase	80,000		
To Direct wages	40,000		
To Factory overheads indirect wages	6,000	By Balance transferred to Trading A/c	1,72,000
To Factory expenses	34,000		
	1,86,000		1,86,000

Trading Account

	Rs.		Rs.
To Opening finished stock	10,000	By sales	2,20,000
To balance transferred , from mfg A/c	1,72,000	By Closing finished stock	11,800
To Gross Profit transferred toP&LA/c	49,800		
	2,31,800		2.31,800

Profit and Loss Account

	Rs.		Rs.
To Administration expenses	6,000	By Trading A/c {Gross Profit)	49,800
To Selling expenses	8,000	By Interest and Dividends	3,200
To Financial expenses	2,000		
To Profit and Loss Appropriation A/c (Net profit)	37,000		
	53,000		53,000

Profit and Loss Appropriation Account

	Rs.		Rs.
To Reserve	8,000	By Balance from last year	15,000
To Dividends	18,000	By Profit and Loss A/c	
To Balance to balan(sheet	26,000		
	52,000		52,000

Profit as per Cost Accounts

	Rs.	Rs.
Opening Stock of materials	12,000	
Add: Purchases	80,000	
Total material available for consumption	92,000	
Less: Closing stock of material of material consumed	8,000	
		84.000
Add: Direct wages		40,000
Prime Cost		1,24,000
Add: Factory overheads absorbed		42,000
lotal work in progress		1,66,000
Add: Opening work in progress		14,000
Total work in progress available		1,80,000
Deduct: Closing work in progress		6,000
Total Cost of Production (Finished stock)		1,74,000
Add: Opening stock of-finished goods		10,000
		1.84,000
Deduct: Closing stock of finished goods		11,800
Cost of goods sold		1,72,200
Sales		2,20.000
Manufacturing profit		47,800
Less: Admn. expenses recovered	4,600	
Selling expenses recovered	9,000	13,600
Cost Account Net profit		34,200

Memorandum Reconciliation Accounts

Particulars	Plus items Rs.	Minus items Rs.
Profit as par cost accounts	34,200	
Add: Over recovery of factory overheads (42,000 - 40.000)	2,000	
Add: Selling overheads	1,000	
Add: Interest and dividends	3,200	
Less: Under recovery of expenses		1,400
Less: Financial expenses		2,000
Profit as per Financial		37,000
	40,400	40,400

Illustration: 6

Organise Products Co Ltd., maintains their financial accounts separate from their cost accounts. In the ledger of 1st January, 2003 the balances were as follows

Store Ledger control		15,000
Work in Progress control		23,250
Finished stock control		5,250
Cost Ledger control		43,500
Transactions for the year ended 31.12.2003 were		52,500
Purchase of raw materials		
Wages		
Direct	1,18,500	
Indirect	31,500	1,50,000
Factory overhead expenses		
Incurred		54,000
Absorbed		82,500
Selling overhead expenses		
Incurred		18,750
Absorbed		18,600
Administration overhead expenses		

NOTES

Incurred	11,250
Absorbed	11,400
Material issued to production	86,250
Sales	3,97,500
Work in progress values at 31.12.2003	20,250
Finished stock : Values at 31.12.2003	6,000

The value of stocks and work in progress in the company balance sheets were as follows

As at 31.12.2003	46,500
31.12.2003	36,750

The following items have been recovered in the financial accounts only:

Debenture interest paid	12,000
Loss on sale of investment	3,750
Dividends received	4,500

You are required to

a) Show the accounts in the cost ledger for the year ended 31st December, 2002.

b) Prepare a statement reconciling the profit disclosed by the cost accounts with the profit shown in the financial accounts.

Solution

Cost Ledger Control Account

		Rs.			Rs.
2003			2003		
Dec 31	To Sales a/c	3,97,500	Jan 1	By Balance b/d	43,500
	To balance c/d	37,500	Dec.31	By Stores Ledger Control a/c	82.500
				By Wages control a/c	1,50,000
				By Factory Overhead control a/c	54,000
				By Administration overhead control	18,750
				By Selling Overhead a/c	11,250
				By Costing Profit and Loss a/c	75.000
		4,35.000			4,35,000

Work in progress control account

		Rs.			Rs.
2003			2003		
Jan 1	To balance b/d	23,250	Dec 31	By finished stock control a/c	2,90,250
	To Wages control a/c	1,18.500			
	To Store Ledger Control a/c	86,250			
	To Factory Overhead control a/c	82.500		By balance c/d	20,250
		3.10,500			3,10,500

Stores Ledger control

2003	To balance b/d	Rs.	2003 Dec	By Work in progress a/c	R
Jan 1			31	By balance c/d	
	To Cost Ledger Control	15,000			86,25
	a/c	82.500			11,25
		97,500			97,50

Finished stock control Account

2003	To balance b/d	Rs.	2003	By Cost of sales a/c	F
Jan 1					
	To work in progress	5,250	Dec 31	By balance c/d	2,89,5
	control a/c	2,90,250			6,0
		2.95,500			2,95,5

Wages Control Account

2003	To Cost Ledger control a/c	Rs.	2003	By work in progress a/c	R
				By Factory overhead control	
Dec 31			Dec 31	a/c	
		1,50,000			1,18,5
					31,5
		1,50.000			1,50,0

Factory overhead control Account

2003		Rs.	2003		R
Dec	To Wages Control a/c To	31,500	Dec 31	By Work in progress a/c	82,5
31	Cost ledger control a/c	54.000		By Overhead Adjustment	3,0
				a/c	
		85,500			85,5

Administration Overhead control

2003	To cost ledger control a/c	Rs.	20t)3	By Cost of sales a/c	Rs.
Dec 31		18,750	Dec 31	By overhead adjustment a/c	18,600 150
		18,750			18,750

Selling Overhead Control Account

2003		Rs.	2003		Rs.
Dec 31	To Cost ledger control a/c	11,250	Dec 31	By Cost of Sales a/c	11,400
	To overheads adjustment a/c	150			
		11,400			11,400

2003			2003		Rs.
Dec 31	To Cost Profit & Loss a/c	3,97,500	Dec 31	By Cost of ledger control a/c	3,97,500
		3,97,500			3,97,500

Cost of sales Account

2003		Rs.	2003		Rs.
Dec 31	To finished stock control a/c	2,89,500	Dec 31	By costing Profit & Loss a/c	3,19,500
	To Administrative overhead control a/c	18,600			
	To Selling overhead control a/c	11,400			
		3,19;500			3,19,500

Overheads Adjustment Account

		Rs.			**Rs**
2003 Dec 31	To Factory overhead control a/c	3,000	2003 Dec. 31	By selling overhead control a/c	150
	To Admin overhead control a/c	150		By Costing profit and loss a/c	3,000
		3,150			3,150

Costing Profit and Loss Account

		Rs.			Rs.
2003 Dec. 31	To Cost of Sales	3,19,500	2003 Dec.31	By sales	3,97,500
	To Overhead adjustment a/c (Under absorbed overheads)	3,000			
	To Cost ledger control a/c (Profit transferred)	*75.000*			
		3,97.500			3,97,500

Reconciliation of Profit as shown by cost accounts and financial accounts

				Rs.
items of Expenditure no recorded in Cost book:		Rs.	Profit as per cost accounts	75,000
Debenture interest	12,000		Items of income not recorded in cost books	4,500
Add: Loss on sale of investment	3.750	15.750		
Difference in valuation of Opening Stock financial Books	46.500			
Less: Cost books	43.500	3,000		
Difference in valuation of Closing Stock Cost books	37.750			
Less financial books	36.500	750		
Profits as per financial accounts		60,000		
		79,500		79,500

Note: Administrative overhead could also have been charged to finished goods control accounts or to the Costing Prof it and Loss Account. This is a matter of the particular Costing Policy.

Profit and Loss account (Financial)

	Rs.		Rs.
To Opening stock	46,500	By Sales	3,97,500
To Purchases	82,500	By Closing stock	36,750
To Wages,	1,50,000	By Dividends received	4,500
To Factory expenses	54,000		
To Administrative expenses	18,750		
To Selling expenses	11,250		
To Debenture interest	12,000		
To Loss on sale of investment	3,750		
To Net profits	60,000		
	4,38,750		4,38,750

Model Questions

1. Indicate the reasons why it is necessary to reconcile cost and financial account. What accounting procedure is to be adopted for their reconciliation?

2. Why is a reconciliation of accounts necessary? State briefly reasons for difference between the profits shown by both the accounts.

3. One firm whose financial years ends on 31st March, 2003, shown profit according to this Financial Books Rs. 2,57,510. Profits as per as Cost accounts are Rs. 3,44,800. While reconciling the two profits, following difference has been noticed.

	Rs.
Under absorption of factory overheads	6,240
Over absorption of office overheads	3,400
Depreciation charge in financial accounts	22,400
Interest on investment not included in cost accounts	16,000
Depreciation charge in cost accounts	25,000

Loss included in financial accounts	11,400
Income tax	8,600
Interest and dividend received	2,450
Less due to depreciation in stock value in financial, books	13,500

You are required to reconcile the two profits and prepare reconciliation statement.

4. Prepare the following statements from the information given below:

a) Cost Statement showing profits

b) Profit and Loss account and

c) Reconciliation statement

Information	Rs.
Material	14,600
Labour	43,200
Factory overheads	22,840
Office overheads	12,420
Sales	88,400

Factory overheads are absorbed on the basis of 100% on direct labour and office overheads Ire absorbed 20% on works costs.

Lesson - 23

Contract Costing

23.1 Introduction

Contract costing is the technique of ascertaining cost of a contract. Each contract is considered as a separate unit of cost., e.g. a building or a bridge etc. Each contract undertaken by a contractor is given a distinguishing number. A separate account is opened for each individual contract. It is similar to job costing in principle, and so the method of recording cost is the same. Both are terminal cost methods as both are required to be completed within the specified period. However, there is some difference between the two. They are as follows.

a) Contract is performed outside the factory. The roads, buildings dams and ports are all constructed outside the factory. But the jobs are performed inside the factory.

b) The value and costs of the contract are much bigger amount generally than that of a job. The contract is completed relatively in a much bigger period also. Some contracts take years to complete while jobs are completed in a shorter duration.

c) While executing a contract, sub-contracts are given, but it is not so with the jobs.

Contract Ledger

A Contract Ledger book is kept, in which a separate account for each contract is opened. This account is debited with all expenditures incurred on the contract and on the completion of the work, credited with the contract price, the stock of materials, plant and tools. The balance represents -profit or loss to be transferred to Profit the Loss Account.

If the contract is incomplete at the end of financial period, the value of

work-in-progress should be calculated and credited to the contract account along with closing stock of materials and plant. The account may show either profit or loss. The entire loss may be transferred to P & L A/c but in case of profit only a part of it (as explain below) should be taken to P & L A/c and the balance should be treated as "Reserve profit".

The recording procedure of the following items may be noted carefully.

Materials

Materials required for a contract - may either be from the stores or purchased directly for the contract. Cost of materials issued from the stores to contract site may be ascertained from the Material Requisitions bearing the number of the concerned contract and debited to the Contract Account. If materials are directly bought for a contract, the cost of such materials is calculated form the invoices and charged directly to the concerned-contract.

Materials returned to stores are valued at cost and credited to Contract Account. Similarly the cost of materials transferred from one contract to another contract, contract receiving the materials is debited and the contract giving up the materials is credited. However such transfer should be duly authorised by a responsible officer through a Transfer Note.

If some of the materials bought for the contract, being excess are sold, then the Contract Account should be credited with the sale proceeds and any profit or loss on this deal should be transferred from contract account to Profit and Loss Account.

If materials, plant or equipments at work-site are damaged, destroyed or lost on account of theft, accident, earthquake etc., the cost of such losses should be determined and transferred to P&L A/c because such losses are 'abnormal'. Where loss could be recovered from insurance company on from sale of scrap the proceeds may be credited to the contract and the net loss (cost of goods damaged less the amount realised is transferred to P&L A/c. When the loss of materials is negligible or is due to causes inherent in the material or manufacturing process, it

should be treated as ' normal loss'. There is no need for passing any adjustment entry in respect of such losses. In other words normal loss is entirely neglected so that is automatically borne by the contract.

Labour

Generally, the cost of labour working at the contract is a direct charge to the contract. Wages paid to workers employed on a contract can be ascertained from separately maintained wage sheets and attendance records for each concerned contract and charged directly to the concerned contract. If separate wage sheet is not prepared a Wage Analysis Sheet should be prepared where in should be entered the particulars of the daily or weekly time sheets. The total of each column should be posted to the debit side of the appropriate contract. Wages accrued to outstanding at the end of the period should appear on the debit side of the contract account. In case of transfer of workers from one contract to another or supervisory staff working on a number Of contracts, the time spent by them on each contract may be properly booked and allocated-to contracts in the ratio of hours booked. The Wages Abstract can be advantageously used to determine labour cost chargeable to each contract.

Direct Expenses

All expenses other than material and labour incurred for a particular contract are the direct expenses and are charged to the include architects fees, hire charge of special equipments, cost of sub-contract etc.

Overheads

The indirect expenses incurred in common for two or more contracts are the overheads. Those expenses such as engineers, surveys supervisors etc. engaged in various contracts cannot be directly charged to contracts. Such expenses are allocated or apportioned to the contracts on an appropriate basis.

Plant and Machinery

The contract account is debited with the full value of plant, machinery and

tools issued to the contract. These assets are revalued at the end of the contract or at the end of the period and the contract account is credited with the revalued amount. Thus the contract account stands debited with the amount of depreciation on the plant. Alternatively the depreciation on the plant at a given rate may be calculated and debited to the contract account. The amount of depreciation is calculated if a plant is used rarely at a contract or simultaneously at several contracts.

The basic principle is that if the plant is issued to a contract, the contract is debited with full value of plant; if the plant is not issued to the contract; only depreciation need be charged; and if the plant is taken on hire, only the hire charges be debited to the contract, and not the depreciation.

Sub-contract cost

A contractor may not be expert in all the work required to execute his project. So he may appoint sub contractors to do specific jobs. For example, in the construction of buildings he may give sub contracts to different parties for flooring, electric fittings, doors and furniture fittings etc. In such cases the work performed by the sub contractors forms a direct charge to the contract concerned. The contract account is debited with the sub contract cost.

Extra work done

Sometimes, a contractor is asked to do some such extra works as were not originally included in the agreement. The contractor is paid extra for such job over and above the contract value originally agreed upon. Example-Minor repairs of foot-path in case for road construction contract or using excavator for clearing a site near the house for garage or garden. The contract account is debited with the cost of extra work done and the price received for this extra work is credited to the contract account.

Work-in-Progress

The work-in-progress includes the value of work certified and cost of work uncertified. Work certified means the work done which architect, or

surveyor etc., of the contractee, approves. It is possible that a part of the work remains to be approved at the end of the accounting period. This part of the work done which the contractee has not yet approved is known work uncertified. It is valued at cost. The cost of work, certified and work uncertified is debited to work-in-progress account. So the work-in-progress account is debited with the value of certified work and the cost of uncertified work and the Contract Account is credited.

The work-in-progress account will appear on the assets side of the balance sheet. The amount of cash received from the Contractee and the reserve for contingencies will be deducted from it. The work-in-progress account can be presented in the Balance sheet as follows.

Balance Sheet (Assets Side)

	Rs.	Rs.
Work-in-progress		
Value of work certified	XXX	
Cost of work certified	XXX	
Less: Reserve for unrealised profit	XXX	
Less: Amount paid by contractee	XXX	XXX

Amount paid by contractee

Generally, contractee makes payment of contract price by installments depending upon work done and approved by him, but the amount paid will not be 100% of the work certified. He may pay 65% or 80% or 90% of the work certified as agreed between them. The contractee to ensure further progress of the work retains the balance. This money is called as "Retention Money".

The sum received from contractee may be credited to his personal account

NOTES

and deducted from the account of work-in-progress in the Balance Sheet.

Contract Price

The contract price is the value of the contract agreed to be paid to the contractor by the contractee on the satisfactory completion of the contract. So on the completion of contract, the contract account is credited with the contract price and Contractee's Accounts debited.

The contractor had been drawing advances from the contractee the basis of the certificates, each time debiting bank accounts and crediting contractee's account. Now on the completion of the contract the balance of the amount as shown by the Contractee's Account will be received from the contractee and thus his account will be closed. Ascertainment of profit or loss on contract

The profit of loss on contract is ascertained as follows

a) On completion of contract

The excess of credit over the debit items of the contract account is the profit. The whole of this profit is taken into account. The excess of debit over the credit is loss.

b) On incomplete contracts

In the case of unfinished contracts the profits shown by the contract account should not entirely be transferred to P&L A/c, because it is unrealised profit. Even complete exclusion from P&L A/c P&L A/c, is not desirable. Therefore only a part of such unrealised profit may be taken to P&L A/c, What part of the notional profit (unrealised profit) should be credited to P&L A/c each year depends on the practice and circumstances of the case. The general rules are

i)If the value of certified work is less than 1/4th-of the contract price, no profit is taken into an account, and the balance of the account is transferred to work-in-progress account.

ii) If the work certified is more than 1/4th but less than 1/2 of the contract price,

1/3 rd of the notional profit as reduced to the percentage of case paid by the contractee may be transferred to P&L A/c. The balance of the profit is the "Reserve for unrealised profit" and is transferred to work-in-progress Account.

Formula: Net profit x1/3x Cash received/work certified

iii) If the value of the certified work is 1/2 or more of the contract is completed, 2/3rd of the notional profit as reduced to the percentage of cash received form contractee can be credited to P&L A/c. and the remaining balance is the "Reserve for unrealised profit".

$$\text{Formula: Net profit} \times 1/3 \frac{\text{Cash received}}{\text{work certified}}$$

The reserve for unrealised profit is deducted from the amount of work-in-progress in the Balance sheet.

iv) If there is loss on contract the whole amount of such loss is debited to . P&L A/c.

c) Profit Calculation on Estimate Basis

If the contract is nearing its completion the contractor may desire to take profit on estimate basis. In such cases estimated profit on contract can be ascertained as under:

	Rs.
Cost of contract completed up to date	XXX
Add: Estimated cost required to finish the contract	XXX
Estimated total cost of the contract	XXX
Contract price	XXX
Estimated profit	XXX

A proportion of this estimated total profit is credited to profit and loss account. This proportion is ascertained by adopting the following

Formula : Estimated profit= Cash received/ work certified

Escalation Clause

Escalation Clause is usually provided in the contract as a safeguard against likely changes in price and utilization of material and labour. Thus this clause provides revision of contract price to accommodate variation in the cost of materials and labour due to market fluctuation. This clause is generally included n case of long period contracts. It protects the interest of both the parties from unfavorable changes in the prices of materials and labour.

Cost Plus Contract

Cost plus contract provides that contractee should pay to the contractor the cost of work done plus a percentage of it towards overhead expenses and profit. Such contracts are undertaken when it is not possible to fix the contract price in advance.

Cost plus contracts are advantageous where the contractee supplies the material and labour. It is convenient and safe to enter into a new contract on cost plus basis because in that case contractor as well as contractee is protected from arbitrary fixation of contract price. The contractor is relieved from the risk of uncertainty and is assured of his profit. In case of cost plus contracts quality of work do not suffer; which is a matter of satisfaction to contractee. So where quality of the work is utmost importance cost plus contract is desirable.

A limitation of these contracts is that there is no inventive to economies the cost off the contract, because paradoxically enough in case of cost plus contracts higher the cost higher will be the profit, since profit allowed as a percentage of cost.

Under this type of contract, the contractee should pay an agreed sum of profit to the contractor over and above the predetermined cost. This predetermined cost is the target figure. If actual cost is below this target, the contractor is also entitled to a bonus, which is a particular percentage of savings thus made.

Illustration : 1

Write up the contract from the following particulars:

	Rs.
Direct materials	32.400
Wages	21,600
Special plant	16,000
Store issued	5,760
loose tools	3,000
Cost of tractor (Fuel, wages of driver & worker)	6,840
Contract price	80.000

The contract was completed in 20 weeks. The special plants were returned subject to depreciation at 20% on original and Rs. 800 respectively. The written down value of tractor used for the contract was Rs. 39,000 and depreciation was to be charged to this contract at 20% per annum on this value. Provide 7% for administrative expenses on works cost.

Solution

Contract Account Dr

	Rs.	Rs.		RS;
To Direct materials		32,400	By Contractor's A/c	80,000
To Wages		21.600	(Contract price).	
To Cost of special plant		3,200		
To Stores issued	5,760			
Less: Returned	800	4,960		
To Loose tools	3,000			
Less: Returned	2,000	1.000		
To Cost of tractor (Fuel		6,840		
To Depn. on tractor		3.000		
Works cost		73,000		
To Admn. Expenses (7%ofRs.73,000)		5,100		
To Profit transferred to P&L A/c		1,900		
		80,000		80,000

Note: Depreciation on tractor

$$= 39.000 \times = \frac{20}{100} \times \frac{20}{52} \text{ Rs.3.000}$$

Illustration : 2

The following particulars relate to a contract for Rs. 80 lakhs.

	2001	2002	Rs.	Rs
		Rs..		
Materials	9,00,000		14,00,000	12,00,000
Wages	8,60,000		12,00,000	10,00,000
Carriage	40,000		1,20,000	1,00,000
Expenses	40,000		1,00 000	32,000
Work certified	18,00,000		60,00,000	80,00,000
Work uncertified (cost)	20,000		T, 00,000	----

plant costing Rs. 2,00,000 was bought in the beginning and depreciation was charged at 25% p.a. The contractee was to pay 80% of work certified *every* year and settle the account in 2003 Draw (1) Contract Account and (2) Contractee's Account for 3 years and show how work-in-progress will appear in. the Balance Sheet.

Solution

Contract Account

Dr. **Cr.**

	Rs.		Rs.
2001		2001	
To Materials	9,00,000	By Work-in-progress	
To Wages	8,60,000	By Work certified	18,00,000
To Carriage	40,000	By Work uncertified	20,000
To Expenses	40,000	By plant on hand	1,50,000
To Plant	2,00,000	P&L a/c (Loss)	70,000
	20,40,000		20,40,000

Contract Account

2002	Rs.	2002	Rs.
To Work-in-progress		By Work-in-progress	
Work certified	18.00,000	Work certified	60,00,000
Work uncertified	20,000	Work uncertified	1,00,000
To Plant at site	1,50,000	Plant at site(1,50,000-50,000)	1,00,000
To Materials	14,00,000		
To Wages	12,00,000		
To Carriage	1,20,000		
To Expenses	1,00,000		
To Notional profit c/d	14,10,000	By Notional profit b/d	
	62,00,000		62,00,000
To P&L A/c (Transfer)	7,52,000		14,10,000
To Reserve for unrealised profit	6,58,000		
	14,10,000		14,10,000

Profit transferred to P & L A/c

$$= \text{National profit} \times \frac{2}{3} \times \% \text{ of cash received}$$

=14,10,000 x 2/3x 80/100=Rs. 7,50,000

Illustration: 3

The following is the summary of expenditure on contract to 31st December 2002

	Rs
Direct wages	13,800
Direct materials	68,000
Stores issued	7,600
Stores returned	1,100
Sub contract cost	12,600
Plant	24,000

You obtain the following information

1) The contract was begun in January 2002 and contract price is Rs. 1,20,000

2) The architects had certified that 4/5 of the contract had been completed on 15th December 2002.

3) Depreciation of plant on 31st December 2002 is Rs. 9,600

4) The summary set out above includes items relating to the period-since 15th December 2002 as follows - wages Rs.1,400 and materials used Rs. 3,240.

5) Materials on site on 31st December 2002 had cost Rs. 10,000 and stores on site had cost Rs. 800.

6) Establishment charges are 40% of direct wages.

7) A fine of Rs. 2,000 is likely to be imposed for late completion.

You are required to

(a) Prepare Contract A/c

(b) Show that profit or loss has arisen on the work certified

(c) Suggest what figure should be taken to the P&L A/c for the *year*

ended 31st December 2002 and

(d) Show that how balance would be shown in the Contract A/c as on 1st January 2003

Solution

Contract Account

2002 Jan/Dec.		Rs.	2002 Jan/Dec		Rs.
To Direct materials		68,000	By stores returned		1,100
				24,000	
To Direct wages		13,800	By Plant in hand		
To Plant		24,000	Less: Depreciation	9,600	
To Stores issued		7,600.			14,400
To Establishment charges			By Materials on site		10,000
(40% on direct wages)		5,520	By Sub contract cost		12,600
			By Stores on site		8,000
			By Works-in-progress		
			Work certified (4/5 of 1,20,000)	96,000	
			Work uncertified	5,200	
					1,01,200
			By P&L A/c (loss)		4,020
		1,31,520			1,31,520
2003					
To work in progress					
work certified	96,00				
work uncertified	5,200	1,01,200			
To Plant in hand		14,000			
To Materials on site		10,000			
To Stores on site		800			

(c) The loss of Rs. 4,020 should be debited to P&L A/c. A contingent reserve for Rs.2,000 be created, the amount of fine likely to be imposed.

Cost of work uncertified

Materials	3,240
Wages	1,400
Establishment charges @ 40% on Direct Wages	500
Cost of work uncertified	5,200

Illustration : 4

A contractor prepares his accounts for the year ending 31st December each year. He commenced a contract on 1st April 1996.

The following information relates to the contract as on 31st December 1996.

	Rs.
Materials issued	5.02,000
Labour charges	11,31,200
Salary of foreman	1,62,600

A machine costing Rs. 5,60,000 has been on the site for'146 days its working life is estimated at 7 years and its final scrap value at Rs. 30,000

A Supervisor who is paid Rs. 16,000 per month has devoted one half of his time to this contract.

All other expenses and administration charges amount *to* Rs. 2,73,000

Materials in hand and at site cost Rs. 70,800 on 31st Dec 2002.

The contract price is Rs.40 lakhs on 31st Dec. 2002 two third of the contract was completed. The architect issued certificate covering 50% of the contract price and the contractor had been paid Rs. 15,00,000 and an account.

Prepare Contract Account and show how profit or loss should be included in financial account to 31 st Dec. 2002.

Solution

Contract Account

Dr. **Cr.**

	Rs.		Rs.
To materials	5.02,000	By materials at site	70,800
To Labour	11,31,200	By Cost of works	20,98,000
To Indirect labour Foreman's	1,62,600		
To Supervisor's Salary (16,000 x1/2 x 9 months)	72,000		
To Depn. on Machine	28,000		
To Admn.Charges and other expenses	2,73.000		
	21,68,800		21,68,800
To Cost of works	20,98.000	By Work in progress :	
		Work certified	20,00,000
To Balanced c/d	4,26,500		
		Work uncertified	5,24,500
	25,24,500		25,24,500
To P&L A/c	2,13,250		4,26,500
To W.I.P. A/c Reserve	2.13,250		
	4,26,500		4.26,500

Note:

Depreciation on machine

(Cost of Rs. 5,20,000 - Scrap Rs. 30,000)

=4,90,000/7x146/365=Rs. 28,000

Cost of work uncertified

Cost of 2/3 work completed - Rs. 20,98,000

$$\text{Cost of Full contract} = \text{Rs. } 20,98,000 \times \frac{3}{2} = 34,27,000$$

Cost of certified one-half contract	=	Rs. 15,73,500
Value of uncertified work	=	20,98,000 - 15,73,500
	=	Rs. 5,24,500

Illustration: 5

The following is the position of contract No. 850 of a building co. on 31 -12-2002. The contract was commenced on 1st Jan 2002.

	Rs.
Materials purchased	2,80,000
Materials transferred from contract No. 150	20,000
Wages paid during the year	3,50,000
Wages accrued	10,000
Indirect expenses	14,000
Stores issued	40,000
Inspection fees	6,000

A second hand plant was purchased on 1st January for Rs. 34,000, overhauling charges for which amounted to Rs. 6,000. On 30th June the plant was transferred to job No. 45. An additional plant was purchased on 30th September for Rs. 80,000. The contract price was Rs. 20,00,000.

The value of work certified on 31st December was Rs. 10,00,000 of which 80% was received immediately in cash. The cost of work done but not certified was Rs. 30,000. The value of stores on hand was Rs. 8,000.Charge depreciation on plant at the rate of 10% p.a. Carry forward 1/4 of a profit earned by way of reserve.Prepare Contract A/c and work-in-progress A/c. Also show how they will appear in the Balance Sheet on 31-12-2002.

Contract No 850 Account

	Rs.	Rs.		Rs.	Rs.
			By Work in progress		
To materials	2,80,000			10.00,000	
			Work certified		
Add Transferred from		3,00,000		30.000	
			Work uncertified		
contract No. 150	20.000				10.30.000
			By plant transferre		
					38,000
			By plant at site (2)		78,000
			By stores on hand		8,000
To wages	3,50,000				
Add: Accrued	10,000	3.60,000			
To direct expenses		14,000			
To stores issued		40,000			
To inspection fees		6,000			
To plant fist Jan-cost	34,000				
Add : overhauling	6,000				
		40,000			
To additional plant		80,000			
(Sept 30)					
To Notional profit		3,14,000			
		11,54.000			11.54.000
To P&L A/c (3/4)		2,35,500	By Notional profit b/d		3.14.000
To Reserve (1/4)		78.500			
		3,14,000			3.14.000'

Note : 1 Value of plant transferred to job No.49

	Rs.
Cost of plant	34,000
Add: overhauling	6,000
	40,000
Less: Depreciation upto 30th June	
$40,000 \times \frac{10}{100} x \frac{6}{12}$	2,000
	38,000

Note 2 value of plant at site

Cost on 30th september

Less : Depreciation for 3 months at 10% p.a

Note : 2 Value of plant at site

Cost on 30th September	80,000
Less: Depreciation for 3 months at 10% p.a	
$=30,000 \frac{10}{100} x \frac{3}{12}$	2000
	78,000

Work in progress account

To contract A/c	10,30,000	By balance	10,30,000
	10,30,000		10,30,000

Illustration : 6

The following Trial balance was extracted on 31st December 2002 from the books of Ram Constructors Ltd., which has authorised capital of Rs. 3,50,000 divided into 3,500 ordinary shares of Rs. 100 each.

Share capital		3,50,000
3.500 ordinary shares of Rs. 100 each		83,000
Creditors		25,000
P&LA/con 1st Jan 2002		63,000
Provision for depn. on plant and tools		12,80,000
Cash received on account		
Land & Building cost	74.000	
Plant & Tools cost	52.000	
Bank	45,000	
Contract 5		
Materials issued	6,00,000	
Direct Labour	8,30.000	
Expenses	40,000	
Plant & Tools on site cost	1,60,000	
	18,01.000	18,01.000

Contract 5 was begun on 1 st January 1996. The contract price is Rs. 24.00,000 and the customer has so far paid Rs. 12,80,000 being 80% of the work certified. The cost of work done since certification is estimated at Rs. 16,000 on 31st December 2002, after the above Trial Balance was extracted. Plant costing Rs. 32,000 was returned to store and materials, then on site, was valued at Rs. 27,000. Provision is to be made for direct labour accrued due Rs. 6,000

and for depreciation of ail plant and tools at 12 %0/ on cost.

You are required to prepare Contract 5 Account and submit the Balance Sheet of the Ram Construction Ltd. as on 31st December 2002.

Contract 5 account

To materials	Rs.	By plant returned to store	32,000	Rs
To Labour	6.00,000	Less: Depreciation	4,000	28.000
	8,30,000			
To Expenses	40,000	By Materials at site		27,000
	1.60.000			
To Plant & tools	6,000	By Plant &Tools at site		
	1.47,000			
To *Direct labour accrued*		less depreciation		
		By Work-in-progress		1,12.000
To Balanced c/d		Work certified		
		Work uncertified		
			16,00,00	
			0 16.000	
				16,16,000
	17.83,000			17,83,000
To P&L A/c	78,400			1,47:000
	68.600			
W.I.P.				
	1.47,000			1.47.000

Plant and tools at site	1,60,000
Less : returned to store	32,000
	1,28,000
Less : Depreciation @ 12 ½ %	16,000
Plant and tools at site less depreciation	1;12,000

Balance Sheet As an
31st December 1996

Liabilities		Rs.	Assets Rs.		Rs.
Share capital 3,500 ordinary share			Land & building cost		74.000
of Rs, 100 each fully paid		3.50.000	Plant & Tools cost	53,000	
			Plant returned from		
Creditors		83.000	contracts less depreciation	28.000	
P&L A/c Account					80.000
			Plant & Tools at site		1.12.000
1st Jan 1990	25.000				
31stDec1990	78,400	1,03,400	Materials at site		27.000
			Work-in-progress	15,47.000	
Provision for depreciation.		63,000	Less: Cash received	12,80,000	
Direct labour actual due		6,000	Bank		2.67,400
					45.000
		6,05,400			6,05,400

"Plant returned to store Rs. 32.000

Less: Depreciation ©121/2% less depreciation Rs. 4,000

Plant returned from contracts Rs. 28,000

	Rs.
W.I.P	18,16,000
Less: Reserve	68.600
Balance	15,47,400

Model Questions

1) Discuss the procedures followed in accounting for cost under Contract Costing?

2) How will you deal with the following?

   a) Materials at site

   b) Plant at site

   c) Work-in-progress

3) What is the cost plus contract?

4) How will you calculate profit on incomplete contract?

5) Write short notes on:

   a) Escalation clause.
   b) Retention Money.
   c) Target costing.

6) The following particulars related to a Contract under taken by ABC Engineers:

	Rs.
Materials sent to site	85,349
Labour engaged on site	74.375
Plant installed at cost	15,000
Direct expenditure	3,167
Establishment charges	4,126
Materials returned to stores	549
Work certified	1.95,000
Work not yet certified	4,500
Materials in hand at the end of the year	1.883
Wages due at end of the year	2.400
Direct expendditure accure due at the end of the year	240
Value of plant at the end of the year	11,000
Contract price	2.50,000

Cash received from contractee	1,80,000

You are required to prepare Contract Account showing profit, Contractee's Account and to show suitable entires in the Balance Sheet of the contractors.

(Ans: Notional profit Rs. 28,275; Profit transferred to P & L A / C Rs. 17,400)\

LESSON - 24

STANDARD COSTING

24.1 Introduction

Profit is influenced by various factors among which the cost of production is very important. By controlling costs, the organisation can increase its profit substantially. For this purpose, accountants have developed a tool known "Standard Costing"

The need and importance of standard costing has been recognised by the accountants since the beginning of the present century, due to the limitations of Historical Costing which ascertains the cost after they have been incurred Historical costing a post mortem system of costing and is of little value and use in modern and complex development of industrial workings. So, Standard costing came to be applied in great Britain and U.S.A in the initial stages and there after in all other industrially developed countries of the world. In India, its importance and ability are being increasingly recognised.

24.2 Definition of Standard Cost: It is defined as " A predetermined cost which is calculated from the . monuments" standards of efficient operation and the relevant necessary expenditure. It may be used as a basis for price fixing and for cost control through variance analysis"

I.C.M.A. Terminology.

24.3 Definition of Standard Costing:

It is defined as "The preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence",

I.C.M.A. Terminology

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Wheldon defines standard costing as a "Method of ascertaining the costs where by statistics are prepared to show:

(a) the standard cost

(b) the actual cost; and

(c) the difference between these costs, which is termed the variance

Standard costing is a system of cost accounting which involves a process of "detailed estimating of the cost of a product before it is produced, so that expenditure can be controlled during production; on completion, the actual result can be compared with the estimate and variances ascertained and investigated". Thus, the technique of standard comprises of:

(1) Predetermination of standard costs- i.e.; the setting of standards for every element of cost even before they are actually incurred;

(2) Ascertaining and recording of Actual Costs as and when they are incurred;

(3) Comparison of these two costs (Actual and standard) and recording the 'variances', if any;

(4) Investigating and reporting on these variances to the management so that suitable remedial action may be taken, whenever necessary, in order to control the costs in future.

24.4 How does this system function?

If a system of standard costing is to be established, the following steps must be taken;

a) **Establishing "cost centers"** .- with well defined areas of responsibility - the cost centre may be the " a location, person or item of equipment for which costs may be ascertained and used for the purpose of cost control"

b) **Classifying accounts** - all the accounts are classified in an appropriate

manner and codes or symbols are used for easy collection and analysis of records.

c) **Setting the standards** - this function is the most important of ali the stages in establishing a system of standard costing because the success of the system depends upon the reliability of the standards. For this purpose, the lines of authority are well defined and responsibilities assigned to specific individuals.

24.5 TYPES OF STANDARDS

The term 'standard' refers to "the level of attainment accepted by management as the basis upon which standard costs determined.

There are at least tour types of standard and consequently four types of standard costs which may be used in an organisation. They are as follows:

1. Ideal standard:

An ampitious organisation may try to reach this level of attainment will result from only ideal conditions like maximum sales, low costs of materials and labour etc. As such the organision expects maximum efficiency say, 100% efficiency from all factors of production. Obviously, such ideal condition, rarely, exist therefore, theses ideal standards are normally unattainable and unrealistic. This only discourages the employees with adverse variances.

2. Expected standard:

With a sense of relation, the organisation hopes to attain certain maximum possible efficiency under the actual conditions, which are prevailing in the business. On the basis to this expected level of attainment, standards are set for budget period. Since these standards are based on current conditions, they are fixed for a short term and revised frequently whenever changes take place in the working, conditions. Therefore, such standard costs are also called 'current standard costs'

3. Basic standard:

Under this method, standards are fixed with reference to base year. For instance, if the year 1995 is taken as the base year, then standard costs fixed for that year will be compared with the actual costs of year under consideration. Suppose there is an increase in the actual price of a particular material by 25% over the base year's standard costs of that material, then the basic standard to be fixed now will be adjusted to the extent of basic standard is in the period of time for which the standard are fixed the, while current standard are set for short term, the basic standards are fixed for quite a long period requiring few revisions. The technique of basic standard has been borrowed from the field of statistics wherein index numbers are constructed similarly with reference to a base year.

4. Normal standard:

Sometimes, an average level to attainment is set as the target. This will smooth out the wide fluctuations that may be caused by the seasonal and cyclical changes in business.

After considering these different types of standards one will realize that the standard set for a period be neither too high nor too low. If the standard, is unattainably high, the adverse variances in performance will only discourage the employees and reduce their morale: on the other hand, an obviously low standard is meaningless because it provides an easy target for the employees.

24.6 Standard Costing differs from Budgetary Control

W.W.Bigg says, "A logical development of Budgetary control is standard costing". Both Budgetary Control and Standard Costing are comparable and inter-related systems of cost accounting. It is sometimes misunderstood that both the systems are one and the same. It is true that both have a 'forward looking' approach; hut they differ mainly in the coverage and in certain other respects. Below, we give the similarities and dissimilarities of the two systems.

Standard Costing as a major system of cost accounting involves (a) setting

standards as targets for each element of cost of production, (b) measuring the actual performance (c) comparing the actual results with the standards to calculate the variances, if any and (d) analysing and investigating the reasons for such variances.

Budgetary Control is "a system of management control and accounting in which all operation are forecasted and as far as possible planned ahead, and the actual results compared with the forecast and planned ones" in order to remedy the differences by either adjusting the budget estimates or controlling the cause of differenc

Points of similaritie.

1) Both the systems have predetermined measures of performance as their target, (viz.. Budgets and standards.)

2) Both the systems involve the comparison of the actual results with the original targets to find out the deviations from the plans.

3) Because of the above two features, budgetary control standard costing prove to be very useful systems of control by analyzing and investigating the variances so that corrective measures are taken up in fu true.

4) Under both the systems, responsibilities are assigned to individuals or departments. This facilitates the effective working of management by exception'.

Points of dissimilarities

Both the standard costing and budgetary control are used for control of cost. However, the distinctions between the two are as follows.

1) The main differences between the two systems is in their coverage and application. The scope of the budgetary control is wider than that of standard costing in the sense that a budget is an integrated plan of all

functions of an enterprise while standard costs are confined only to the production functions of the business. !n either words, the budget provides an overall plan of action (covering costs, revenues and other activities like capita! expenditure personal planning purchases, production, sales, etc) but standard costing, being limited to the production and some of the sales functions, covers only costs and revenues from sales. In this context, it may be said that budgetary control system covers standard costing itself.

2) Preparing budgets and enforcing the budgetary control system require the co-ordination of all functions: on the other hand, such a functional co-ordination is not required for the functioning of the standard costing system because it concentrates on the various aspects of costs only.

3) Standards are established on the basis of technical estimates, while budgets are based on past experience.

4) Standard costing can be incorporated in the routine accounting system. As such the variances in the various elements of costs are revealed in the accounting system itself. Bud budgetary control system operates independently. The targets are not included in accounting systems; therefore, the variances are calculated outside the account books and are incorporated in the reports outside the regular accounting system.

5) Standards are "ought to be" estimates while budgets are should be estimates. Standard fix targets, while budget fix limits.

6) Standards are worked out generally "per unit" while budgets are calculate in total amounts.

After considering both the similarities and the dissimilarities between standard costing and budgetary control, we can understand, the both these control systems, should not be treated exclusively as they are complementary to each other.

24.6 Advantages of Standard Costing Systems

If an effective system of standard costing is successfully implemented in an organisation, any benefits will accrue.

1) Standards function as a 'yardstick' to measure the actual performance and the efficiency of labour and other factors.

2) When standards are set, the factors of production are motivated to attain the target. Employees, for instance, are motivated to and improve their productivity and work efficiency.

3) While setting the standards, the best materials and methods are considered in order to read the economics of efficiency.

4) While actual results are compared with the standard, we get variances, which are analysed to show the management where we went wrong. Thus the principle of management by exception is applied so that the busy managers can concentrate their mind only on the exceptional cases.

5) Since standards are set for every element of cost, the costing procedures are simplified.

6) The standard cost of a product forms the basis for pricing the products and formulation of policies.

7) Valuation of closing stock is facilitated by the standard costs of production.

8) When standards are fixed for every cost centre, responsibility to achieve the target is assigned to the concerned people. The actual performance may not be the same as planned such variances may be due to various factors; e.g., the materials might have been utilised inefficiently; power-failure or plant break - down night have caused labour idle-time or the labour might have turned to be less efficient. All

such factors are analysed, investigated and proper actions will be taken whenever necessary.

24.7 Setting of Standard costs for Manufacturing, Administration, Selling and Distribution cost

The setting of standard costs require consideration of following:

1. Quantities
2. Price or rates
3. Qualities or grades

} For each element of cost entering into a product, i.e. material,labour overhead.

The production engineer and cost accountant will have to collaborate in setting. The recording of standard costs and variances the interpretation and presentation to results to management are the cost accountants primary responsibilities.

25.8 Standard costs for Direct Materials

If the benefit resulting from incurring a cost can he traced directly to a product, then such cost a direct cost. Thus if material is used to make a saleable product, the cost incurred for that material can be traced to a specific product on hatch of products by means of a Material, (stores) Requisition.

Material Quantities (Material Utilisation)

Standardisation of the materials, both as to qualities and sizes should proceed the determination of quantities of materials. The aim should he to achieve maximum economics in material usage. Fixing of the precise quality or grade ensures that the customer gets what he expects and the business can be certain of consistently producing the desired grade of product at minimum material cost.

An analysis of a product's material requirements is necessary. This will lead to the preparation of a list which slows, precisely, the types or specifications,

and the quantities of materials, which enter into the product for which the standard cost is being complied. The list prepared is known as a Standard Material specification.

The setting of a standard allowance for waste may be for from easy. The type of standard being' adopted will obviously affect the calculation. If the allowance is too high much inefficiency; if too low, unfavorable variances may not represent inefficiencies. In most cases it should be possible to calculate the unavoidable waste, and this could be used as standard allowance for waste for ideal standards. For an expected standard to be realistic, it is advisable to allow a small percentage for avoidable waste. No precise figures can be stated, for this will depend, upon the nature of the material.

Material Price

Any Material Price Variances are normally referred to the purchasing department for explanation. So, before setting standards for material prices, it is advisable to ensure that the purchasing and store keeping functions are efficient in particular; a study of the following should be made:

1. Procedures for receiving, recording, inspecting and where necessary returning to supplier the materials purchased.

2. Minimum, maximum and re-order levels for each type of material.

3. Discount policy-whether it is the practice to take discounts for prompt payment.

4. Layout of bins, and types of bins used, and location of the different types of materials in the stores.

5. Means of transporting materials lo the producing departments.

The aim should he to increase efficiency in purchasing and store keeping and thus keep down, directly or indirectly, the material prices. Where the practice of including purchasing and store keeping costs in the price of materials is

followed, an increase in efficiency will result in a direct reduction in that price.

24.9 Standard costs for Direct Labour

The workers directly engaged upon the manufacture of a product are known as direct labour. The benefit derived from the labour costs incurred (direct wages) can be traced to a particular product or batch of product. A through analysis of {lie labour operations involved in the manufacture of a product will be an essential preliminary. Close attention must he paid to the grading of labour for the time taken for an operation by a particular grade of worker may not be the same if a different grade is used. The possibility and desirability of substituting machines for hand labour and of improving the plant lay-out should be considered before the standards are set.

Labour Quantities

The labour quantity to be embodied into a product is usually indicated by the number of minutes or hours that the appropriate, grade of worker will take to perform the total number of operations necessary to manufacture that product. Different methods may be used to arrive at the standard times, and the detailed procedures, may differ, depending on the type of industry involved, Nevertheless it is possible to generalize and state two principal methods which may be used to determine standard times. These are as follows:

1. Use of past performance records.

2. Test runs, setting the time s of the essential, basic operation, by the use of work study.

Labour Rate Standard and Grades of Labour

Labour rates paid in the past-'last month or last year are very often a poor guide to what rates will be paid in the future. The supply and demand conditions relating to labour are far from static, so accordingly labour rates may change quite often. A very careful analysis of all factors like to affect wage-rates is the safest

approach. The object is to fore tell, as far as possible, the actual rate which should be paid during the next year. Only by making due allowance for the future trend of wages can a useful. Standards Cost be calculated if a bonus or premium scheme of payment is in operation the cost accountant will have to decide whether to include the anticipated entre payments in the standard rates or in the manufacturing overhead. When a price rate method of payment is in operation the standard cost will be the fixed rate per piece. The general rule is that overtime premiums should he debited to a manufacturing overhead account. The rates for apprentices may require special consideration.

24.10 Standard costs for overheads

A preliminary survey of overheads will be necessary. The aim should be to examine each item of expense with a view to reducing the amounts spent under each heading; e.g. Heading, lighting. General Labour, etc. Every function which involves an indirect cost should be surveyed; the number of indirect workers in relation to direct workers, the clericals the use made of services -all these should be given attention. The correct use of internal transport lights, motors and other essential services should he stressed maximum efficiency in utilization being the aim.

The procedure to follow is shown below:

1. Determine

   (a) Units of products to be made by producing cost centers:

   (b) Work to be performed by service cost centre.

2. Divide the overhead costs into..

(a) fixed

(b) Variable

(c) Semi variable.

3. Calculate the fixed, variable, and semi-variable overhead costs expected to be incurred for each producing cost centre and each service cost centre.

4. Calculate the standard overhead rate for each service cost centre.

5. Apply the services, cost centers, rates to each producing cost centre.

6. Calculate a standard overhead rate for each producing cost centre.

24.11 Standard Cost Card

When standards have been established in respect of each element of costs, it is necessary to maintain a card, known as standard cost card. It is showing the quantity and price of each type of materials, labour, time and rate, hours and rates of overhead Variable and fixed. In short, a Standard Cost Card should be maintained for each product showing total unit cost of production breaking into respective elements of cost.

24.12 Limitations of Standard Costing

1) Setting up of Standards is a difficult task. Establishment of Standards may demand a lot of skill, 'imagination and experience

2) Standards, once set, are not changed for a considerable period. This makes the standards rigid and unrealistic in certain industries which face fluctuations. Revision of standards is not easy and the revision costs high.

3) Standard costing cannot be applied with advantage in industries producing non-standardised products.

4) This method of costing is hardly useful to small manufacturers; the cost of establishment of standards is too high for small producers.

24.13 VARIANCE ANALYSIS

The management through exception for the control of business is possible only when the 'man who matters' is regularly kept informed about erratic and out-of line behaviour of the business. The study of this aberrant and vagrant action of the business is done by comparing and noting the differences in the date on

current performances with the predetermined standards. In cost accounting the difference between the two i.e., actual cost and standard cost, is termed as a variance. Thus Variance serves as a 'red flag' to communicate to management that actual performance is not according to reestablished standards. However, the success and usefulness of variances do hot as much lie inherent characteristics as much in the accuracy and "kill used in fixing the standards with the which these (variance) are compared. Hence, before coining to any conclusion by seeing the variance only, it is desirable for the management to see that such standards are reasonable and accurate and that they are revised in-the light of charged circumstances and persisting alternation so drawn will unnecessarily be distorted and still more serious thing would be that guided by such a bad conclusion futile efforts may be made correct the "not wrong" position.

For Controlling the amount spent, at various stages of production it is necessary for the management not only to know the simple deviations of the actual performance from the standard performance but also essential to know.

(a) When actual performance is not in conformity with the pre-established standards.

(b) Where the variance has taken place, i.e., management know in which departments the excess costs are being incurred.

(c) Why the variance has arisen, i.e., cause of variance must he properly identified. For example, if cost of material is higher than the standard cost then cause of this deviation can he identified by making further investigation into the price of material and quantity of material. Similar investigations can be made in respect of labour cost and overhead cost.

(d) Who is responsible for the variance within the department? The answer to this question is necessary to suggest proper remedial action.

(e) What can hen done about the variance? This must be answered in order to justify the calculation of-variance? Variances arc calculated not for the sake of advantage derived out of it. Normally various alternatives are

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open to the management out of which they select the best one: What is the best is always a little subjective hut unavoidable.

24.14 CONTROLLABLE AND UNCONTROLLABLE VARIANCES

If a variance is equated with the responsibility of a person in the department reflecting on the degree of efficiency there it is said to be controllable variance.

If the cause of variance is beyond. the control of management, being an extraneous cause, it is said to uncontrollable variance.

It is important to realize the importance of the concept of controllable and uncontrollable variance because it is the controllable variance which is very carefully analysed and reported to the management as it is in this direction where a scope of further investigation and ultimate cost reduction can be cleared.

Example: 1

		Rs.
Standard cost of output	-	1,00;000
Actual cost of output	-	90,000.
Variance	-	10.000 (F)

Note:

The actual cost of production is less than the standard cost. Therefore, this variance favorable to the company. Such variances are usually denoted by the abbreviation (f) -e.g., cost variance =Rs.10,000 favourable.

Example: 2

Standard Sales Value	-	(2,500 Units x Rs.10) -	25.000
Actual Sales Value	-	(2,500 Units x Rs.9) -	22,500
Variance	-	2,500 (adv)	

Note:

Here, actual selling price is less than the standard price fixed earlier. Therefore, the difference between the standard and actual sales values (rs.2,500) is adverse. Such adverse variance are denoted by the abbreviation adv- e.g.. Sales Price Variance = Rs.2,500 *adv*

The favourable variance is also called **credit variance or positive variance** while the adverse variance otherwise known as **debit variance or negavtive or unfavourable variance.**

As stated earlier, variances must be analysed and investigated in order to pinpoint responsibilities- i.e. who is to be blamed for the poor performance. For instance, the wages cost for the budget period may show an adverse variance; this may be due to

(a) the recruitment of inefficient workers or

(b) the high rate to wages paid.

Likewise, "Adverse Materials Cost Variance' may indicate either an excessive use of materials or a sudden increase in the price of the materials. Therefore, in a well-established system of standard costing, standards are fixed for all the components of cost and also or certain elements of sales. Consequently, variances in respect of all these standards analysed. In this context, a number of variances may he calculated. Ail these variances are grouped under two heading viz.,

(a) Price Variances and

(b) Volume Variances.

Price variances consist of the following.

1) Material Price Variance.

2) Labour Rate Variance.

3) Variable Overhead Expense Variance.

4) Fixed overhead Expense variance.

5) Selling Price variance.

Similarly, Volume Variances consist of:

1) Materials Usages Variance.

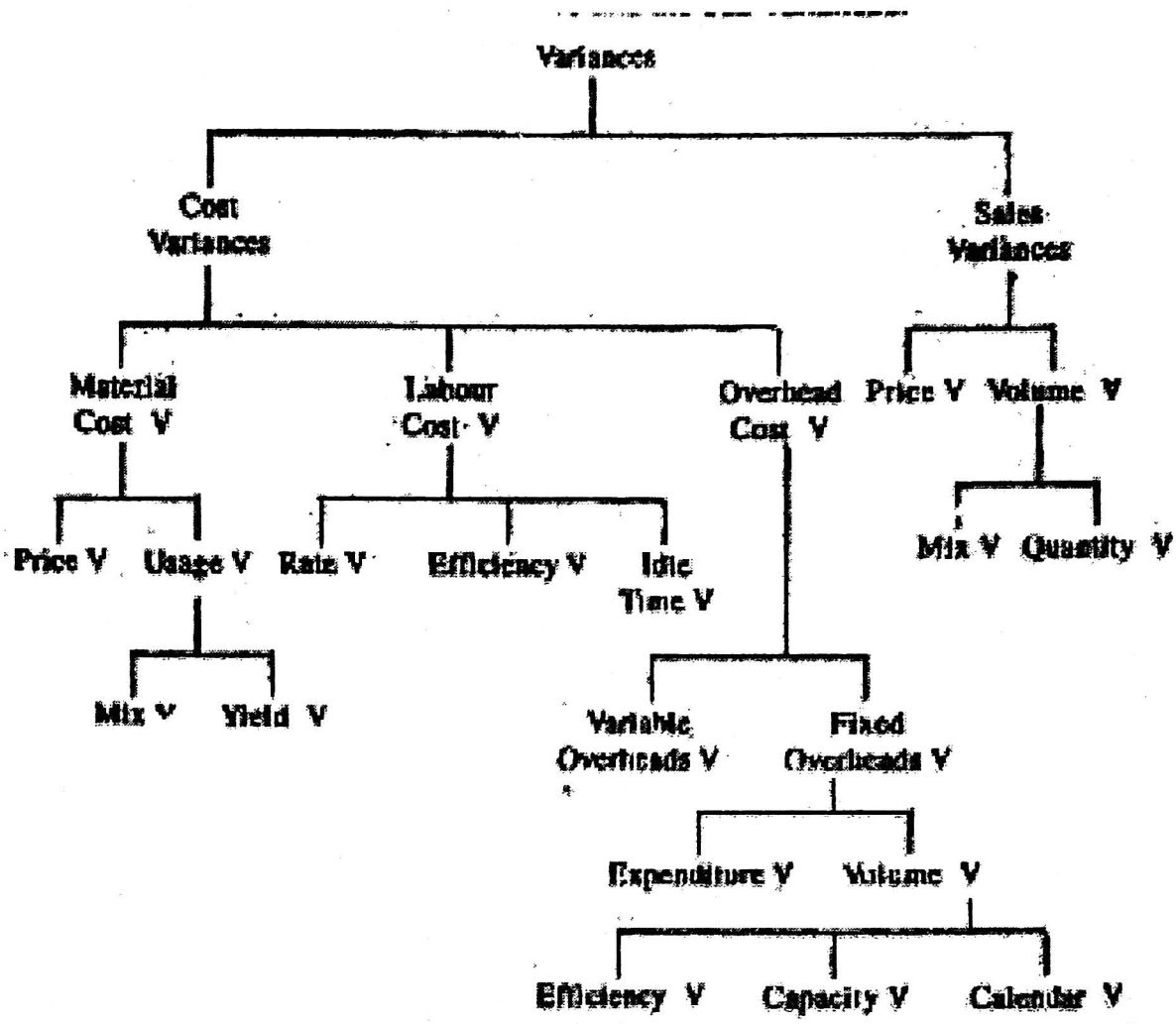
2) Labour Efficiency Variance

3) Fixed Overhead Volume Variance.

4) Sales Volume Variance.

A careful study of these groups of variances will reveal that every element of cost (except variable overheads) will have basically two variances, price and volume variances; therefore the total, of these to variances give the total variance in that element of cost. This is called the "Cost variance". For example, the sum total of the Material Price Variance and the Material Usage Variance is called the Material Cost Variance (simply called Material Variance). As regards safes, the total variance is called the value variance (or sales value variance). It comprises of price variance and volume variance. The following diagram will explain the inter-relationships of the various variances and the sub-variances.

Variances



24.15 Significance of the variances

The various variances and their sub-variances are explained below so that the nature of these variances can he understood properly.

1. Material Cost Variance

This variance shows the difference between the standard cost of direct materials used in the actual output and the actual cost of" direct materials used, If the actual cost is less than the standard cost, the variance is favourable and vice versa. This variance whether favourable or adverse may be due to (a) a change in the price of materials or (b) a change in the usage.

Example :3

Rs.

Standard =10,000unitsx Rs.10 = 10,000

Actual = 9,000 units x Rs.9 = 81,000

Material variance = standard - Actual

= (9000 x 10)-(9000x9)

Rs. 90,000 - 81,000 = 9,000(fav)

a) **Material Price Variance:**

This variance represents that portion of the material cost variance whine is due to the difference between the standard price and actual price, of material. If the actual price Rs.9 and the standard price Rs.K), then the variance for an output of 9,000 units will he Rs.9.000 fav.

b) **Usage Variance** :

This variance in the CQSI of materials is due to the difference between the actual quantity consumed and the standard quantity which ought to have been consumed to produce the actual output.

The Usage Variance is further analysed by calculating the two Sub-Variances viz.. Mix variance and Yield variance..

The mix variance shows the effect of a change in them exture of raw materials consumed and the yield variance represents the difference in terms of cost, between (lie actual output and the output which should have resulted from the input of the materials.

2. Labour Cost Variance

This variance reveals the difference between the standard direct wages

determined for the actual output and the actual wages paid for the actual output. Tins variance is further analysed to show the factors which contribute towards thi* cost difference.

a) Rate Variance:

This is concerned with the portion of the cost variance which is due to a change in the wage rate. If the actual wage rate paid to the employees is higher than the standard rate, we get an advers variance and vice versa.

b) Efficiency Variance:

This signifies efficiency level of employees. This variance is calculated as the difference between the standard labour hours specified for the output achieved and the actual labour hours spent.

c) Idle-time Variance:

The cost in terms of the standard wage rate of the actuals hours that were spent idle by the employees due to abnormal and unavoidable circumstances.

3. Variable Overheads Variance

As stated earlier, only one variance is calculated in this element of cost i.e., variable overheads expenditure variance. This variance indicated the difference between the standard cost of the overheads absorbed in the actual output and the actual overhead cost.

4. Fixed Overheads Variance

Fixed overheads cost variance is the difference between the standard cost of overheads absorbed in the actual output and the actual overhead cost. The two major sub-variances are expenditure variance and volume variance.

(a) Expenditure Variance:

This is (he difference between the budgeted fixed overheads and the actual

fixed overheads incurred.

(b) Volume Variance:

This represents that portion of fixed overhead variance which is the result of a difference between the standard cost of overhead absorbed in the actual output and the standard allowance for that output (standard allowance here refers to the budgeted overheads). Thus the volume variance reveals the over or under absorption of the fixed overheads in the budgeted period. The volume variance is further analysed as follows.

(b-1) Efficiency Variance:

This sub variance is concerned with that portion of the volume variance which is caused by the increased or decreased output arising from efficiency attained above or below the standard.

b-2) Capacity Variance:

This measures that portion of the volume variance which is the result of working at higher or lower capacity usage. If the capacity of the factory is not fully utilised we get an adverse capacity usage variance and vice versa.

(b-3) Calendar Variance:

This variance calculates that portion of volume variance which is a difference between the actual number of working days in a period (say a week or month) and the standard number of working days for that period, valued at the standard absorption rate.

Supposing that the standard number of working days for a month is fixed as 2.5 days and the factory has functioned for 26days (i.e., a day more): the result is over absorption of overheads to the extent of one day at the standard rate. On the overhead, if the actual number of working days decreased to 24 days (i.e., day less than the standard) than if will result in under-absorption of overhands to the extent of one day's output in terms of standard rate.

Seasonal Variance:

It arises in the case of seasonal industries, like sugar industry. For example, the crushing season of the sugar factory is planned for 200 days, but the actual crushing period is extended to say, 210 (i.e., ten days more than the budgeted period). This will result in over absorption of the extend of 10 days at the standard rate.

5. Sales Variance

A system of standard costing will he incomplete if the sales variances are not included in the information of variance analysis when compared with the cost variances, these sales variances are difficult to calculate. There are/two methods of calculation of sales variances. Both (lie methods will give different final results. The two methods are (1) Turnover Method and (2) Profit Method the first method showing the effect of a change in sales on turnover and the second one indicating the effect of a change in sales on profits. Of these two methods, the profit method is more useful and is familiar with accountants. The London Institute of Cost and Works Accountants also favour this method. Variance calculated under this method have been restyled as Margin Variances (or sales margin variances). On the other hand variances calculate under the turnover method arc called value variances (or sales value variances).

The total sales margin variance calculated under the profits method reveals the "difference between the budgeted profit and the actual profit". This difference may be due to a change in price and or a change in volume. Therefore, the total sales margin variance may he further analysed by calculating the two important sub variances viz.. Price variance and volume.

a) **Price Variance:**

That portion of sales margin variance which is due to a price change. This variance calculates the "difference between He standard profit and the actual profit."

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b) Volume Variance:

This represents that portion of sales margin variance which is due to a chance in the volume of sales. This variance calculates the "Difference between the budgeted and the standard volume".The volume Variance can be further sub-divided into (1) Quantity variance and (2) Mix variance.

(b-1) Quantity Variance:

This is concerned with that portion of volume variance which is due to a change in the total number of units sold.

(b-2) Mix Variance:

This represents that portion of volume variance which is due to a change in the proportion (or mix) of the various goods sold. This variance may arise only when more than one ' commodity is sold. The quantity and mix variances which make up the volume variance may be explained with the following examples.

Example : 4 (Quantity variance alone)

	Budget	Actual
Product	y 100 units @ Rs. 10 each	200 units @ Rs. 10 each
	X 200 Units @ Rs. 15 eah	400 units @ Rs. 15 each
	---	---
	600	600
	---	---

Here, more number of units have been sold (at the budget price) but the proportion or ratio between the two product is maintained as budgeted, (i.e., 1:2) Therefore, the volume variance comprises of quantity variance alone.

Example : 5 (Mix Variance alone)

	Budgeted			Actual
Product	y	100	Units @ Rs. 10 each	150 Units @ Rs. 10 each
	x	200	Units @ Rs.15 each	150 Units @ Rs. 15 each
		---		---
		300		300
		---		---

Here, the total of units sold are as budgeted but the mix of the sales has changed from the ratio of 1:2 to the ratio of 1:1. Therefore the volume variance is caused only because of the change in the sales mix.

Example : 6 (Volume Variances due to both quantity and mix changes)

	Budgeted		Actual	
Product	y	100	Units @ Rs. 10 each	250 Units @ Rs. 10 each
	X	200	Units @ Rs. 15 each	350 Units @ Rs. 15 each
		300		600

Here, not only the total of units sold has changed but also the mix different from the budgeted one. So the volume variance consists of both quantity and mix variances.

24.16 REVISION OF STANDARDS

As stated earlier, the variances, both adverse and favourable should be analysed after they are recorded. It should be understood that a favourable variance does not always reflect the increased efficiency. Therefore, they should also be analysed as seriously as adverse variances. Standards once set may become absolute in course of time due to various factors. This needs a revision as standards at convenient intervals. Various factors like changes in prices or wage rates or technological changes also necessitate the revision of standards. Depending on the nature of varianced and situations, the revision may be upward or downward.

Disposal of Variances:

Variances recorded in the books of accounts can be dispose of in two alternative ways i.e., (q) the variances are charged to the costing profit and loss a/c or (2) they are charged to the cost of sales and inventories.

Under the first method, adverse variances are debited and favourable variances are credited to the costing Profit and Loss a/c.

Under the second method adverse variances are added back to the standard cost of sales and inventories (as they are, in effect product costs) and the favourable variance are deducted. By this process, the actual cost of sales and inventories are shown in the balance sheet.

Illustration : 1 (Material Cost Variances)

A manufacturing company uses one. ton of raw-materials to produce 25 units of the product that it sells. The standard price of the material was fixed @ Rs.5 per ton. In the first month of the budget period, 100 tons of materials were used, to produce 2600 .units of the product. The materials were actually purchased @ Rs.5.50 per ton. Calculate the Material cost variance during this month and also expalin the causes for this variance with help of the relevant sub-variances.

Material Cost Variance = Standard cost - Actual cost

Rs.520-Rs.550 =-Rs. 30 (adv)

Notes :

a) Standard cost =Actual output x Standard rate = 2,600 Units xRe. 0.20 = Rs.520

b) Standard rate = $\frac{\text{Standard cost per ton}}{\text{standard out per ton}} = \frac{\text{Rs.5}}{\text{25 units}}$ = Re. 0.20

c) Actual cost = Materials consumed x Actual price

= 100 tons x Rs.5.50 = Rs.550

This adverse variance of Rs.30 is disc to an increase in the price of the materials. However, due to an efficient use of (tic materials, the incidence of price rise is tempered. These can he explained with She help of following calculation:

1) Price Variance = Actual quantity (Standard price - Actual price)

= 100 tons (5 - 5.50) = Rs.50 (adv)

2) Usage Variance = Standard price (standard quantity - Actual quantity)

Rs.5 (104 – 100tons) =Rs.20(fav).

Verification: Materials cost variance = Price variance + Usage variance Rs.30 (adv.)

= Rs. 50(adv) + Rs.20 (fav)

Standard quantity represents the quantity of materials which should have been consumed to produce the actual output- i.e..2600 X 1/25 = 104 tons.

Illustration: 2 (Material (Mix) cost Variance)

The standard mix of raw materials for the production of 1000kgs of finished is as follows:

(For one mix)

Materials	Weight Kg	Price per kg
X -	600	1.50
Y -	300	2.00
Z -	200	2.50

The actual quantity of materials used in the factory is as follows:

X - 3.000kg. - Rs.1.60p.kg.

Y - 2.400kg. - Rs. I.80 p.kg.

Z - 1,600kg. - Rs.2.75p.kg

Totally 6 mixes were processed with an actual production of 6.7000 kg. of finished goods Calculated the Material Cost Variance and its sub variances.

Workings

1) Normal **Standard Coat** of A Mixes ;

Materials	**Qty.**	**Price Per Kg.**	**Amount Rs.**
X	3,600kg; x	1.50	= 5.400
Y	1,800kg. x	2.00	= 3.600
Z	1,200kg. x	2.50	= 3,000
	6,600kg. 600 kq		12,000

Estimated output 6,600kg. 12,000

Standard cost per unit of output = $\frac{12,000}{6,000} = Rs.20$

(b-2) Yield Variance:

Std. rate (std. yield - Act. yield)

Rs.2 (6,000-6,700)

= Rs. 1,400 (fav.)

Check: Material Cost V. = Price V. + Usage V.

= Rs. 120 (adv) = Rs.220 (adv.) + Rs.100 (fav.)

M.UasageV. (Rs.100 (Fav)

MixV + Yield V.
Rs. 1,300 (adv.) + Rs. 1,400 (fav.)

Illustration : 4 (Labour Cost Variances)

In a manufacturing concern employing 150 workers, standards have been set for direct wages as follows.

Standard wage rate	=	Rs. 1.00 per hours per worker.
Standard working hours	=	35 hours a week
Standard performance	=	250 units per hour.

Totally 150 employees are engaged in the factory.

During the last week of December 1990 a machine broke down in the assembling department which caused all the 50 employees of that department idle for one hour. The actual production during the remaining month was 9,000 units. 5 employees were paid at the rate of Rs.1.20 per hour and remaining were paid at the standard rate. Calculate the relevant variances.

Labour Cost variance = Stand. Cost - Actual Cost

= Rs.5,400 - Rs.5,285 = Rs.115 (fav.). **Note:**

a) Standard cost = Actual output x Standard rate per unit

= 9,000 units X Rs.0.60 - Rs. 5,400

b) Stand rate = Standard cost per hour (per unit)

Standard output per hour

$$= \frac{Rs.1x150}{250Units} = 0.60$$

c) Actual cost = 145 workers x 35hrs x Re. 1 = Rs. 5,075

5workersx35hrs.xRs1.20 = Rs. 210

Rs. 5.285

This favourable variance of Rs. 115 is due to an increased efficiency of the, loabour, despite the adverse effects of idle-time and higher wage rate for 5

NOTES

workers. These aspects are explained.

1) Efficiency Variance:

Standard rate per hour (standard man hrs. - Actual man hrs. Re. 1.00 (5,400 - 5.200) = Rs. 200 (fav)

Note:

a) Standard hours represent the time which should have been taken to manufacture the actual output.

$$\text{i.e}\frac{\text{Actualoutput}}{\text{Standardoutputperunit}} = \frac{9000}{250\text{unitsperhour}} = 36\text{hours}$$

Total man-hours = 36hrs. x 150 men = 5,400.

b) Actual hours do not include the idle time spent due to the break-down of
the machine.

(100x35) + (50x34) = 5,200 hrs.

2. Rate Variance:

Actual hours (standard rate - Actual rate)

175 hrs (Re.1.00 - Rs. 1.20) = Rs. 35 (adv.)

Note:

Here the actual hours mean the time worked by those workers, who were paid a different rate. (i.e., 35 hrs x5)

3) Idle time Variance :

Idle hrs x Standard rate per hours.

50 hrs. x Re. 1.00 = Rs. 50 (adv.)

Check = Labour Cost Variance = Efficiency V + Rate V + Idle Time V.

Rs. 115 (fav.) = Rs. 200 (fav) + Rs. 35 (adv.) + Rs.50 (adv.)

Illustration :5 (Variable Overhead Cost Variance)

In a manufacturing concern, the standard variable overhead is Re.0.20 per unit. During the month of January 2003, 1000 units were produced involving a total variable overhead expenditure of Rs. 210 Calculate the variance.

Part able Overhead Expenditure Variance:

Standard Cost - Actual Cost

Rs. 200 - Rs. 210= Rs. 10 (adv.)

From this illustration we can understand that calculation of variable overhead variance is easier than that of any other variance.

Illustration :6 (Fixed Overhead Cost Variance)

In a manufacturing company, the budgeted output for the year 2003 was 7,50,000 units. For this period the fixed overheads were expected to amount to Rs. 3,30,000. During the first month of the budgeted period (January. 80) 42,000 units were actually produced incurring fixed expenses to the tune of Rs.20,000. The standard performance is 300 units per hour and 35 hours work per week 4 hours were lost during this month as idle time calculates the variances.

FIXED OVERHEAD COST VARIANCE

Standard cost - Actual cost
= Rs. 18,480- Rs. 20,000 = Rs. 1,520 (Adv.) :

Note : Standard cost = Actual output X Standard rate

= 42,000 units x 0.44

= Rs. 18,480

$$\text{Std Rate} = \frac{3,30,000}{7,50,000} = \text{Re}.0.44$$

Sub-variance:

a) Expenditure Variance:

Budgeted Cost - Actual Cost

= Rs. 27,500 - Rs. 20,000 = Rs. 7,500 (fav.)

Note:

Budgeted Cost

$$\frac{\text{Total fixed over heads}}{\text{Number of months budgeted.}}$$

$$\text{Rd.}\frac{3,30,000}{12} = \text{Rs.}27,500$$

b) Volume Variance:

Standard rate (Budgeted quantity - Actual quantity)

Re. 0.44(62,500-42,000)

Rs. 9,020 (adv.)

Note:

$$\text{Budged Quantity} = \frac{\text{Budgetedoutput p.a}}{\text{Budgeted number of months}}$$

$$= \frac{7,50,000}{12} = 12,500\text{units}$$

Since, the actual output is less than the budgeted output, there is under

recovery of overheads. Therefore, it is an adverse result.

Check: Cost variance can be further analysed by calculating the two sub-variances, (a) Efficiency variance and (b) capacity variance. These Variances show the change in efficiency or in capacity utilised.

(b-1) Efficiency Variance :

Standard rate (standard quantity - Actual quantity)

= 0.44 (40,500-42,000)

= 0.44(1,500)

= Rs. 660 (fav.)

Note:

Standard quantity = Actual hrs. x Standard quantity per hours

135x300=40,500 Units.

Here, the actual production has exceeded the standard output. Therefore more number of units share'the burden of fixed overheads. Thus, the variance is favourable.

(b-2) Capacity Variance:

Standard rate (Std. quantity - Budgeted quantity)

= 0.44 (40,500 - 62,500) = 0.44 (22,000) = Rs. 9,680 (adv.)

Here, the standard quantity is less than our original target by 22,000 units. To that extent, the variance is adverse because capacity has been less utilised.

Check : Volume Variance = Efficiency V + Capacity V.

Rs. 9,020 (adv.) = Rs.660!(fav.) + Rs 9^680 (adv.)

NOTES

Illustration :7

(Sales variances)

From the following data, calculate the sales variance to be reported to the management of the Jai Javan company.

	Budgeted		
Sales	9000 units x Rs. 10 = 90,000	10,000 units x Rs. 3	= 30,000
Cost	9000 units x Rs. 8 = 72,000	10,000 units x Rs. 2	= 20,000
Profit	= 9000 units x Rs. 2 = 18,000	10,000 units x Rs. 1	= 10,000

	Actual	
Sales	12,000 units x Rs. 9 = 1,08,000	13,000 units Rs. 2.50 = 32,500
Cost	12,000 units x Rs. 7 = 84,000	13,000 units x Rs. 1.75 = 22,750
Profit	= 12,000 unit x Rs. 2 = 24,000	13,000 Units x Re. 0.75 = 9.750

Calculation of Variances:

1) Total sales margin Variance :

1) Total sales margin variance = Budgeted profit - Actual profit

Product A:	=	Rs. 18,000	- 25,000
Product B:	=	Rs 10,000	- 9,750
		Rs. 28,000	- 33,750

Margin Variance Rs.5,750 (fav.)

2) Margin Variance due to selling price (Price Variance) :

= Standard profit - Actual profit

= Rs. 37,000 - 33,750

Price Variance Rs. 3,250 (adv.)

Note :

The Standard profit refers to the profit earned by actual sales at the budgeted price and cost. This can be calculated as follows.

	Standard	
	Product A	**Product B**
Rs.		**Rs.**
Sales Price	10	3
Cost	8	2
Profit rate per unit	2	1
Actual Sales...	12,000 unit	13,000 units
Standard profit	(12,000x2)	(13,000x1)
	Rs. 24,00.0	Rs.13,000

Total standard profit = Rs. 24,000 + 13,000 = Rs. 37,000

Margin variance due to volume (Volume Variance) = Budgeted profit – tandard profit

= Rs. (18,000 + 10,000) - (24,000 + 13,000)

= Rs. (28,000 - 37,000) = Rs. 9000 (fav.)

Check: Total Sales Margin Variance = Price V + Volume V

= Rs.5,750(fav.)+3,250(adv.)=Rs.9,000(fav.)

NOTES

Illustration :8

Following are the standard and actual cost figures for a factory for the year 1979-&0 computre the variances and their sub-variances.

	Standard 30,000 Rs.			Actual 31,500 Rs.
Direct materials Rs. 2 per kg	60,000	@	Rs. 2.50 per kg	62,700
Direct Labour				
@ Re. 1 per hr...	45,000	@	Rs. 1.10 per hr	47,850
Variable overheads	30,000			31,000
Fixed overheads	60,000			68,000
	1,95,000			2,09,550

Workings:

The Actual production has increased over the standard larger by 1,500 units (31,500 - 30,000) so we have to first calculate the revised standards for each element of cost and then find out the variances, if any.

Standard cost (Revised) = Actual output x std rate per unit.

REVISED STANDARDS

(A) Std. Materials *cost* = Act. Output x Std race per unit\

$$31{,}500 \times \frac{\text{Rs. } 60.000}{30{,}000} = \text{Rs.}'63{,}000$$

(B) Std. Labour cost = Act, Output x Std. rate per unit.

$$31{,}500 \times \frac{\text{Rs. } 45.000}{30{,}000} - \text{Rs. } 47{,}250$$

(C) Std. Variable overheads cost = Act. output x Std. rate per unit

$$= 31,500 \times \frac{\text{Rs. } 30.000}{30,000} = \text{Rs. } 31,500$$

(D) Std. fixed overheads cost Act. output x std. rate per unit

$$= 31,500 \times \frac{\text{Rs. } 60.000}{30,000} = \text{Rs. } 63,000$$

(E) Std. Total cost = Actual output x Std. rate *of cost* per unit

$$= 31.500 \times \frac{\text{Rs. } 1.95,000}{30,000} = \text{Rs.}2,04,750$$

After calculating the revised standard as above, we have to now calculate the variance in each element of separately by using the following formula:

(Cost Variance = Standard Cost* - Actual Cost)

It refers to the revised standard cost as calculated earlier.

The reason or reasons for each of the above variances can he found in the respective and variances. These can be calculated follows.

Sub - Variances

1) Material Cost Variance = Rs. 300 (fav.)

(1-a) Price variance = Act. input (std. price - Act. price)

= 25.080 kg. (Rs. 2-2.50) = Rs. 12.540 (adv.)

(1-b) Usage variance = Std. price (std. input - Act. input)

= Rs. 2(31,500 kgs - 25.080 kgs.) = Rs. 12,840(fav.)

2) D. Labour Cost Variance = Rs. 600 (adv.)

(2-a)*Rate Variance:

Actual hrs worked (Std. rate - Act rate) = $\frac{47,850}{1,10}$ (Rs.100 - Rs. 1.10)

43.500 hrs. (Re. 0.10)

Rs. 4,350 (adv.)

(2-b) Efficiency Variance:

Std. rate(std hrs. - Act hrs.) = Rs.1, (47,250 - 43,500)= Rs. 3,750 (fav.)

Check : Labour Cost Variance = Rate V. + Efficiency V.

Rs. 600 (adv.) = 4.350 (adv.) + 3.750) (fav.)

3) Variable Overhead Cost Variance = Rs. 500 (fav.)

Note: There are no sub variances for variable overheads as (he only variance is the expenditure.

4) Fixed Overhead Cost Variance = Rs. 5.000 (adv.)

(4a) Expenditure Variance:

Budgeted expenditure - Act. Expenditure = Rs. 60,000 -.68,000= Rs. 8000 (adv.)

(4b) Volume Variance:

Std^rate per unit (Budgeted output - Act. output)

= Rs. ^{60,00_0} (30.000 units - 31.500 units) 30,000

= Rs. 2x 1,500 units = Rs. 3,000 (fav.)

Note: This variance is favourable because when more number of units are produced, the fixed overhead absorbed per unit will be less - i.e., the incidence of cost will be lesser than the budgeted one.

(5) Total Cost variance = Rs. 4800 (adv.)

This is equal to the sum of all cost variances :-

1)	Material Cost Variance	=	Rs. 300 (fav.)
2)	Labour Cost Variance	=	Rs. 600 (adv.)
3)	Variable Overhead Variance	=	Rs. 500 (fav.)
4)	Fixed Overheads Variance .	=	Rs. 5,000 (adv.)
			Rs. 4800 (adv.)

CHART SHOWING THE COST VARIANCES AND SUB VARIANCES

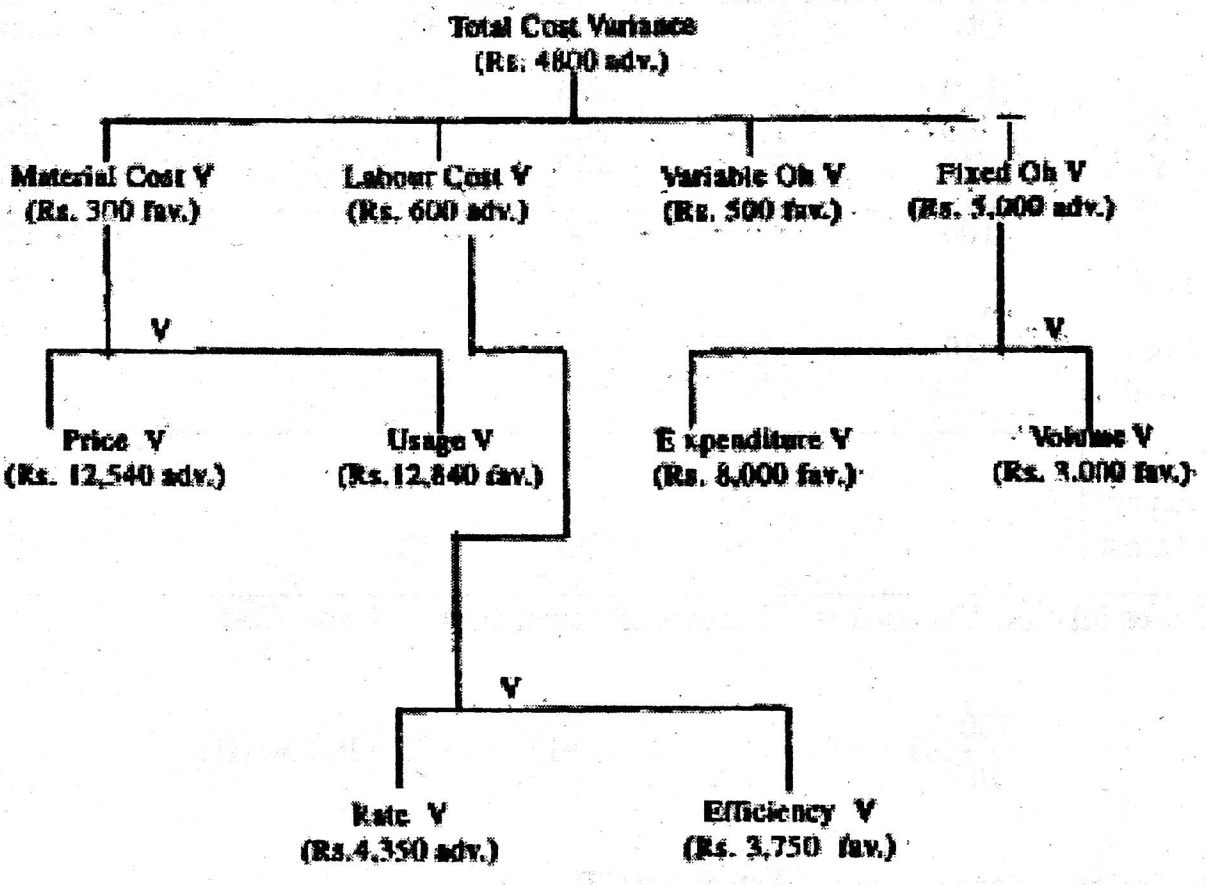

Illustration :9

A Ltdls engaged in producing a 'standard mix' using 60 kgs of chemical X and 40 kgs. of chemical Y. The standard loss of production is 30%. The standard price of X is Rs.5 and of Y is Rs.1C per kg.

The actual mixture and yield were as follows:

X 80 kgs. @ Rs.4.50 per Kg. and

Y 70 Kgs @ Rs.8.00 per Kg.

Actual yield 115 Kgs.

Calculate material variances.

Solution

	Standard			Actual		
	Qty. (Kg)	Price (Rs)	Amount (Rs)	Qty. (Kg)	Price (Rs)	Amount (Rs)
X	60	5	300	80	450	360
Y	40	10	400	70	800	560
	100		700	150		920
Less Loss Total	30		-	35		—
Output and Cost	70		700	115		920

1) Material Cost Variance = Std cost of Actual output - Actual Cost.

$$\frac{700}{70} X115 - 920 \qquad = 1150 - 920 = \text{R. } 230 \text{ (f)}$$

2)Materials price variance = Actual qty (SP – A)P)

X = 80 (5.4.50) = Rs. 40 (F)

Y = 70 (10-8) = Rs. 140 (F)

---

180 (F)

---

3. **Materials usage variance** = SP (Std. Qty for actual output – Actual Qty)

$$X = 5(\frac{60}{70}X115 - 80 = 93(F)$$

$$Y = 10(\frac{40}{70}X115 - 70 = 43\ (F)$$

180 (F)

4. **Material mix variance** = SP Revised std Qt – Actual Qty)

$$X = 5\ (60 \times \frac{150}{100} - 80) = Rs.50(F)$$

$$Y = 10\ (40 \times \frac{100}{100} - 70 = Rs.\frac{Rs.100(A)}{Rs.50(A)}$$

5) **Material Yield variance** = Std Cost per units (Std. Yield for Actual mix - Actual Yield)

$$\frac{700}{70}(\frac{70}{700} \times 150 - 115) = 100(F)$$

Verification

1) MCV = MPV + MUV

230 (F) = 180(F) + 50 (F)

2) MUV = MMV + MYV

50(F) = 50 (A) + 100 (F)

Illustration: 10

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

Man - Re. 0.80

Woman - Re. 0.60

Boy - Re. 0.40

NOTES

In a normal working week of 40 hours, the gang is expected to produce 2000 units of output.

During the week ended 31st December 1997, the gang consisted.of 40 men, 10 women and 5 boys. The actual wages paid were @ Re. 0.70, Re. 0.65 and Re. 0.30 respectively. 4 hours were lost due to abnormal idle time and 1600 units were produced.

Solution:

1) Labour cost variance = Std. Cost of Actual output - Actual Cost

$$= \left[\frac{1480}{2000} x 16000\right] - 1440 = 256(A)$$

Std. Cost			**Rs.**		**Actual Cost** -		**Rs.**
Men-	30	x.80	x 40 =960	40	x.70	x 40	= 1120
Women-	15	x.60	x 40 =360	10	x.65	x 40	= 260
Boys-	10	x.40	x 40 =160	5	x.60 ,	x 40	= 60
			1480				1440

2. Labour Rate Variance= Actual Hours paid (SR-AR)

Men	40	x 40 (.80 - .70)	160 (F)
Women	10	x 40 (.60 -.65)	20 (A)
Boys	5	x 40 (.40 -.30)	20 (F)
			Rs. 160 (F)

3) **Labour Efficiency Variance** = Std Rate (Std. Hours for Actual output - Actual Hours worked)

Men - 0.80 $\left[\frac{30x40}{2000} x 1600 - (40x36)\right] = 384(A)$

Women - 0.60 $\left[\frac{15x40}{2000} x 1600 - (10x36)\right] = 72(F)$

Boys - $0.40 \left[\frac{10x40}{2000} x1600-(5x36)\right] = 56(F)$

256

Actual Hours Worked = A.H. Paid - Abnormal time.

4) Idle Time Variance = Std. Rate X Idle Time

men = 0.80 x 40- x 4 = 128.(A).

Women =0.60x10 x4's = 24 (A)

Boys

=0.40x 5 x4 = 8(A)

Rs. 160 (A)

LCV = LRV+LEV+ITV.

256(A) = 160(F)+ 256 (A)+ 160 (A)

5) Labour Mix Variance = Std, Rate (Revised Std. Hours - Actual Hours)

Men 0.80 $(\frac{30x40}{2200} x1980-40x36) = 288(A)$

Women 0.60 $(\frac{15x40}{2200} x1980-10x36) = 108(F)$

Boys 0.40 $(\frac{10x40}{2200} x1980-5x36) = 72)(F)$

Rs. 108(A)

Total Std. Hours = 30x40 + 15x40 + 10x40 = 2200

Total Actual Hours = 40x36+10x36 +.5x36 =1980

Illustration: 11

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

Category of	Standard		Actual	
	No. of Labours	Weekly wage rate per labour	No. of Labours	Weekly wage rate per labour
Skilled		Rs.		Rs.
Semi-skilled	75	60	70	70
un-skilled	45	40	30	50
	60	30	80	20

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

Solution:

Labour cost variance = Std. Cost of Actual output - Actual cost

= 2,43,000 - 2,53,000 = Rs. 13.000 (A)

	Std cost of Actual output, Rs.		Actual cost Rs.	
Skilled	30 x 75 x 60	= 1,35,000	32x70x 70	= 1,56.800
Semi-skilled	30 x 45 x 40	= 54,000	32x30x 50	= 48,000
un-skilled.	30. x 60 x 30	= 54,000	32 x 80 x 20	= 51,200
		2,43,000		2,56,000

2) **Labour Rate variance** = Actual weeks paid (SR - AR)

			Rs.
Skilled	=	70x32(60-70)	= 22.400(A)
Semi - skilled	=	30 x 32 (40-50)	= 9,600 (A)
Un- skilled	=	80 x 32 (30-20)	= 25,600 (F)
			6,400 (A)

3) **Labour Efficiecy Variance** = SR (Std. weeks for Actual output - Actual weeks)

			Rs.
Skilled	=	60(75x30 - 70 x 32)	= 600(F)
Semi-skilled	=	40(45x30 - 30x32)	= 15,600 (F)
Un-skilled	=	30 (60 x 30 - 80 x 32)	= 22,800 (A)
			6,600 (A)

LCV = LRV + LEV

13,000 (A) = 6,400 (A) + 6,600 (A)

4) **Labour mix Variance** = SR (Revised std weeks for Actual output - Actual weeks)

			Rs.
Skilled	=	60(75x32-70x32)	= 9.600(F)
Semi-Skilled	=	40(45x32-30x32)	= 19,200 (F)
Un - Skilled	=	30(60x32-80x32)	= 19,200 (A)
			9.600(F)

5) Labour yield variance = Std. cost per job (Std. yield for Actual mix - Actual yield)

2,43,000 =1/5400x5760-1=16,200

Std. Mix = 180 workers x 30 weeks = 5400
Actual Mix- 180 workers x 32 weeks = 5760
LEV = LMV + LYV
6600 (A) =9600 (F) + 16200 (A)

Illustration : 12

The following figures have been extracted from the cost books of a factory for the month of March 2002.

	Standard	Actual
Number of units produced	15,000	16,000
Capacity	100	105

Number of days worked	25	26
Variable overheads	Rs. 30,000	Rs. 31,500
Fixed overheads	Rs. 45,000	Rs. 46,500

Solution

1) Variable overhead variance = Std. o/h. for Actual output - Actual V. o/h

$$= \frac{30,000}{15,000} x\, 16,000 - 21,500 \text{ Rs. } 500 \text{ (F)}$$

2) Fixed overhead variance = Std o/h. for Actual output - Actual F. o/h.

$$= \frac{45,000}{15,000} x\, 16,000 - 56,500 \text{ Rs. } 1,500 \text{ (F)}$$

3) Expenditure variance = Budget Expenditure - Actual Expenditure

$$= 45,000 - 46,500 \quad = \quad \text{Rs. } 1500 \text{ (A)}$$

4) Volume Variance = Std-. Rate (Budget output - Actual output)

$$= \frac{45,000}{15,000} x\, 15,000 - 16,000 \text{ Rs. } 3000 \text{ (F)}$$

FOV = Exp. V+V.V.

1500(F) = 1500(A) +

3000(F)

5) Capacity Variance = SR (Budget output - Budget output due to change in capacity)

$$= 3(15,000 - \frac{1500}{100} x105)$$

$$= 3 (15,000 - 15,750) = \text{Rs. } 2250 \text{ (F)}$$

6) Calendar Variance = SR (Budget output due to change in capacity - budget output due to change in working days)

=3 15,750- 15,750/25x26

= 3 (15,750 - 16,380) = Rs. 1890 (F)

7) Efficiency Variance = SR (Budget output due to change - Actual output)

3(16,380-16,000) =Rs. 1140(A)

Vol. V = Cap. V + Cal. + Eff. V

3000 (F) = 2250 (F) + 1890 (F) + 1140 (A)

Model Questions:

1) What is meant by standard costing? State its main objectives.
2) State the advantages of standard Costing. In which type of industries standard costing is employed?
3) Discuss the relationship of budgetary control and standard costing.
4) Define and explain briefly the following terms.
   a) Material Price Variance
   b) Material Usage variance
   c) Material Mix Variance
5) Define and explain the different labour variances.
6) Explain the different methods of disposal of variances.

NOTES

7) From the following information, calculate (he variances

Standard

		Rs.
Material A	40 Kg. x Rs. 3 =	120
Material B	60 Kg. x Rs. 2 =	120
	100	240

Standard output = 80 kg.
Normal loss' -20%

Actual

Material A	600Kg.	@	Rs. 2per.kg.
Material B	400Kg.	@	Rs. 3per kg.

Actual output - 700 kg.

8) The standard material cost to produce a tonne of chemical X is 300Kg. of Material A. @ Rs. 10per kg.
400Kg. of Material B. @ Rs. 5per kg.
500Kg. of Material C. @ Rs. 6per kg.

During the period. 100 tones mixture were produced from the usage of 35 tonnes of Material A. @ Rs. 9000 per tones
42 tonnes of Material B. @ Rs. 6000 per tonne.
53 tonnes of Material C. @ Rs. 7000 per tonnes
Calculate price usage mix variances.

9) Calculate Labour Rate Efficiency. Mix and cost Variances from the following.

Skilled	6000	2,00	12,000	5800	2.50	14,500
Semi Skilled	8000	1,10	8.000	X500	1.00	X.5M
Skilled	12,000	0.50	6000	12,500	0.60	7.500
	26.000		26.000	26.000		30,500

10) The following is the cost date for the month of April

Actual member of working days	24
Actual man-hours worked	9,600
Actual units produced	800
Actual Fixed overhead incurred	4,200

The company's budget and standard cost data for the month are as follows.

Budgeted number of working days	22
Budgeted man hours	8,800
Std. man hours per unit produced	11
Std. fixed overhead rate per man hour	Re 0.50

Calculate fixed overhead variances.

11) From the following details calculate the variances.

	standard	**Actual**
Output for the month (units)	10,000	10,090
No. of working days	25	24
Working Hours.	2,000	1,950
Fixed overheads	Rs. 15,000	Rs15,150

12)From the following budgeted, actual figures, calculate and present the variances in respect of profit, sale and cost of sales.

Budget	**Rs.**
Sales - 2000 units @ Rs. 15 each	30,000
Cost of sales @ Rs. 12 each	24,000
Profit	6,000

Actual	**Rs.**
Sales - 1900 units @ Rs.14 each	26,600
Cost of sales @ Rs. 10 each	19,000
Profit	7,600

LESSON - 25

TRANSFER PRICING

Before going to the subject, let us know about a few terms related to the above subject. They are as follows:-

25.1 Profit centre

1. A profit center is any sub-unit of an organisation (e.g) division of a company to which both revenues and cost are assigned, so that profitability of the may be measure.

2. In many organizations, the manager in charge of a profit center is made accountable and responsible for the profits achieved. There are some highly centralized organizations where managers are held responsible for the profits of their division, but are not given sufficient authority (or power) to, make planning decision, which will improve profitability, it is preferable, however, that managers of profit centers should have sufficient authority to "make such decisions themselves, and profit centre accounting is often associated with DECENTRALISATION.

25.2 Decentralisation

The essence of decentralization is the freedom to make decisions (Horragren). Therefore, decentralization is a matter of degree depending on how much freedom divisional Managers are enjoying. The optimal amount of decentralization is the amount that attains top management's overall objectives most efficiently and effectively.

25.3 Advantages of decentralization

Better quality vision, because the divisional manager is more familiar with local conditions and can make a more informed judgement:

ii) In decentralized set-up, managers (Divisional) are motivated to improve performance.

iii) The head office bureaucracy should he reduced in size because many administrative decisions will be decentralized.

iv) Heavy hen transfer pricing is in vogue, there is a greater awareness of market conditions and market prices, since these often provide the basis for what the transfer prices should he.

25.4 Disadvantages of decentralization

1) Divisional decision making, i.e., decisions made by divisional managers . which enhances the profitability of his own division, but his decision/techniques may offset the profitability of other divisions. In simple terms, narrow tunnel vision.

2) Since decisions are taken at the division itself, only big organizations will be in a position to absorb the heavy extra overheads involved in decentralized setup.

25.5 Responsibility Accounting

Responsibility Accounting is the term used to describe the decentralization of authority with performance of decentralized units measured in firms of accounting results. Responsibility accounting, profitability accounting or activity accounting systems recognize various decision centers throughout an organization and trace costs (and revenues, assets and liabilities, where pertinent) to the individual managers who are primarily responsible for making decisions-about the costs in question.

The manager of a decentralized profit centre might be given the authority to decide matters relating to:

i) Introduction of new products.

ii) All aspects of marketing

iii) Plant, replacement decisions and initiation of new investments schemes.

iv) Stock carrying decisions.

v) Employment of personnel in the divisions.

(vi) Short-term operational decision, such as, subcontracting work, overtime working, productivity, standard etc.

vii) Short-term financing arrangements. The corporate office might retain powers such as

i) company policy

ii) company financing decision

iii) Appointment of senior personnel.

iv) Product line closure or departmental closure decisions.

v) Administration of centralise departments, such as, the Group purchasing department or computer department.

vi) Approval for all major capital expenditure.

vii) Monitoring overall results and setting interdepartmental disputes (e.g., on transfer pricing):

25.6 Transfer Prices

Transfer prices are the prices at which one profit centre sells its goods or services to another profit centre. They provide a mechanism by which the profits of the company as a whole are shared out between the individual profit centre's.

Why Transfer Prices?

When there are divisional profit centre's, the transfer affect the profitability and operations of each division. Hence, there should be a systematic

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way at which transfer is to he effected between buying division and selling division. Hence, transfer pricing. Further, for the evaluation of the performance of Division/Divisional beads, suitable transfer pricing is necessary. There are various methods of transferring the finished goods from one profit centre to another profit centre. Let us discuss them one by one.

I. Transfer price at cost

Here are goods manufactured by one unit will be transferred to another unit at, cost (total cost)

Let us see an example.

	A	B
	Rs.	Rs.
Sales	8,000	24,000
Transfer sales from A to B	6,000	
Cost	12,000	10,000

Note: Transfer sales and transfer costs are contra.

Since transfer sales A are self-cancelling with the transfer costs of B, the total profits are unaffected by transfer items. Further, no question of unrealistic profit

The drawback of this system of transfer pricing, is that unit A Manager will try to sell output in open market because he can make a profit whereas he cannot, if he sells at cost to B Further, in competitive environment, there is no charm in this system.

2. Transfer price at cost plus

Here transfer is done at cost plus a percentage of profit. Assume 25% of cost for the above example, then, the transfer price and profitability will be as follows:

	A	B	Total
Open market sales	8000	24,000	32000
Transfer sales (6000 + 25)	7500	--	--
	15500	25000	32000
Less			
Transfer costs	-	7500	--
Own cost	12000	10000	22000
Profit	3500	6500	10000

The advantage of this system is that;

1) The company A gets a reasonable profit. So, the Manager of A unit will not mind selling to B because his interest will be taken care of.

i) Unit B Manager may object the overspending and higher side cost of products of A because transfer price is at cost plus.

ii) Unit B Manager may object the quantity of A goods.

iii) Suppose if there is some closing stock in unit B and the goods transferred from A is also there, then from the profit of A, we have to remove the portion of unrealized profit. So the problem of unrealized profit is there.

Note:

Students are advisee to, do more problems on process costing so that they can familiarize themselves with enterprises, profits and unrealized profit.

3. Transfer Price at Market volume

Here transfer pricing will he done at market price, i.e., transfer will be done at market prices i.e.. Efficient units will be getting more benefits of this system.

Suppose in the above example. A sells its output at Rs 8000 then, the position of individual units are as follows:

	A	B	Total
Market sales	8000	24000	32,000
Transfer sales	8000(c)	--	--
Total	16000	24000	32000
Less			
Transfer cost	--	8000(c)	---
Own cost	12000	1000	22000
Profit	4000	6000	10000

Advantages of Market Value Transfer prices

In decentralised company, divisional managers should have the opportunity to make, output selling and buying decisions which appear to-be in the best interests-of the division's performance. If every unit' of the company optimizes its performance the company's whole must inevitably achieve optimal results. Thus the output in the open market, rather than to transfer them with in the company. The reason for this option is that the seller might find more profitable opportunities to sell other products, so that if the, output is switched to this new option, the transfers division is able lo replace the halted internal supply by buying on the open market. 2) Because of this buying decisions, both the divisions may be benefited by better quality of service, greater flexibility and dependability of service, and cheaper cost of administration selling and transport,

Disadvantages of market value transfer prices

1) Market .price may be a temporary one, induced by adverse economic conditions or dumping.

2) A transfer price at market value might under some circumstances, act as a disincentive to use up any spare capacity in the divisions. A price based on incremental cost, in contrast, might provide an incentive to use up the spare resources in order to provide a marginal contribution to profit.

4. Transfer price at Negotiated price

When authority is decentralized in any organization, to the extent that divisional managers negotiate transfer prices with each other, the agreed price may be finalized from a mixture of calculation, politics and compromise. For example, negotiated price may be fixed according to equivalent market value of similar products, but with some reductions for the internal nature of transaction, which may not affect the selling and distribution costs.

The main strength of the negotiated price lies in its scope and flexibility. It does not depend solely on transfer pricing. Some factors like quantity, designs of like products, production and delivery schedules.

The processor negotiation takes place at various stages and agreement may he achieved on a trade-off between several conflict variables. For example, the buying division may be willing to meet asking price, provided the selling division incorporates some designs, improvements and promises early delivery.

The interdepartmentally conflicts may not be taken into consideration. The Head Offices fix the prices, which gives maximum profit to the company as a whole.

5. Transfer prices when cost and revenues are Linear:

When the variable cost par unit and sales price per unit are more or less same at ail levels of output, a company may try to increase the profit by maximizing the output. In this case the most suitable transfer price is the mark price where market price is known. It the market price is not known then, the standard cost plus the profit is the suitable transfer price.