P4 (MODULE 2)

COST AND MANAGEMENT ACCOUNTING

CA INTER | GROUP 2

CA INTER
P4: COST AND MANAGEMENT ACCOUNTING
INDEX

CHAPTER 11: JOINT PRODUCTS AND BY PRODUCTS

MEANING OF JOINT PRODUCTS AND BY PRODUCTS

Agricultural product industries, chemical process industries, sugar industries, and extractive industries are some of the industries where two or more products of equal or unequal importance are produced either simultaneously or in the course of processing operation of a main product. In all such industries, the management is faced with the problems such as, valuation of inventory, pricing of product and income determination, problemof taking decision in matters of further processing of by-products and/or joint products after a certain stage etc. In fact, the various problems relate to

i. apportionment of common costs incurred for various products and

ii. aspects other than mere apportionment of costs incurred upto the point of separation.

Before taking up the above problems, we first define the various necessary concepts.

Joint Products

Joint products represent "two or more products separated in the course of the same processing operation usually requiring further processing, each product being in such proportion that no single product can be designated as a major product".

By-Products

These are defined as "products recovered from material discarded in a main process, or from the production of some major products, where the material value is to be considered at the time of severance from the main product." So in a nutshell By product is a product which is recovered incidentally from the material used in the manufacture of main or desired products, such a by-product having either a net realisable value or a usable value which is relatively insignificant in comparison with the saleable value of the main or desired products. By-product may be further processed to increase their realisable value Thus by-products emerge as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short a by-product is a secondary or subsidiary product which emanates as a result of manufacture of the main product.

Split of Point

This is a point in a production process where joint products emerging from the process gets separately identifiable. Split of Point has its importance in the joint product costing as joint cost incurred up to this point only and needs to be borne jointly by the products emerging from the

common process. Any cost incurred after Split of Point is a product specific cost and to be borne by the product concerned.

Distinction between Joint-Product and By-Product

The main points of distinction as apparent from the definitions of Joint Products and By-Products are:

a. Joint products are of equal importance whereas by-products are of small economic value.

b. Joint products are produced simultaneously but the by-products are produced incidentally in addition to the main products.

Co-Products

Joint products and co-products are used synonymously in common parlance, but strictly speaking a distinction can be made between two. Co-products may be defined as two or more products which arecontemporary but do not emerge necessarily from the same material in the same process.

APPORTIONMENT OF JOINT COSTS

Joint costs are the expenditures incurred up to the point of separation i.e.split-off point Joint Cost is the resources spent by a manufacturer\producer for producing more than one product from processing a common input. These costs include raw material, Labour, power, fuel, depreciation and overhead costs towards the production of the joint products. Joint costs are the expenditures incurred up to the point of separation i.e. split-off point Joint Cost is the resources spent by a manufacturer / producer for producing more than one product from processing a common input. These costs include raw material, Labour, power, fuel, depreciation and overhead costs towards the production of the joint products. The main problem faced in the case of joint products / by-products is the apportionment of this joint costs to joint products / or by products. For costs incurred after the split off point there is no problem, as these costs can be directly allocated to individual joint products or by-products.

METHODS OF APPORTIONMENT OF JOINT COST TO JOINT PRODUCTS

As the relations between materials, processes and joint products are complex and unobservable, there is no way to determine the cost of the differentproduction factors used in the processes for the production of each of thejoint products. Therefore, the costs incurred in the manufacture of each ofthe joint products cannot be correctly identified. It can only be apportioned to the joint products by using some rational methods

The commonly used methods for apportioning total process costs up to the point of separation over the joint products are as follows:

i. Physical Units Method

ii. Net Realizable Value at split-off point

iii. Using Technical Estimates

Physical Unit Method

In other words, the basis used for apportioning jointcost over the joint products is the physical volume the joint products at the point of separation. Any loss arises during the joint production process is alsoapportioned over the products on the same basis. In situation where physical units are different, the joint products must be converted to a common unitof measurement. In case, the same cannot be converted to a common unitof measurement, this method cannot be applied. This method has advantage as relative sales value serves as a proxy for relative benefit received by each product from the joint cost. When selling prices for all products exist at split off, the sales value at split off method is the preferred technique. It is a relatively simple technique that depends on a common basis for cost allocation – revenues. The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Net Realizable Value at Split-off Point Method:

To arrive at the sales value at the split-off point, following are deducted from the sales value of joint products at final stage i.e. after processing:

i. directly attributable Selling and distribution expenses like freight, royalty, commission, etc.

ii. Post split- off processing cost.

Using Technical Estimates

This method uses technical estimates to apportion the joint costs over the joint products. This method is used when the result obtained by the above methods does not match with the resources consumed by joint products or the realisable value of the joint products are not readily available.

Other Methods

Market value at the point of separation

This method is used for the apportionment of joint costs to joint products upto the split off point. It is difficult to apply this method if the market value of the products at the point of separation is not available. It is a useful method when the realisable value of joint products at split-off (point of separation) is known and where further processing costs are incurred disproportionately. To determine the apportionment of joint costs over joint products, a factor known as multiplying factor is determined. This multiplying factor on multiplication with the sales values of each joint product gives rise to the proportion of joint cost. The use of this method is unfair where further processing

costs after the point of separation are disproportionate or when all the joint products are not subjected to further processing. The net realizable value method which is discussed as above overcomes the shortcoming of this method.

Multiply in factor = Joint Cost ÷ Total sales revenue

Average Unit Cost Method

Under this method, total process cost (upto the point of separation) is divided by total units of joint products produced. On division average cost per unit of production is obtained.

Average unit cost = Total process cost (upto the point of separation) ÷ Total units of joint product produced.

This is a simple method. The effect of application of this method is that all joint products will have uniform cost per unit.

Contribution Margin Method

According to this method, joint costs are segregated into two parts - variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. In case the products are further processed after the point of separation, then all variable cost incurred be added to the variable costs determined earlier. In this way total variable cost is arrived which is deducted from their respective sales values to ascertain their contribution. The fixed costs are then apportioned over the joint products on the basis of the contribution ratios.

Summary of different types of method of apportioning joint costs that can be used under certain circumstances:

Physical Unit Method	When sale price of all the products is uniform
Net Realisable Value (NRV) at Split-off Point Method	When the realisable value of joint products at split-off is not known.
Technical Estimates	When the result obtained by Net Realisable Value (NRV) at Split-off Point Method does not match with the resources consumed by joint products.
Market value at the point of separation	Where further processing costs are incurred disproportionately.
Market value after further processing	Where further processing costs after the point of separation are proportionate and all the joint products are subject to further processing.
Average Unit Cost Method	When units produced have same unit.

METHODS OF APPORTIONMENT OF JOINT COST TO BY PRODUCTS

Net Realisable Value method

The realisation on the disposal of the by- product may be deducted from the total cost of production so as to arrive at the cost of the main product. For example, the amount realised by the sale of molasses ina sugar factory goes to reduce the cost of sugar produced in the factory. When the by-product requires some additional processing and expenses are incurred in making it saleable to the best advantage of the concern, the expenses so incurred should be deducted from the total value realized from the sale of the by-product and only the net realizations should be deducted from the total cost of production to arrive at the cost of production of the main product. Separate accounts should be maintained for collecting additional expenses incurred on:

A. further processing of the by-product, and

B. selling, distribution and administration expenses attributable to the by- product.

Standard cost in Technical Estimates

By-products may be valued at standard costs. The standard may be determined by averaging costs recorded in the past and making technical estimates of the number of units of original raw material going into the main product and the number forming the by- product or by adopting some other consistent basis. This method may be adopted where the by-product is not saleable in the condition in which it emerges or comparative prices of similar products are not available.

Comparative price

Under this method, the value of the by-product is ascertained with reference to the price of a similar or an alternative material. Suppose in a large automobile plant, a blast furnace not only produces the steel required for the car bodies but also produces gas which is utilised in the factory. This gas can be valued at the price which would have been paid to a gas company if the factory were to buy it from outside sources.

Re-use basis

In some cases, the by-product may be of such a nature that it can be reprocessed in the same process as part of the input of the process. In that case the value put on the by-product should be same as that of the materials introduced into the process. If, however, the by-product can be put into an earlier process only, the value should be the same as for the materials introduced into the process.

TREATMENT OF BY-PRODUCT COST IN COST ACCOUNTING

By-product cost can be dealt in cost accounting in the following ways:

When they are of small total value

When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

When the by-products are of considerable total value

Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

Where they require further processing

In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products. If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under a.. In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under b..

QUESTIONS FOR CLASSROOMDISCUSSION

PROBLEM – 1

From a joint process, three joint products emerge, namely A, B and C. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000. The output details and the Selling price of the joint products are given in the table below. Apportion the joint cost on the basis of Physical units and prepare a product wise profitability statement. Also, comment on the effectiveness of the Physical unit's method as a method of joint cost apportionment.

PRODUCTS	UNITS PRODUCED	SELLING PRICE
A	30,000	₹ 7.50
B	20,000	₹ 25.00
C	50,000	₹ 3.00

PROBLEM – 2

FIND OUT the cost of joint products A, B and C using average unit cost method from the following data:

Pre-separation Joint Cost ₹60,000

Production data:

Products	Units produced
A	500
B	200
C	300
	1000

PROBLEM – 3

From a joint process, three joint products emerge, namely A, B and C. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000. The output details, the selling price and further processing cost of the joint products are given in the table below.

PRODUCTS	UNITS PRODUCED	SELLING PRICE AT SPLIT OFF	SELLING PRICE AFTER FURTHER PROCESSING	FURTHER PROCESSING COST
A	30,000	₹ 7.5	₹ 10	₹ 30,000
B	20,000	₹ 25	₹ 30	₹ 80,000
C	50,000	₹ 3	₹ 5	₹ 50,000

Apportion the joint cost on the basis of the following methods and also calculate the gross margin % under each of the methods.

- Sales value at split of point method

- Final sales value method [sales value after further processing]
- Net Realisable value method.

PROBLEM – 4

From a joint process, two joint products emerge, namely A and B. The joint cost incurred in manufacturing the joint products is ₹ 5,00,000.

The output, units sold and the selling price of the joint products are given in the table below.

PRODUCTS	PRODUCTION (UNITS)	SALES (UNITS)	SP
A	30,000	20,000	₹ 10
B	20,000	10,000	₹ 5

Apportion the joint cost on sales value basis.

PROBLEM – 5

From the following information apportion marginal cost and fixed cost on a suitable basis and obtain profit/loss for each of the joint products –

Sales: A 100 kg @ ₹ 60 per kg and B 120 kg @ ₹ 30 per kg.

Total cost: Marginal cost ₹ 4,400 and Fixed cost ₹ 3,900.

PROBLEM – 6

A factory produces three products from joint process namely Joint products A & B and by-product C. Joint cost incurred in the joint process is ₹ 5,25,000.

Other details are as follows:

A	30,000 kg
B	20,000 kg
C	5,000 kg

The by-product is further processed at a cost of ₹ 5,000 and sold for ₹ 6 per kg. Apportion the joint cost on the basis of physical units.

PROBLEM – 7

JP Ltd. uses joint production process that produces three products at the split -off point. Joint production costs during the month of July, 20x2 were Rs.33,60,000.

Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000

Sales prices:			
At the split-off	200		
After further processing	300	350	100
Costs to process after split-off	6,00,000	6,00,000	6,00,000

Other information is as follows:

Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value.

PROBLEM – 8

A company manufactures two types of industrial sealant by passing materials through two consecutive processes. The results of operating the two processes during the previous month are shown below:

Process I:		
Costs incurred:		
Materials 7,000 kg at ₹ 0.50 per kg	₹ 3,500	
Labour and overheads	₹ 4,340	
Output (kg):		
Transferred to process 2		6,430
Defective production		570
Process II:		
Cost incurred:		
Labour and overheads	₹ 12,129	
Output (kg):		
Type E sealant		2,000
Type F sealant		4,000
By-product		430

It is considered normal for 10% of the total input in Process I to be defective and all defective output is sold as scrap at ₹ 0.40 per kg. Losses are not expected in Process II.

There was no work in process at the beginning or end of the month and no opening stocks of sealants. Sales of the month's output from Process II were:

Type E sealant	1,100 kg
Type F sealant	3,200 kg
By-product	430 kg

The remainder of the output from Process II was in stock at the end of the month.

The selling prices of the products are:

Type E sealant ₹ 7 per kg and Type F sealant ₹ 2.50 per kg.

No additional costs are incurred on either of the two main products after the second process. The by-product is sold for ₹ 1.80 per kg after being sterilized, at a cost of ₹ 0.30 per kg, in a subsequent process. The operating costs of process II are reduced by the net income receivable from sales of the by-product.

Required:

1. Calculate, for the previous month, the cost of the output transferred from Process I into Process II and the net cost or saving arising from any abnormal losses or gains in Process I.
2. Calculate the value of the closing stock of each sealant and the profit earned by each sealant during the previous month using the following methods of apportioning costs to joint products:
   - **i.** According to the weight of output,
   - **ii.** According to the market value of output.

Problem – 9

From a joint process, two products A and B emerge. The joint cost incurred in the joint process is ₹ 1,00,000. Other details are as follows:

PRODUCTS	UNITS	SP AT SPLIT OFF	SP AFTER FURTHER PROCESSING	FURTHER PROCESSING COST
A	50,000	₹ 10	₹ 12	₹ 1,50,000
B	50,000	₹ 10	₹ 15	₹ 1,50,000

Advise the stage of production at which the joint products should be sold.

PROBLEM – 10

Inorganic Chemicals purchases salt and processes it into more refined products such as Caustic Soda, Chlorine and PVC. In the month of July, Inorganic Chemicals purchased Salt for ₹ 40,000. Conversion cost of ₹ 60,000 were incurred up to the split off point, at which time two sealable products were produced. Chlorine can be further processed into PVC.

The July production and sales information is as follows:

	Production (in tonne)	Sales Quantity (in tonne)	Selling price per tonne (₹)
Caustic Soda	1,200	1,200	50
Chlorine	800	—	—
PVC	500	500	200

All 800 tonnes of Chlorine were further processed, at an incremental cost of ₹ 20,000 to yield 500 tonnes of PVC. There was no beginning or ending inventories of Caustic Soda, Chlorine or PVC in July. There is active market for Chlorine. Inorganic Chemicals could have sold all its July production of Chlorine at ₹ 75 per tonne.

Required:

1. SHOW how joint cost of ₹1,00,000 would be apportioned between Caustic Soda and Chlorine under each of following methods:
   - **a.** sales value at split- off point;
   - **b.** physical unit method, and
   - **c.** estimated net realisable value.

2. Lifetime Swimming Pool Products offers to purchase 800 tonnes of Chlorine in August at ₹ 75 per tonne. This sale of Chlorine would mean that no PVC would be produced in August. EXPLAIN how the acceptance of this offer for the month of August would affect operating income?

PROBLEM – 11

Sun-moon Ltd. produces and sells the following products:

Products	Units	Selling price at split-off point (₹)	Selling price after further processing (₹)
A	2,00,000	17	25
B	30,000	13	17
C	25,000	8	12
D	20,000	10	-
E	75,000	14	20

Raw material costs ₹35,90,000 and other manufacturing expenses cost ₹ 5,47,000 in the manufacturing process which are absorbed on the productson the basis of their 'Net realizable value'. The further processing costs of A,B, C and E are ₹ 12,50,000; ₹ 1,50,000; ₹ 50,000 and ₹ 1,50,000 respectively. Fixed costs are ₹ 4,73,000.

You are required to PREPARE the following in respect of the coming year:

1. Statement showing income forecast of the company assuming that none of its products are to be further processed.
2. Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.
3. Can you suggest any other production plan whereby the company can maximise its profits? If yes, then submit a statement showing income forecast arising out of adoption of that plan.

ADDITIONAL QUESTIONS FOR PRATICE

QFP 1 (Concept Similar to Problem – 1)

A coke manufacturing company produces the following products by using 5,000 tonnes of coal @ ₹1,100 per tonne into a common process.

Coke	3,500 tonnes
Tar	1200 tonnes
Sulphate of ammonia	52 tonnes
Benzol	48 tonnes

PREPARE a statement apportioning the joint cost amongst the products on the basis of the physical unit method.

QFP 2 (Concept Similar to Problem – 6)

Smile company produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. Details of company's operation are given in the table below. During the month, company incurred joint production costs of ₹ 10,00,000/- The main products are not marketable at the split off point and thus have to be processed further.

Particulars	Product-A	Product-B	By product
Monthly output in kg.	60,000	1,20,000	50,000
Selling price per kg.	₹ 50	₹ 30	₹ 5
Process costs	₹2,00,000	₹3,00,000	

FIND OUT the amount of joint product cost that Smile company would allocate to the product-B by using the physical volume method to allocate joint production costs?

QFP 3 (Concept Similar to Problem – 9)

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹ 100 per 1000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

The January production and sales information is as follows:

Products	Production (in Kiloliter/tonne)	Sales Quantity(in Kiloliter/tonne)	Selling priceper Litre/Kg (₹)
Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kiloliter of Ghee. There was no opening or closinginventories of buttermilk, butter or ghee in the month of January.

Required:

i. SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realizable Value method.

ii. 'Healthy Bones' offers to purchase 20 tonne of butter in February at ₹ 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee wouldbe produced in February. SUGGEST whether 'Buttery Butter' shallaccept the offer affecting its operating income or further process butter to make Ghee itself?

QFP 4 (Concept Similar to Problem – 9)

RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for a particular month:

Cost incurred up to separation point: ₹ 10,000

Output (in Litre)	Product X100 ₹	Product Y70 ₹	Product Z80 ₹
Cost incurred after separation point	2,000	1,200	800
Selling Price per Litre: After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

i. Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method ofapportionment of pre-separation cost.

ii. Advise the management whether, on purely financial consideration, the three products are to be processed further or not.

QFP 5 (Concept Similar to Problem – 10)

OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the spilt-off point - S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and Ncan be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oil and processing it were ₹ 40,000 which is apportioned on the basis of Sales Value at split-off point. Other details are as follows:

Product	Further processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A	-	20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions.

CHAPTER 12: MARGINAL COSTING

INTRODUCTION

As discussed in the first chapter 'Introduction to Cost and Management Accounting', the cost and management accounting system by provision of information, enables management to take various decisions. Marginal Costing is a technique of cost and management accounting which is used to analyses relationship between cost, volume and profit. In order to appreciate the concept of marginal costing, it is necessary to study the definition of marginal costing and certain other terms associated with this technique.

The important terms have been defined as follows:

Marginal Cost: Marginal cost as understood in economics is the incremental cost of production for producing one additional unit of product. As we understood, variable costs have direct relationship with volume of output and fixed costs remains constant irrespective of volume of production. Hence, marginal cost is measured by the total variable cost attributable to one additional unit. For example, the total cost of producing 10 units and 11 units of a product is ₹10,000 and ₹10,500 respectively. The marginal cost for 11th unit i.e. 1 unit extra from 10 units is ₹500. Marginal cost can precisely be the sum of prime cost and variable overhead.

Marginal Costing: It is a costing system where products or services and inventories are valued at variable costs only. It does not take consideration of fixed costs. This system of costing is also known as direct costing as only direct costs forms the part of product and inventory cost. Costs are classified on the basis of behaviour of cost (i.e. fixed and variable) rather functions as done in absorption costing method.

Direct Costing: Direct costing and Marginal Costing is used synonymously at various places. But the relation of costs with respect to activity level must be understood. Some costs are variable at batch level but fixed for unit level whereas others are variable at production line level but fixed for batches and units.

Differential and Incremental Cost: Differential cost is difference between the costs of two different production levels. It is a relative representation of costs for two different levels that results in the increase or decrease in cost. Incremental cost, on the other hand, is the increase in the costs due to change in the volume or process of production activities. Incremental costs are sometime compared with marginal cost but in reality, there is a thin line difference between the two. Marginal cost is the change in the total cost due to production of one extra unit while incremental cost can be both for increase in one unit or in total volume. In the Example 2 above, ₹ 1,220 is the incremental cost of producing one extra unit but not marginal cost for producing one extra unit.

CHARACTERISTICS OF MARGINAL COSTING

The technique of marginal costing is based on the distinction between product costs and period costs. Only the variables costs are treated as the costs of the products while the fixed costs are treated as period costs which will be incurred during the period regardless of the volume of output. The main characteristics of marginal costing are as follows:

1. **All elements of cost are classified into fixed and variable components**. Semi-variable costs are also analyzed into fixed and variable elements.
2. The marginal or **variable costs** (as direct material, direct Labour and variable factory overheads) **are treated as the cost of product**.
3. Under marginal costing, **the value of finished goods and work–in–progress is also comprised only of marginal costs**. Variable selling and distribution are excluded for valuing these inventories. Fixed costs are not considered for valuation of closing stock of finished goods and closing WIP.
4. **Fixed costs are treated as period costs** and are charged to profit and loss account for the period for which they are incurred.
5. Prices are determined with reference to marginal costs and contribution margin.
6. Profitability of departments and products is determined with reference to their contribution margin.

FACTS ABOUT MARGINAL COSTING

Some of the facts about marginal costing are depicted below:

Not a distinct method

Marginal costing is not a distinct method of costing like job costing, process costing, operating costing, etc., but a special technique used for managerial decision making. Marginal costing is used to provide a basis for the interpretation of cost data to measure the profitability of different products, processes and cost centres in the course of decision making. It can, therefore, be used in conjunction with the different methods of costing such as job costing, process costing, etc., or even with other techniques such as standard costing or budgetary control.

Cost Ascertainment

In marginal costing, cost ascertainment is made on the basis of the nature of cost. It gives consideration to behaviors of costs. In other words, the technique has developed from a particular conception and expression of the nature and behaviors of costs and their effect upon the profitability of an undertaking.

Decision Making:

According to traditional or total cost method, as opposed to marginal costing, the classification of costs is based on functional basis. Under this method the total cost is the sum total of the cost of direct material, direct Labour, direct expenses, manufacturing overheads, administration overheads, selling and distribution overheads. In this system, other things being equal, the total cost per unit will

remain constant only when the level of output or mixture is the same from period to period. Since these factors are continually fluctuating, the actual total cost will vary from one period to another. Thus, it is possible for the costing department to say one day that an item cost ₹20 and the next day it costs ₹18. This situation arises because of changes in volume of output and the peculiar behavior of fixed expenses included in the total cost. Such fluctuating manufacturing activity, and consequently the variations in the total cost from period to period or even from day to day, poses a serious problem to the management in taking sound decisions. Hence, the application of marginal costing has been given wide recognition in the field of decision making.

DETERMINATION OF COST AND PROFIT UNDER MARGINAL COSTING

	Amount (₹)	Amount (₹)
Revenue a.		**xxx**
Product Cost:		
• Direct Materials	xxx	
• Direct employee (Labour)	xxx	
• Direct expenses	xxx	
• Variable manufacturing overheads	xxx	
Product (Inventoriable) Costs:	xxx	**xxx**
b. Product Contribution Margin {A – B}		**xxx**
• Variable Administration overheads	xxx	
• Variable Selling & Distribution overheads	xxx	**xxx**
Contribution Margin: c.		**xxx**
Period Cost: d.		
Fixed Manufacturing expenses Fixed non-manufacturing	xxx	
expenses	xxx	**xxx**
Profit/ (loss) {C – D}		**xxx**

i. Product (Inventoriable) Costs

In the case of merchandise inventory, these are the costs which are associated with the purchase and sale of goods. In the production scenario, **such costs are associated with the acquisition and conversion of materials and all other manufacturing inputs into finished product for sale**. Hence, under marginal costing, variable manufacturing costs constitute inventoriable or product costs.

Finished goods are measured at product cost. Work-in-process (WIP) inventories are also measured at product cost on the basis of percentage of completion (Please refer Process & Operation costing chapter)

ii. Contribution

Contribution or contribution margin is the difference between sales revenue and total variable costs irrespective of manufacturing or non-manufacturing.

Contribution c. = Sales Revenue (S) – Total Variable Cost (V)

It is obtained by subtracting variable costs from sales revenue. It can also be defined as excess of sales revenue over the variable costs. The contribution concept is based on the theory that the profit and fixed expenses of a business is a 'joint cost' which cannot be equitably apportioned to different segments of the business. In view of this difficulty the contribution serves as a measure of efficiency of operations of various segments of the business.

iii. Period Cost

These are the **costs, which are not assigned to the products but are charged as expenses against the revenue of the period in which they are incurred.** All fixed costs either manufacturing or non-manufacturing are recognized as period costs in marginal costing.

ABSORPTION COSTING

Absorption Costing is the practice of charging all costs, both variable and fixed to operations, processes or product.

In absorption costing the classification of expenses is based on functional basis whereas in marginal costing it is based on the nature of expenses. In absorption costing, the fixed expenses are distributed over products on absorption costing basis that is, based on a pre-determined level of output. Since fixed expenses are constant, such a method of recovery will lead to over or under-recovery of expenses depending on the actual output being greater or lesser than the estimate used for recovery. This difficulty will not arise in marginal costing because the contribution is used as a fund for meeting fixed expenses.

ADVANTAGES AND LIMITATIONS OF MARGINAL COSTING

Advantages

1. **Simplified Pricing Policy:** The marginal cost remains constant per unit of output whereas the fixed cost remains constant in total. Since marginal cost per unit is constant from period to period within a short span of time, firm decisions on pricing policy can be taken. If fixed cost is included, the unit cost will change from day to day depending upon the volume of output. This will make decision making task difficult.
2. **Proper recovery of Overheads:** Overheads are recovered in costing on the basis of pre-determined rates. If fixed overheads are included on the basis of pre-determined rates, there will be under-recovery of overheads if production is less or if overheads are more. There will be over- recovery of overheads if production is more than the budget or actual expenses are less than the estimate. This creates the problem of treatment of such under or over-recovery of overheads. Marginal costing avoids such under or over recovery of overheads.

3. **Shows Realistic Profit:** Advocates of marginal costing argues that under the marginal costing technique, the stock of finished goods and work-in-progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.
4. **How much to produce:** Marginal costing helps in the preparation of break- even analysis which shows the effect of increasing or decreasing production activity on the profitability of the company.
5. **More control over expenditure:** Segregation of expenses as fixed and variable helps the management to exercise control over expenditure. The management can compare the actual variable expenses with the budgeted variable expenses and take corrective action through analysis of variances.
6. **Helps in Decision Making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc.
7. **Short term profit planning:** It helps in short term profit planning by B.E.P charts.

Limitations

1. **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. Most of the expenses are neither totally variable nor wholly fixed. For example, various amenities provided to workers may have no relation either to volume of production or time factor.
2. **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.
3. **Scope for Low Profitability:** Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.
4. **Faulty valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in- progress. In order to show the correct position, fixed overheads have to be included in work-in- progress.
5. **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption that fixed cost will remain static throughout is not correct. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. The variable costs do not remain constant per unit of output. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.
6. **Marginal costing ignores time factor and investment:** The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true

cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

7. **Understating of W-I-P:** Under marginal costing stocks and work in progress are understated.

COST-VOLUME-PROFIT (CVP) ANALYSIS

Meaning

It is a managerial tool showing the relationship between various ingredients of profit planning viz., cost, selling price and volume of activity. As the name suggests, cost volume profit (CVP) analysis **is the analysis of three variables, cost, volume and profit.** Such an analysis explores the relationship between costs, revenue, activity levels and the resulting profit. It aims at measuring variations in cost and volume.

Assumptions

1. **Changes in the levels of revenues and costs arise only because of changes in the number of product (or service) units produced and sold** – for example, the number of television sets produced and sold by Sony Corporation or the number of packages delivered by Overnight Express. The number of output units is the only revenue driver and the only cost driver.
   Just as a cost driver is any factor that affects costs, a revenue driver is a variable, such as volume, that causally affects revenues.
2. **Total costs can be separated into two components**; a fixed component that does not vary with output level and a variable component that changes with respect to output level. Furthermore, variable costs include both direct variable costs and indirect variable costs of a product. Similarly, fixed costs include both direct fixed costs and indirect fixed costs of a product
3. When represented graphically, **the behaviours of total revenues and total costs are linear** (meaning they can be represented as a straight line) in relation to output level within a relevant range (and time period).
4. Selling price, variable cost per unit, and total fixed costs (within a relevant range and time period) are known and constant.
5. The analysis either covers a single product or assumes that **the proportion of different products when multiple products are sold will remain constant** as the level of total units sold changes.
6. All revenues and costs can be added, subtracted, and compared **without taking into account the time value of money.** (Refer to the FM study material for a clear understanding of time value of money).

Importance

It provides the information about the following matters:

1. The behavior of cost in relation to volume.
2. Volume of production or sales, where the business will break-even.

3. Sensitivity of profits due to variation in output.
4. Amount of profit for a projected sales volume.
5. Quantity of production and sales for a target profit level.

Impact of various changes on profit:

An understanding of CVP analysis is extremely useful to management in budgeting and profit planning. It elucidates the impact of the following on the net profit:

1. Changes in selling prices,
2. Changes in volume of sales,
3. Changes in variable cost,
4. Changes in fixed cost.

Marginal Cost Equation

The contribution theory explains the relationship between the variable cost and selling price. It tells us that selling price minus variable cost of the units sold is the contribution towards fixed expenses and profit. If the contribution is equal to fixed expenses, there will be no profit or loss and if it is less than fixed expenses, loss is incurred. Since the variable cost varies in direct proportion to output, therefore if the firm does not produce any unit, the loss will be there to the extent of fixed expenses.

These points can be described with the help of following marginal cost equation:

Marginal Cost Equation = S -V = C = F ± P Were, S = Sales value, V = Variable cost, C = Contribution, F = Fixed Cost,

Marginal Cost Statement

	(₹)
Sales	xxxx
Less: Variable Cost	xxxx
Contribution	xxxx
Less: Fixed Cost	xxxx
Profit	**xxxx**

Contribution to Sales Ratio (Profit Volume Ratio or P/V Ratio)

This ratio shows the **proportion of sales available to cover fixed costs and profit**. Contribution represents the sales revenue after deducting variable costs. This ratio is usually expressed in percentage.

$$P/V\,Ratio = \frac{Contribution}{Sales} \times 100 \text{ or, } P/V\,Ratio = \frac{Change\ in\ contribution/Profit}{Change\ in\ sales} \times 100$$

A higher contribution to sales ratio implies that the rate of growth of contribution is faster than that of sales. This is because, once the breakeven point is reached, profits shall grow at a faster rate when compared to a product with a lesser contribution to sales ratio.

By transposition, we have derived the following equations:

i. C = S × P/V ratio

ii. $S = \frac{C}{P/V ratio}$

Break-Even Analysis

Break-even analysis is a generally used method to study the CVP analysis. This technique can be explained in two ways:

i. In narrow sense it is concerned with computing the break-even point. At this point of production level and sales there will be no profit and loss i.e. total cost is equal to total sales revenue.

ii. In broad sense this technique is used to determine the possible profit/loss at any given level of production or sales.

METHODS OF BREAK-EVEN ANALYSIS

Break even analysis may be conducted by the following two methods:

A. Algebraic computations

B. Graphic presentations

ALGEBRAIC CALCULATIONS

Break-even Point

The word contribution has been given its name because of the fact that it literally contributes towards the recovery of fixed costs and the making of profits. The contribution grows along with the sales revenue till the time it just covers the fixed cost. This is the point where neither profits nor losses have been made is known as a break- even point. This implies that in order to break even the amount of contribution generated should be exactly equal to the fixed costs incurred. Hence, if we know how much contribution is generated from each unit sold, we shall have sufficient information for computing the number of units to be sold in order to break even. Mathematically,

$$\text{Break-even point in units} = \frac{\text{Fixed costs}}{\text{Contribution per unit}}$$

Cash Break-even Point

When break-even point is calculated only with those fixed costs which are payable in cash, such a break-even point is known as cash break-even point. This means that depreciation and other non-cash fixed costs are excluded from the fixed costs in computing cash break-even point.

Multi-Product Break-Even Analysis

In a multi-product environment, where more than one product is manufactured by using a common fixed cost, the break-even point formula needs some adjustments. The contribution is calculated by taking weights for the products. The weights may be of sales mix quantity or sales mix values. The calculation of Multi-Product Break-even analysis can be understood with the help of the following example.

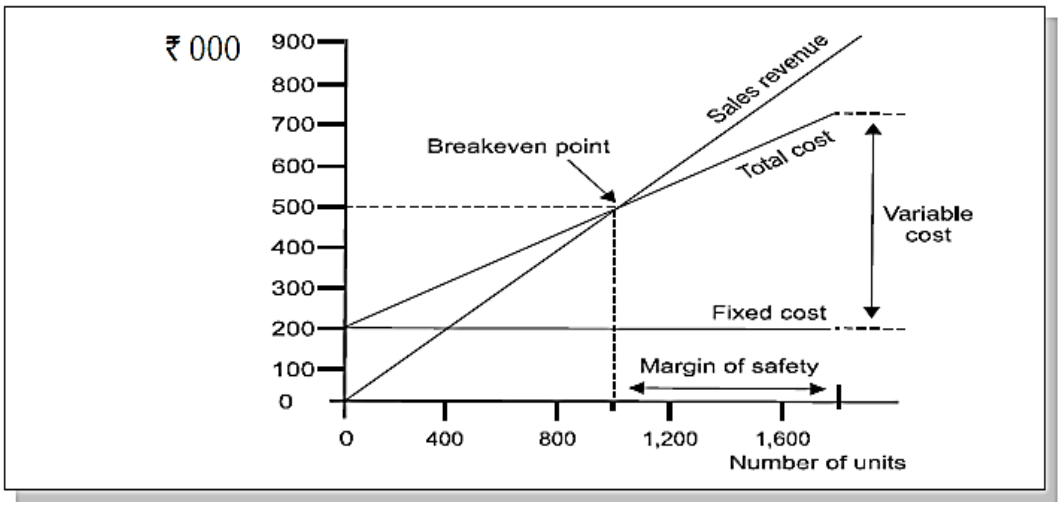
GRAPHICAL PRESENTATION OF BREAK-EVEN CHART

Break-even Chart

A breakeven chart records costs and revenues on the vertical axis and the level of activity on the horizontal axis. The making of the breakeven chart would require you to select appropriate axes. Subsequently, you will need to mark costs/revenues on the Y axis whereas the level of activity shall be traced on the X axis. Lines representing (i) Fixed costs (horizontal line at ₹ 2,00,000 for ABC Ltd), (ii) Total costs at maximum level of activity (joined to the Y-axis where the Fixed cost of ₹ 2,00,000 is marked) and (iii) Revenue at maximum level of activity (joined to the origin) shall be drawn next.

The breakeven point is that point where the sales revenue line intersects the total cost line. Other measures like the margin of safety and profit can also be measured from the chart.

The breakeven chart for ABC Ltd (Example-3) is drawn below.

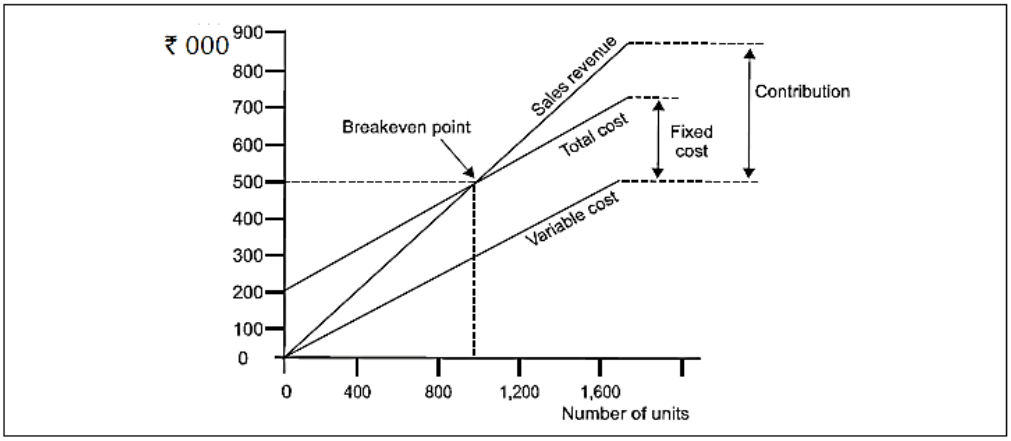


Contribution Breakeven Chart

It is not possible to use a breakeven chart as described above to measure contribution. This is one of its major limitations especially so because contribution analysis is literally the backbone of marginal

costing. To overcome such a limitation, accountants frequently resort to the making of a contribution breakeven chart which is based on the same principles as a conventional breakeven chart except for that it shows the variable cost line instead of the fixed cost line. Lines for Total cost and Sales revenue remain the same. The breakeven point and profit can be read off in the same way as with a conventional chart. However, it is also possible to read the contribution for any level of activity.

Using the same example of ABC Ltd as for the conventional chart, the total variable cost for an output of 1,700 units is 1,700 × ₹300 = ₹5,10,000. This point can be joined to the origin since the variable cost is nil at zero activity.

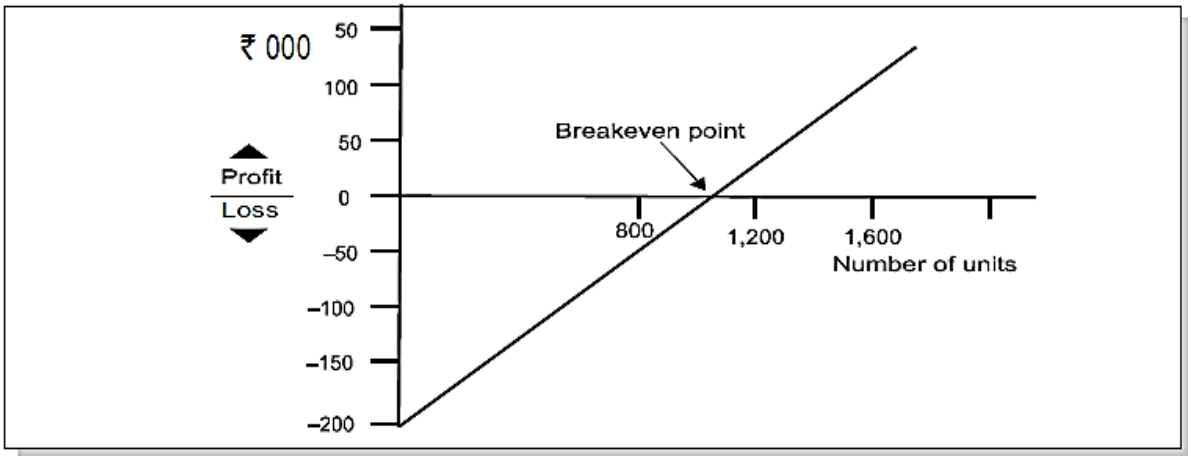


The contribution can be read as the difference between the sales revenue line and the variable cost line.

Profit-Volume Chart

This is also very similar to a breakeven chart. In this chart the vertical axis represents profits and losses, and the horizontal axis is drawn at zero profit or loss.

In this chart each level of activity is taken into account and profits marked accordingly. The breakeven point is where this line interacts the horizontal axis. A profit-volume graph for our example (ABC Ltd) will be as follows,



The loss at a nil activity level is equal to ₹ 2,00,000, i.e. the amount of fixed costs. The second point used to draw the line could be the calculated breakeven point or the calculated profit for sales of 1,700 units.

Advantages of the profit-volume chart

The biggest advantage of the profit-volume chart is its capability of depicting clearly the effect on profit and breakeven point of any changes in the variables.

LIMITATIONS OF BREAK-EVEN ANALYSIS

The limitations of the practical applicability of breakeven analysis and breakeven charts stem mostly from the assumptions underlying CVP which have been mentioned above. Assumptions like costs behaving in a linear fashion or sales revenue remain constant at different sales levels or the stocks shall remain constant period after period are unrealistic. Similarly, the assumption that the only factor which influences costs is the 'activity level achieved' is erroneous because other factors like inflation also have a bearing on costs.

MARGIN OF SAFETY

The margin of safety can be defined as **the difference between the expected level of sale and the breakeven sales**. The larger the margin of safety, the higher is the chances of making profits.

The Margin of Safety can also be calculated by identifying the difference between the projected sales and breakeven sales in units multiplied by the contribution per unit. This is possible because, at the breakeven point all the fixed costs are recovered and any further contribution goes into the making of profits. It also can be calculated as:

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V ratio}}$$

VARIATIONS OF BASIC MARGINAL COST EQUATION AND OTHER FORMULAE

i)	Sales – Variable cost = Fixed cost ± Profit/ Loss By multiplying and dividing L.H.S. by S
ii)	$\frac{S(S-V)}{S} = F + P$
iii)	$S \times P/V\,Ratio = F + P$ or Contribution $\left(\because P/V\,Ratio = \frac{S-V}{S}\right)$
iv)	BES × P/V Ratio = F $(\because \text{at BEP profit is zero})$
v)	$BES = \frac{\text{Fixed cost}}{\text{P/V ratio}}$
vi)	$\text{P/V ratio} = \frac{\text{Fixed cost}}{\text{BES}}$
vii)	S × P/V Ratio = Contribution (Refer to iii)
viii)	P/V Ratio = $\frac{\text{Contribution}}{\text{Sales}}$
ix)	(BES + MS) × P/V Ratio = Contribution (Total sales = BES + MS)

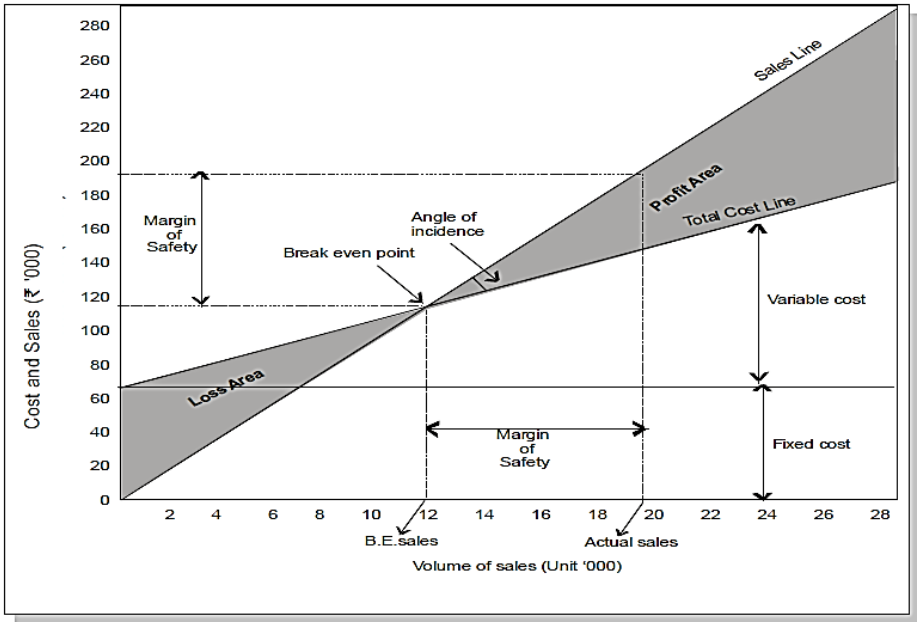
x)	(BES × P/V Ratio) + (MS × P/V Ratio) = F + P By deducting (BES × P/V Ratio) from L.H.S. and F from R.H.S. in (x) above, we get:
xi)	M.S. × P/V Ratio = P
xii)	P/V Ratio = $\frac{\text{Change in profit}}{\text{Change in Sales}}$
xiii)	P/V Ratio = $\frac{\text{Change in contribution}}{\text{Change in Sales}}$
xiv)	$\text{Profitability} = \frac{\text{Contribution}}{\text{Key factor}}$
xv)	Margin of Safety = Total Sales – BES or $\frac{\text{Profit}}{\text{P/V ratio}}$
xvi)	BES = Total Sales – MS Margin of Safety Ratio = $\frac{\text{Total sales - BES}}{\text{Total Sales}}$

ANGLE OF INCIDENCE

This angle is formed by the intersection of sales line and total cost line at the break- even point. **This angle shows the rate at which profit is earned once the break- even point is reached.**

The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favourable position.

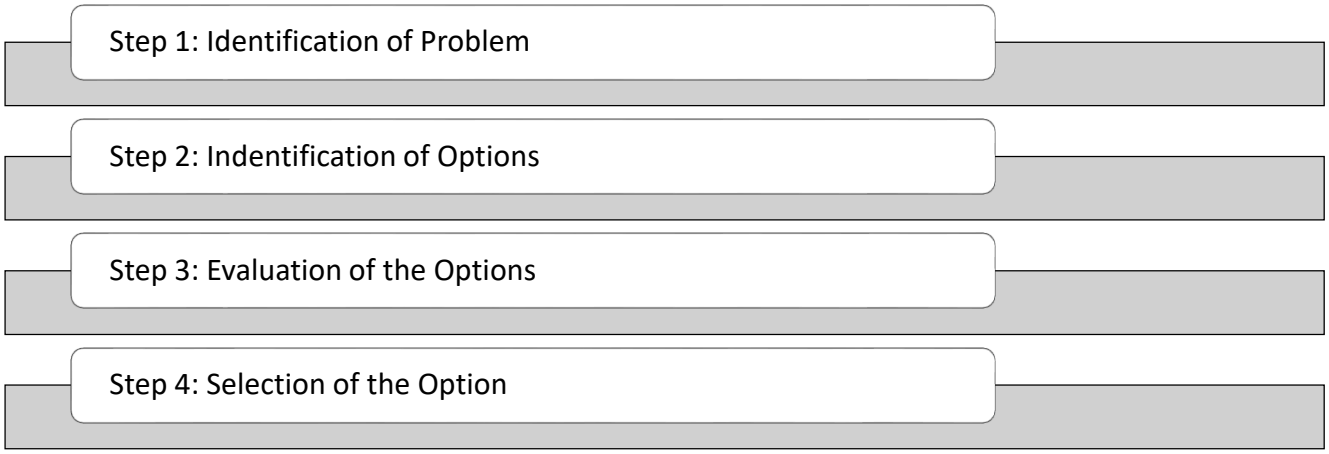
The shaded area in the graph given below is representing the angle of incidence. The angle above and below the break-even point shows the rate of earning profitability (loss). Wider angle denotes higher rate of earnings and vice-versa.



APPLICATION OF CVP ANALYSIS IN DECISION MAKING

As discussed, earlier CVP analysis is used as an evaluation tool for managerial decisions. In this chapter we will discuss the use of CVP Analysis for short term decision making. Before going into illustration, let us discuss the decision-making framework.

Framework for Decision Making



Step-1: Identification of Problem

Every organisation has its own objectives, and goals are set to achieve these objectives. To reach at the goal, actions are to be taken. For example, if an organisation wants to be a cost leader in the industry it operates in, it has to achieve 3Es in its all activities. 3Es means economy in inputs, efficiency in process and operations and effectiveness in output. An entity that exists for profit may identify few areas (problem areas) which if worked on can add to the profit or wealth maximisation. For example, Arnav Ltd. a manufacturer of Steel products, has identified that it can be leader in the industry if it can produce steel products at lower cost than its rival. Here the goal should be (problem area) low-cost production.

Step- 2: Identification of Options

After identification of problem(s), the next step is identification of options to achieve the goal (to answer the problem). All possible options need to be explored. In the above example, the Arnav Ltd. may have the following options for low-cost production:

1. Purchase of inputs from specialised market- Local vs Import
2. Make the input in its own factory- Make or Buy
3. Bulk purchase to avail discount offer- How much to purchase
4. Make in-house- Make vs Outsource
5. Bulk processing- How much to produce
6. Using efficient machine for manufacturing- Old machine vs New machine
7. Optimisation of key resources- Product mix decisions etc.

Step- 3: Evaluation of the Options

After identification of options, each option is to be evaluated against the objective criteria. An entity with objective of making profit may evaluate options on the basis of financial measures like impact of profit or loss, market share, overall impact on profitability, return on investment etc. Non-financial factors like customer satisfaction, impact on existing market/ customer, ethics of decision are also evaluated.

This step is a very important and may be grouped into two tasks

i. Identification of Cost and Benefits of each option

ii. Estimation of amount of each option

Step-4: Selection of option:

After evaluation of the options, the best option is selected and implemented.

Principles for Identification of Cost and Benefits for Measurement

The cost and benefit of an option is identified for measurement if it passes the principles of Controllability and Relevance.

i. Controllability: Those cost and benefits which arise due to choice of an option. In other words, benefits received, and cost incurred are directly related with the choice of the option. Thus, the costs and benefits which are controllable are considered for measurement for making decision.

ii. Relevance: The costs which are controllable need to be relevant for decision making. This means all controllable costs are not relevant for decision making unless it differs under the two options. Thus, **a cost is treated is relevant only if**

1. it is a future cost

2. it differs under two options under consideration.

For Example, Arnav Ltd. wants to manufacture 1,000 additional units of Product X. It is considering either to manufacture in its own factory or to outsource to job worker in this example cost of raw materials to manufacture additional 1,000 units is controllable as it arises due to management's decision to make additional units. But it is not relevant for making choice between manufacturing in-house and outsource to job workers, as under the both options, the raw materials cost would be same.

Hence, for decision making purpose only those cost and benefits are identified for measurement which are both Controllable and Relevant.

Below is an analysis of few costs for its relevance

Cost	Relevance	Reason
i. Historical Cost	Irrelevant	The cost has already been incurred and do not affect the decision. Example: Book value of machinery etc.
ii. Sunk Cost	Irrelevant	The cost which are already paid either for goods or services availed or to be availed. Example: Raw material purchased and held in store without having replacement cost, Cost of drawing, blueprint etc.

iii. Committed Cost	Irrelevant	The committed costs are the pre-agreed cost which cannot be revoked under the normal circumstances. This is also a sunk cost. Examples: Cost of materials as per rate agreement, Salary cost to employees etc.
iv. Opportunity Cost	Relevant	The opportunity cost is represented by the forgone potential benefit from the best rejected course of action. Had the option under consideration not chosen, the benefit would come to the organization.
v. Notional or Imputed Cost	Relevant	Notional costs are relevant for the decision making only if company is actually forgoing benefits by employing its resources to alternative course of action. For example, notional interest on internally generated fund is treated as relevant notional cost only if company could earn interest from it.
vi. Shut-down Cost	Relevant	When an organization suspends its manufacturing operations, certain fixed expenses can be avoided and certain extra fixed expenses may be incurred depending upon the nature of the industry. By closing down the manufacturing, the organization will save variable cost of production as well as some discretionary fixed costs. This particular discretionary cost is known as shut-down cost.

Principles of Estimation of Costs and Benefits

After identification of the costs and benefits, it is now required to be quantified i.e., the cost and benefit should be measured and estimated. The estimation is done by following the two principles as discusses below:

i. **Variability:** Variability means by how much a cost or benefit increased or decreased due to the choice of the option. Variable costs are the cost which differs under the different volume or activities. On the other hand, fixed costs remain same irrespective of volume and activities.

ii. **Traceability:** Traceability of cost means degree of relationship between the cost and the choice of the option. Direct costs are directly assigned to the option on the other hand indirect costs needs to be apportioned to the option on some reasonable basis.

For Example, Arnav Ltd. wants to manufacture 1,000 units of Product X. It is considering to manufacture the same in its own factory. To manufacture in its own factory, it requires 1,000 hours of employees and a specialised machine. In this example, employee cost for labour of 1,000 hours is variable cost for in-house manufacturing and it is directly traceable. Cost of machinery is also direct cost but so far as traceability of the machinery cost is concerned it is direct cost for 1,000 units as a whole but indirect cost for a unit.

Hence, the cost and benefits of an option is measured at directly traceable and variable costs.

Short-term Decision-Making using concepts of CVP Analysis

Management uses marginal costing and CVP concepts for making various decisions. In this chapter we will learn how the concepts of marginal costing and CVP is applied for analysis of identified options for short-term decision making. Generally, short-term decisions are related with temporary gaps between demand and supply for available resources. The areas of short term decision may be classified into two broad categories:

i. Decisions related with excess supply, such as:
   - **a.** Processing of Special Order
   - **b.** Determination of price for stimulating demand
   - **c.** Local vs Export sale
   - **d.** Determination of minimum price for price quotations
   - **e.** Shut-down or continue decision etc.

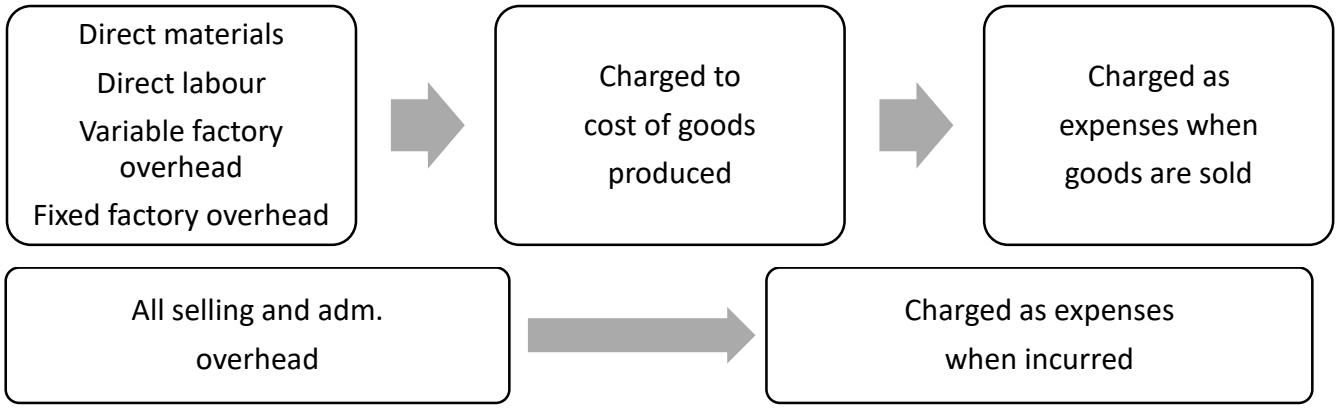
ii. Decisions related with excess demand, such as:
   - **a.** Make or Buy/ In-house-processing vs Outsourcing
   - **b.** Product mix decision under resource constraints (limiting factors)
   - **c.** Sales mix decisions
   - **d.** Sale or further processing etc.

What is a Limiting Factor?

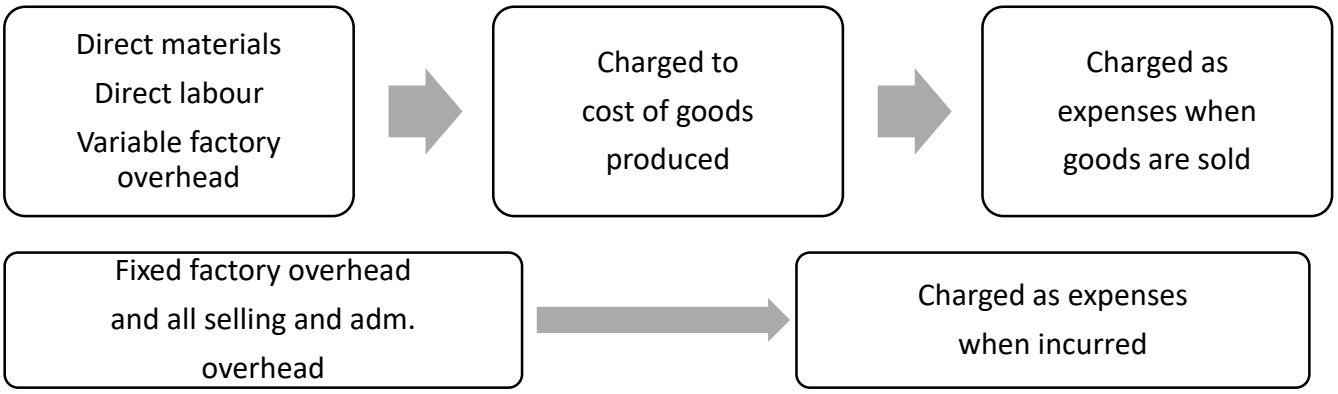
Limiting factor is anything which limits the activity of an entity. The factor is a key to determine the level of sale and production, thus it is also known as Key factor. From the supply side the limiting factor may either be Men (employees), Materials (raw material or supplies), Machine (capacity), or Money (availability of fund or budget) and from demand side it may be demand for the product, other factors like nature of product, regulatory and environmental requirement etc. The management, while making decisions, has objective to optimize the key resources up to maximum possible extent.

DISTINCTION BETWEEN MARGINAL AND ABSORPTION COSTING

The distinctions in these two techniques are illustrated by the following diagrams:



Absorption Costing Approach



Marginal Costing Approach

Main Points of distinction between Marginal Costing and Absorption Costing

	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

Difference in Profit under Marginal and Absorption costing

The above two approaches will compute the different profit because of the difference in the stock valuation. This difference is explained as follows in different circumstances.

1. **No opening and closing stock:** In this case, profit / loss under absorption and marginal costing will be equal.

2. **When opening stock is equal to closing stock:** In this case, profit / loss under two approaches will be equal provided the fixed cost element in both the stocks is same amount.
3. **When closing stock is more than opening stock:** In other words, when production during a period is more than sales, then **profit as per absorption approach will be more** than that by marginal approach. The reason behind this difference is that a part of fixed overhead included in closing stock value is carried forward to next accounting period.
4. **When opening stock is more than the closing stock:** In other words, when production is less than the sales, **profit shown by marginal costing will be more** than that shown by absorption costing. This is because a part of fixed cost from the preceding period is added to the current year's cost of goods sold in the form of opening stock.

The presentation of information to management under the two costing techniques is as under:

Income Statement (Absorption costing)

		(₹)
Sales		XXXXX
Production Costs:		
Direct material consumed		XXXXX
Direct labour cost		XXXXX
Variable manufacturing overhead Fixed manufacturing overhead **Cost of Production**		XXXXX
Add: Opening stock of finished goods (Value at cost of previous period's production)		XXXXX
		XXXXX
Less: Closing stock of finished goods (Value at production cost of current period)		XXXXX
Cost of Goods Sold		XXXXX
Add: (or less) Under (or over) absorption of fixed Manufacturing overhead		XXXXX
Add: Administration costs	XXXXX	
Selling and distribution costs	XXXXX	XXXXX
Total Cost		XXXXX
Profit (Sales – Total cost)		XXXXX

Income Statement (Marginal costing)

	(₹)
Sales	XXXXX
Variable manufacturing costs:	
– Direct material consumed	XXXXX
– Direct labour	XXXXX
– Variable manufacturing overhead	XXXXX
Cost of Goods Produced	XXXXX
Add: Opening stock of finished goods	XXXXX
(Value at cost of previous period)	
Less: Closing stock of finished goods (Value at current variable cost)	
Cost of Goods Sold	XXXXX
Add: Variable administration, selling and dist. overhead	XXXXX
Total Variable Cost	XXXXX
Add: Selling and distribution costs	
Contribution (Sales – Total variable costs)	XXXXX
Less: Fixed costs (Production, admin., selling and dist.)	XXXXX
Net Profit	XXXXX

It is evident from the above that under marginal costing technique the contributions of various products are pooled together and the fixed overheads are met out of such total contribution. The total contribution is also known as gross margin. The contribution minus fixed expenses yields net profit. In absorption costing technique cost includes fixed overheads as well.

QUESTIONS FOR CLASSROOM DISCUSSION

PROBLEM – 1

A company producing a single article sells it at 10 each. The marginal cost of production is ₹ 6 each and the fixed cost is ₹ 400 per annum.

Calculate

a. The P/V ratio;

b. The break-even sales;

c. The sales to earn at profit ₹ 5,000;

d. Profit at sales ₹ 3,000;

e. New break-even point if the Sale price is reduced by 10%.

f. MOS when the profit earned in ₹ 200 and PVR – 40%.

PROBLEM – 2

Fill in the blanks for each of the following independent situations:

SITUATIONS	AYE	BYE	CEE
Selling price per unit	a.	₹ 50	₹ 20
Variable cost as % of selling price	60	c.	75
No. of units sold	10,000	4,000	(e)
Marginal contribution	20,000	80,000	(f)
Fixed costs	₹ 12,000	d.	₹1,20,000
Profit or loss	b.	₹20,000	₹30,000

PROBLEM – 3

The company estimates that next year it will earn a profit of ₹ 50,000. The budgeted fixed cost is ₹ 2,50,000 and the sales is ₹ 9,93,000. Find out the breakeven point for the company.

PROBLEM – 4

From the following particulars, find out the selling price per unit if BEP is to be brought down by 1800 units.

Particulars	Amount
Variable cost per unit	₹ 75
Fixed expenses	₹ 2,70,000
Selling price per unit	₹ 100

PROBLEM – 5

1. If margin safety is ₹ 2,40,000 (40% of sales) and PVR is 30%, calculate a. BES b. amount of Profit on sales of 9,00,000.
2. X Ltd. has earned a Contribution of 2,00,000 and a Net Profit of ₹ 1,50,000 on sales of ₹ 8,00,000. What is its margin of safety?
3. The ratio of variable cost to sales is 70%. The break-even point occurs at 60% of the capacity sales. Compute the capacity sales when the fixed costs are ₹ 90,000. Also, compute profit at 75% of the capacity sales.
4. PV ratio of X Ltd. is 50% and the margin of safety is 40%. Calculate the net profit when sales is ₹ 1,00,000.
5. Ascertain profit when sales is ₹ 2,00,000, fixed cost is ₹ 40,000 and BEP is ₹ 1,60,000.
6. Ascertain sales when the fixed cost is ₹ 20,000, profit is ₹ 10,000 and BES is ₹ 40,000.
7. If BEP is 40% and the net profit ratio is 12%, find out the contribution sales ratio.

PROBLEM – 6

A company had incurred fixed expenses of ₹ 4,50,000, with sales of ₹ 15,00,000 and earned a profit of ₹ 3,00,000 during the first half year. In the second half, it suffered a loss of ₹ 1,50,000.

CALCULATE

i. The profit-volume ratio, break-even point and margin of safety for the first half year.
ii. Expected sales volume for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year.
iii. The break-even point and margin of safety for the whole year.

PROBLEM – 7

An analysis of Chaitanya Ltd gives the following information:

Cost element	Variable cost (% sales)	Fixed cost
Direct material	32.8	-
Direct labour	28.4	-
Factory OH	12.6	₹1,89,900
Distribution OH	4.1	₹ 58,400
General administration OH	1.1	₹ 66,700

A budgeted sale is ₹ 1,85,0000. You are required to determine:

1. Break-even sales volume
2. Profit at budgeted sales volume
3. Profit if the actual sales decrease by 10%

PROBLEM – 8

You are given the following data for the current financial year of Rio Co. Ltd:

Variable cost	60,000	60%
Fixed cost	30,000	30%
Net profit	10,000	10%
Sales	1,00,000	100%

FIND OUT a. Break-even point, b. P/V ratio, and c. Margin of safety. Also DRAW a break-even chart showing contribution and profit.

PROBLEM – 9

PREPARE a profit graph for products A, B and C and find break-even point from the following data:

Products	A	B	C	Total
Sales (₹)	7,500	7,500	3,750	18,750
Variable cost (₹)	1,500	5,250	4,500	11,250
Fixed cost (₹)	---	---	---	5,000

PROBLEM – 10

MNP Ltd sold 2,75,000 units of its product at ₹ 37.50 per unit. Variable costs are ₹ 17.50 per unit (manufacturing costs of ₹ 14 and selling cost ₹ 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amounting to ₹ 35,00,000 (including depreciation of ₹ 15,00,000). There is no beginning or ending inventories.

Required:

COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

PROBLEM – 11

Company	Variable Cost per unit	Fixed cost
P	9	₹ 60,000
Q	5	₹ 90,000

At what sale range is P more profitable than Q and vice versa? Assume that both the products have the same selling price.

PROBLEM – 12

The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

Particulars	Manual	Semi-Automatic	Fully-Automatic
Monthly fixed costs:			
Occupancy	₹ 15,000	₹ 15,000	₹ 15,000

Maintenance contract	-	₹ 5,000	₹ 10,000
Equipment lease	-	₹ 25,000	₹ 1,00,000
Unit variable costs (per report):			
Supplies	₹ 40	₹ 80	₹ 20
Labour	₹200 (5hrs x ₹ 40)	₹60 (1hrs x₹ 60)	₹20 (0.25hrs x₹ 80)

Required:

- CALCULATE cost indifference points. Interpret your results.
- If the present caseload is 600 cases and it is expected to go up to 850 cases in the near future, SELECT most appropriate on cost considerations?

PROBLEM – 13

Two businesses AB Ltd and CD Ltd. sell the same type of product in the same type of market. Their budgeted Profit and Loss Accounts for the year ending 20x1 are as follows:

	A.B. Ltd.		C.D. Ltd.	
Sales		₹ 1,50,000		₹ 1,50,000
Less:				
Variable costs	₹ 1,20,000		₹ 1,00,000	
Fixed costs	₹ 15,000	₹ 1,35,000	₹ 35,000	₹ 1,35,000
Net profit budgeted		**₹ 15,000**		**₹ 15,000**

You are required to:

a. Calculating the break-even point of each business;

b. Calculate the sales volume at which each of the businesses will earn ₹ 5,000 profit; and

c. State which business is likely to earn greater profits in conditions of:

i. Heavy demand for the product;

ii. Low demand for the product.

PROBLEM – 14

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Particulars	**Amount**
Sales	₹ 5,00,000
Direct Materials	₹ 2,50,000

Direct Labour	₹ 1,00,000
Variable Overheads	₹ 40,000
Capital Employed	₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required:

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

PROBLEM – 15

You are given the following data:

	Sales	**Profit**
Year 2021-22	₹1,20,000	8,000
Year 20x2-23	₹1,40,000	13,000

FIND OUT

1. P/V ratio,
2. B.E. Point,
3. Profit when sales are ₹ 1,80,000,
4. Sales required earn a profit of ₹ 12,000,
5. Margin of safety in year 20x2-20x3.

PROBLEM – 16

A company has three factories situated in the north, east and south with its Head Office in Mumbai. The management has received the following summary report on the operations of each factory for a period:

	Sales		**Profit**	
	Actual	**Over/(Under) Budget**	**Actual**	**Over/(Under) Budget**
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE for each factory and for the company as a whole for the period:

i. The fixed cost

ii. Break even sales

PROBLEM – 17

Good luck Ltd has prepared the following estimate for the year 20x1-x2.

Sales	15,000 units
Fixed expenses	₹ 34,000
Sales value	₹ 1,50,000
Variable cost	₹ 6 per unit

You are required to;

- Find the PVR, BEP and MOS
- Calculate the revised PVR, BEP and MOS in each of the following cases
  - **i.** Decrease of 10% in selling price
  - **ii.** Increase of 10% variable cost
  - **iii.** Increase of sales volume by 2,000 units.
  - **iv.** Increase of ₹6,000 in fixed cost.

PROBLEM – 18

A company has a P/V ratio of 40 % COMPUTE by what percentage must sales be increased to offset: 20% reduction in selling price?

PROBLEM – 19

PQR Ltd. has furnished the following data for the two years:

Particulars	**20x1**	**20x2**
Sales	₹ 8,00,000	?
Profit/Volume Ratio (P/V ratio)	50%	37.50%
Margin of Safety sales as a % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 20x2 due to the restructuring process. The company could maintain its sales quantity level of 20x1 in 20x2 by reducing the selling price.

You are required to CALCULATE the following:

i. Sales for 20x2 in Value.

ii. Fixed cost for 20x2 in Value,

iii. Break-even sales for 20x2 in Value.

PROBLEM – 20

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Particulars	Amount
Sales	₹ 5,00,000
Direct Materials	₹ 2,50,000
Direct Labour	₹ 1,00,000
Variable Overheads	₹ 40,000
Capital Employed	₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required:

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

PROBLEM – 21

The following set of information is presented to you by your client AB Ltd producing two products X and Y.

Particulars	X	Y
Direct materials	₹ 20	₹ 18
Direct wages	₹ 6	₹ 4

- Fixed expenses during the period are expected to be ₹ 1,600.
- Variable expenses are allocated to the products at the rate of 100% of direct wages.
- Selling price per unit X: ₹ 40 and Y: ₹ 30.
- Proposed sales mix:
  - **i.** 100 units of X and 200 units of Y
  - **ii.** 150 units of X and 150 units of Y
  - **iii.** 200 units of X and 100 units of Y

As a cost accountant, you are required to present to the management the following:

a. The total contribution and profit from each of the above sales mix.

b. The proposed sales mix to earn of profit of ₹ 300 and ₹ 600 with the total sales of X and Y being 300 units.

c. Calculate BEP when the sales mix is 2:1

d. Recalculate BEP when sales mix is 1:2

PROBLEM – 22

Aravind Ltd. manufactures and sells four products under the brand names A, B, C, & D. the following details are provided in respect of the products.

PRODUCT	**A**	**B**	**C**	**D**
% in Sales Value	30	40	20	10
% of Variable cost to selling price	60	70	80	30

The total budgetary sales (100%) are ₹ 10,00,000 p.m. fixed costs are ₹ 2,50,000 p.m. The Company's new sales manager Aravind has suggested a change in sales mix keeping the total sales at ₹ 10,00,000 per month. His suggestion is as under:

Product	**A**	**B**	**C**	**D**
% in sales Value	25	40	30	5

- Calculate the break-even point for the company, under the existing sales mix.
- Compute the effect of implementing the suggested change in the sales mix.
- Explain the reasons for the effect of change in sales mix despite total sales and fixed cost being the same.

PROBLEM – 23

A, B and C are three similar plants under the same management who want them to be merged for better operation. The details are as under:-

Plant	**A**	**B**	**C**
Capacity Operated %	100	70	50
	(in lakhs)	**(in lakhs)**	**(in lakhs)**
Turnover	₹ 300	₹ 280	₹ 150
Variable Cost	₹ 200	₹ 210	₹ 75
Fixed Costs	₹ 70	₹ 50	₹ 62

Find out:

a. The capacity of the merged plant for break-even

b. The profit at 75% capacity of the merged plant.

c. The turnover from the merged plant to give a profit of ₹28 lakhs.

PROBLEM – 24

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

Particulars	**X**	**Y**	**Z**
Selling Price (₹/unit)	₹ 10	₹ 12	₹ 12
Variable Costs (₹/unit)	₹ 6	₹ 9	₹ 7
Market Demand (units)	3,000	2,000	1,000
Production Capacity (units)	2,000	3,000	900
Fixed Costs (₹)	₹ 30,000		

Required:

COMPUTE the opportunity costs for each of the products.

PROBLEM – 25

The following particulars are extracted from the records company:-

Particulars	**Product A**	**Product B**
	Per Unit	**Per Unit**
Sales	₹ 100	₹ 120
Consumption of Material	2 Kg.	3 Kg.
Material Cost	₹ 10	₹ 15
Direct wages cost	₹ 15	₹ 10
Direct expenses	₹ 5	₹ 6
Machine Hours used	3	2
Overhead expenses :		
- Fixed	₹ 5	₹ 10
- Variable	₹ 15	₹ 20

Direct wages per hour is ₹ 5.

a. Comment on the profitability of each product (both use the same raw material) when

i. Raw material is in short supply;

ii. Production capacity (in terms of machine-hours) is the limiting factor.

b. Assuming Raw material as the key factor availability of which is 10,000 Kg. and the maximum sales potential of each product being 3,500 units, find out the product mix which will yield the maximum profit.

PROBLEM – 26

X Ltd. supplies spare parts to an aircraft company Y Ltd. The production capacity of X Ltd. facilitates the production of any one spare part for a particular period of time. The following are the cost and other information for the production of the two different spare parts A and B

Particulars	Part A	Part B
Per unit		
Alloy usage	1.6 kgs.	1.6 kgs.
Machine Time: Machine P	0.6 h	0.25 h
Machine Time: Machine Q	0.5 h	0.55 h
Target Price (₹)	₹ 145	₹ 115

Total hours available:

Machine P: 4,000 hours

Machine Q: 4,500 hours

Alloy available is 13,000 kgs. @ ₹ 12.50 per kg.

Variable overheads per machine hours:

Machine P: ₹ 80

Machine Q: ₹ 100

Required:

i. IDENTIFY the spare part which will optimize contribution at the offered price.

ii. If Y Ltd. reduces the target price by 10% and offers ₹ 60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

PROBLEM –27

A paint manufacturing company manufactures 2,00,000 medium-sized tins of "Spray Lac Paints" per annum when working at normal capacity. It incurs the following costs of manufacturing per unit:

Particulars	(₹)
Direct Material	7.8
Direct Labour	2.1
Variable overheads	2.5
Fixed overheads	4
Product Cost per unit	16.4

The selling price is ₹ 21 per and variable selling and administrative expenses are 60 paise per tin. During the next quarter, only 10,000 units can be produced and sold. Management plans to shut down the plant estimating that the fixed manufacturing cost can be reduced to ₹ 74,000 for the quarter. When the plant is operating, the fixed overheads are incurred at a uniform rate throughout the year. Additional costs of plant shutdown for the quarter are estimated at ₹ 14,000.

REQUIRED:

a. Express your opinion, as to whether the plant should be shut down during the quarter, and

b. Calculate the shutdown point for the quarter in terms of number of tins.

PROBLEM –28

Mr. X has ₹ 2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales, his fixed costs are ₹ 80,000 per year.

Show COMPUTATIONS to answer the following questions:

i. What sales volume must be obtained to break even?

ii. What sales volume must be obtained to get 15 per cent return on investment?

iii. Mr. X estimates that even if he closed the doors of his business, he would incur ₹ 25,000 as expenses per year. At what sales would he be better off by locking his business up?

PROBLEM –29

From the following data compute the profit under a. Marginal costing, and b. Absorption costing and reconcile the difference in profit.

	₹ Per unit
Selling price	₹ 8
Variable cost	₹ 4
Fixed cost	₹ 2

The normal volume of production is 26,000 units per quarter.

The opening and closing stocks consisting of both finished goods and equivalent units of work-in-progress are as follows:-

Particulars	Qr. I	Qr. II	Qr. III	Qr. IV	Total
Op. stock	-	-	6,000	2,000	-
Production	26,000	30,000	24,000	30,000	**1,10,000**
Sales	26,000	24,000	28,000	32,000	**1,10,000**
Closing stock	-	6,000	2,000	-	-

PROBLEM – 30

Wonder Ltd, manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

Activity Level	**50%**	**100%**
Sales and production (units)	400	800
Sales	₹ 8,00,000	₹16,00,000
Production costs:		
Variable	₹ 3,20,000	₹ 6,40,000
Fixed	₹ 1,60,000	₹ 1,60,000
Selling and distribution costs:		
Variable	₹ 1,60,000	₹ 3,20,000
Fixed	₹ 2,40,000	₹ 2,40,000

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year. In the first quarter, 220 units were produced and 160 units were sold.

Required:

a. COMPUTE the fixed production costs absorbed by ZEST if absorption costing is used.

b. CALCULATE the under/over-recovery of overheads during the period.

c. CALCULATE the profit using absorption costing.

d. CALCULATE the profit using marginal costing.

PROBLEM – 31

A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

i. On 1st April, 20x3, the company has an opening stock of 20,000 packets whose variable cost is ₹180 per packet.

ii. In 20x2-20x3, production was ₹ 1,20,000 packets and the expected production in 20x3-20x4 is 1,50,000 packets. Expected sales for 20x3-20x4 is 1,60,000 packets

iii. In 20x2-20x3, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 20x3-20x4. The variable cost is expected to increase by 25%. Selling price for 20x3-20x4 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 20x3-20x4.

ADDITIONAL QUESTIONS FOR PRACTICE

QFP 1 (Concept Similar to Problem – 1 to 6)

You are given the following particulars

i. Fixed cost ₹ 1,50,000

ii. Variable cost ₹ 15 per unit

iii. Selling price is ₹ 30 per unit

CALCULATE:

a. Break-even point

b. Sales to earn a profit of ₹ 20,000

QFP 2 (Concept Similar to Problem – 1 to 6)

A company earned a profit of ₹ 30,000 during the year. If the marginal cost and selling price of the product are ₹ 8 and ₹ 10 per unit respectively, FIND OUT the amount of margin of safety.

QFP 3 (Concept Similar to Problem – 1 to 6)

A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to ₹ 5 lakhs.

CALCULATE the following:

i. Break-even sales

ii. Total sales

iii. Total variable cost

iv. Current profit

v. New 'margin of safety' if the sales volume is increased by 7 ½ %.

QFP 4 (Concept Similar to Problem – 1 to 6)

You are required to

	(₹)
(i) DETERMINE profit, when sales	2,00,000
Fixed Cost	40,000
BEP	1,60,000
(ii) DETERMINE sales, when fixed cost	20,000
Profit	10,000
BEP	40,000

QFP 5 (Concept Similar to Problem – 1 to 6)

M.K. Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit.

i. If the Fixed Costs for this year are ₹ 4,80,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%

ii. For the next year, it is proposed to add another product line Y whose selling price would be ₹ 50 per unit and the variable cost ₹ 10 per unit. The total fixed costs are estimated at ₹ 6,66,600. The sales mix values of X : Y would be 7 : 3. DETERMINE at what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

QFP 6 (Concept Similar to Problem – 8)

a. You are given the following data for the coming year for a factory.

Budgeted output 8,00,000 units

Fixed expenses Rs. 40,00,000

Variable expenses per unit Rs. 100

Selling price per unit Rs. 200

DRAW a break-even chart showing the break-even point.

b. If price is reduced to Rs. 180, what will be the new break-even point?

QFP 7 (Concept Similar to Problem – 15)

A company sells its product at ₹ 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000 units, it earns a profit of ₹ 4 per unit. CALCULATE break-even point both in terms of Value as well as in units.

QFP 8 (Concept Similar to Problem – 17)

By noting "P/V will increase or P/V will decrease or P/V will not change", as the case may be, STATE how the following independent situations will affect the P/V ratio:

i. An increase in the physical sales volume;

ii. An increase in the fixed cost;

iii. A decrease in the variable cost per unit;

iv. A decrease in the contribution margin;

v. An increase in selling price per unit;

vi. A decrease in the fixed cost;

vii. A 10% increase in both selling price and variable cost per unit;

viii. A 10% increase in the selling price per unit and 10% decrease in the physical sales volume;

ix. A 50% increase in the variable cost per unit and 50% decrease in the fixed cost.

x. An increase in the angle of incidence.

QFP 9 (Concept Similar to Problem – 20)

A single product company sells its product at ₹ 60 per unit. In 20x1-20x2, the company operated at a margin of safety of 40%. The fixed costs amounted to ₹ 3,60,000 and the variable cost ratio to sales was 80%.

In 20x2-20x3, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.

i. FIND the selling price required to be fixed in 20x2-23 to earn the same P/V ratio as in 20x1-20x2.

ii. Assuming the same selling price of ₹ 60 per unit in 20x2-20x3, FIND the number of units required to be produced and sold to earn the same profit as in 20x1-20x2.

QFP 10 (Concept Similar to Problem – 20)

An automobile manufacturing company produces different models of Car The budget in respect of model 007 for the month of March is as under:

Budgeted Output			**40,000 Units**
		₹ In lakhs	**₹ In lakhs**
Net Realisation			2,10,000
Variable Costs:			
Materials		79,200	
Labour		15,600	
Direct expenses		37,200	1,32,000
Specific Fixed Costs		27,000	
Allocated Fixed Costs		33,750	60,750
	Total Costs		1,92,750
	Profit		17,250
	Sales		2,10,000

CALCULATE:

i. Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.

ii. Volume to be achieved to maintain the original profit after a 10 percent rise in material costs, at the originally budgeted selling price per unit.

QFP 11 (Concept Similar to Problem – 22)

M.K. Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit.

i. If the Fixed Costs for this year are ₹ 4,80,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%

ii. For the next year, it is proposed to add another product line Y whose selling price would be ₹ 50 per unit and the variable cost ₹ 10 per unit. The total fixed costs are estimated at ₹ 6,66,600. The sales mix values of X : Y would be 7 : 3. DETERMINE at what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

QFP 12 (Concept Similar to Problem – 22)

A company has made a profit of ₹ 50,000 during the year. If the selling price and marginal cost of the product are ₹ 15 and ₹ 12 per unit respectively, FIND OUT the amount of margin of safety.

QFP 13 (Concept Similar to Problem – 22)

Prisha Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	A	**B**	**C**
Sales Mix	40%	35%	25%
Selling Price	₹ 300	₹ 400	₹ 200
Variable Cost	₹ 150	₹ 200	₹ 120
Total Fixed Costs	₹ 18,00,000		
Total Sales	₹ 60,00,000		

The company has currently under discussion, a proposal to discontinue the manufacture of Product C and replace it with Product E, when the following results are anticipated:

	Products		
	A	**B**	**E**
Sales Mix	45%	30%	25%
Selling Price	₹ 300	₹400	₹ 300
Variable Cost	₹ 150	₹200	₹ 150
Total Fixed Costs	₹ 18,00,000		
Total Sales	₹ 64,00,000		

Required:

i. CALCULATE the total contribution to sales ratio and present break-even sales at existing sales mix.

ii. CALCULATE the total contribution to sales ratio and present break-even sales at proposed sales mix.

iii. STATE whether the proposed sales mix is accepted or not?

QFP 14 (General calculation)

An Indian soft drink company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

	Total annual costs	**Percent of Total Annual Cost which is variable**
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary. You are required to

i. COMPUTE the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.

ii. CALCULATE the break-even point in rupees sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is ₹ 14 per bottle.

QFP 15 (Concept Similar to Problem – 29)

XYZ Ltd. has a production capacity of 2,00,000 units per year. Normal capacity utilisation is reckoned as 90%. Standard variable production costs are ₹ 11 per unit. The fixed costs are ₹3,60,000 per year. Variable selling costs are ₹ 3 per unit and fixed selling costs are ₹2,70,000 per year. The unit selling price is ₹ 20.

In the year just ended on 31st March, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 31st March was 20,000 units. The actual variable production costs for the year were ₹ 35,000 higher than the standard.

i. CALCULATE the profit for the year

- **a.** by absorption costing method and
- **b.** by marginal costing method.

ii. EXPLAIN the difference in the profits.

CHAPTER 13: STANDARD COSTING

INTRODUCTION

Cost control is one of the objectives of cost management. Management of an organisation setups predetermined cost to compare the actual cost with the predetermined cost. Predetermined costs are standard costs used for cost controland performance evaluation. Standard costing is a method of cost and management accounting which starts with setting of standards and ends with reporting of variances to management for taking corrective actions. The Official Terminology of CIMA, London defines standard costing as "Control technique that reports variances by comparing actual costs to pre-set standards so facilitating action through management by exception."

In this chapter we will learn how standards are set for each cost component i.e. material, labour and overheads of a cost object.

What Is A Standard Or Standard Cost?

Standard cost is defined in the CIMA Official Terminology as "'the planned unit costof the product, component or service produced in a period. The standard cost maybe determined on a number of bases. The main use of standard costs is in performance measurement, control, stock valuation and in the establishment ofselling prices." From the above definition Standard costs can be said as

- Planned cost
- Determined on a base or number of bases.

Why Standard Costing is Needed?

Standards or Standard costs are established to evaluate performance of a responsibility centre. Apart from performance evaluation and cost control, standard costs are also used to value inventory where actual figures are not reliably available and to determine selling prices particularly while preparing quotations.

Standard costing system is widely accepted as it serves different needs of an organisation. The standard costing is preferred for the following reasons:

a. **Prediction of future cost for decision making:** Standard costs are set after taking all present conditions and future possibilities into consideration. Hence, standard cost is future cost for the purpose of cost estimation and profitability from a proposed project/ order/ activity.
b. **Provide target to be achieved:** Standard costs are the target cost which should not be crossed by the responsibility centres. Performance of a responsibility centre is continuously monitored and measured against the set standards. Any variance from the standard is noted and reported for appropriate action.

c. **Used in budgeting and performance evaluation:** Standard costs are usedto set budgets and based on these budgets managerial performance is evaluated. This is of two benefits, one managers of a responsibility centre will not compromise with the quality to fulfill the budgeted quantity and second, variances can be traced with the responsible department or person.

d. **Interim profit measurement and inventory valuation:** Actual profit can only be known after the closure of the accounts. But an organisation may need to prepare profitability statement for interim periods for managerial reportingand decision making. To arrive at profit figure, standard costs are deducted from the revenue.

TYPES OF STANDARDS

Types of standards are as below:

i. **Ideal Standards:** These represent the level of performance attainable when prices for material and labour are most favourable, when the highest output is achieved with the best equipment and layout and when the maximum efficiency in utilisation of resources results in maximum output with minimum cost.

   These types of standards are criticised on three grounds:

   a. Since such standards would be unattainable, no one would take these seriously.

   b. The variances disclosed would be variances from the ideal standards. These would not, therefore, indicate the extent to which they could have been reasonably and practically avoided.

   c. There would be no logical method of disposing of these variances.

ii. **Normal Standards:** These are standards that may be achieved under normal operating conditions. The normal activity has been defined as "the number of standard hours which will produce at normal efficiency sufficient good to meet the average sales demand over a term of years".

   These standards are, however, difficult to set because they require a degree of forecasting. The variances thrown out under this system are deviations from normal efficiency, normal sales volume, or normal production volume.

   If the actual performance is found to be abnormal, large variances may result and necessitate revision of standards.

iii. **Basic or Bogey Standards:** These standards are used only when they are likely to remain constant or unaltered over a long period. According to this standard, a base year is chosen for comparison purposes in the same way as statisticians use price indices. Since basic standards do not represent what shouldbe attained in the present period, current standards should also be prepared ifbasic standards are used. Basic standards are, however, well suited to businesses having a small range of products and long production runs. Basic standards are set, on a long-term basis and are seldom revised. When basic standards are in use, variances are not calculated. Instead, the actual cost is expressed as a percentageof basic cost. The current cost is also similarly expressed and the two percentages are compared to find out how much the actual cost

has deviated from the current standard. The percentages are next compared with those of the previous periodsto establish the trend of actual and current standard from basic cost.

iv. **Current Standards: These standards reflect the management's anticipation of what actual costs will be for the current period.** These are the costs which the business will incur if the anticipated prices are paid for the goodsand services and the usage corresponds to that believed to be necessary to produce the planned output.

The variances arising from expected standards represent the degree of efficiencyin usage of the factors of production, variation in prices paid for materials and services and difference in the volume of production.

THE PROCESS OF STANDARD COSTING

The process of standard cost is as below:

i. **Setting of Standards:** The first step is to set standards which are to beachieved, the process of standard setting is explained below.
ii. **Ascertainment of actual costs:** Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.
iii. **Comparison of actual cost with standard cost:** Actual costs are compared with the standards costs and variances are determined.
iv. **Investigate the reasons for variances:** Variances arises are investigated for further action. Based on this, performance is evaluated and appropriate actions are taken.
v. **Disposition of variances:** Variances arise are disposed-off by transferring it the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.

SETTING-UP OF STANDARD COST

Standard cost is set on the basis of management's estimation. Cost is estimated on the basis of technical specification provided by the engineering department or other expert such as production engineer. Generally, while setting standards, consideration is given to historical data, current production plan and expected conditions of future. For the sake of detailed analysis and control, standard cost is set for each element of cost i.e. material, labour, variable overheads and fixed overheads. Standard are also set for the sales quantity and sales value; this is generally known as budgeted sales.

Standards are set in both quantity (units or hours) and in cost (price or rate). It isthus measure in quantities, hours and value of the factors of production.

Standard costs are divided into three main cost components, such as

a. Direct Material Cost
b. Direct Employee (Labour) Cost and
c. Overheads

Standards are set in both physical and monetary terms for each cost components. Details are as follows:

Physical Standards

Physical standards refer to expression of standards in units or hours. At this stage standard quantity and standard hours are determined for a particular product or service. The purpose of setting standards is to secure economies in scale of production and to set selling price for quotation purpose. In manufacturing organisations, the task of setting physical standards is assigned to the industrial engineering department. While setting standards consideration is given to :

- Company's operating plan i.e. budgets
- Final output to be produced
- Material specification, in both quantity and quality provided by theengineering department.
- Proportion of material to be used in case of multiple inputs.
- Method of production i.e. fully automated, semi-automated or manual.
- Skill set of workers and availability of workers.
- Working conditions and internal factors.
- External factors (such as Labour Law, Factories Act, Govt. policy etc.).

PROCEDURE OF SETTING MATERIAL QUANTITY STANDARDS

The following procedure is usually followed for setting material quantity standards.

a. **Standardisation of products:** At this phase, products to be produced are decided based on production plan and customer's order.
   Generally following questions are answered at this stage: (i) What to be produced? (ii) Which type to be produced and (iii) How much to be produced?
b. **Product study:** Product to be produced is analysed and studied for developments and production. Product study is carried out by the engineering department or product consultants. At this phase answers to the following questions are satisfied: (i) How can it be produced? (ii) What are the pre-requisites? (iii) Which type of materials to be used? (iv) How products can be accepted in the market? etc.
c. **Preparation of specification list:** After the product study a list of material is prepared. It specifies types (quality) and quantity of materials to be used, substitute of the materials, quantity and proportion of materials to be used, process to be followed, pre-requisites and condition required etc. While preparing specification list consideration to expected amount of wastage is given. It must be customised to adopt changes in the product.
d. **Test runs:** Sample or test runs under specified conditions are carried out and sample products are tested for the desired quality and quantity. Any deviation from the specification is noted down and specification list is updated.

PROCEDURE OF SETTING LABOUR TIME STANDARDS

The following are the steps involved in setting labour standards:

a. **Standardisation** of product and product study is carried out as explained above.
b. **Labour specification:** Types of labour and labour time is specified. Labour time specification is based on past records and it takes into account normal wastage of time.
c. **Standardisation of methods:** Selection of proper machines to use proper sequence and method of operations.
d. **Manufacturing layout:** A plan of operation for each product listing the operations to be performed is prepared.
e. **Time and motion study:** It is conducted for selecting the best way of completing the job or motions to be performed by workers and the standard time which an average worker will take for each job. This also takes intoaccount the learning efficiency and learning effect.
f. **Training and trial:** Workers are trained to do the work and time spent at the time of trial run is noted down.

PROCEDURE OF SETTING OVERHEADS TIME/ QUANTITY STANDARDS

Variable overhead time/ quantity is estimated based on specification made by the engineering departments. Variable overheads may either be based on direct material quantity or labour hour. Generally, it is based on labour time worked.

Fixed overhead time is based on budgeted production volume.

PROBLEMS FACED WHILE SETTING PHYSICAL STANDARDS

The problems involved while setting physical standards will vary from industry to industry and may be illustrated as under:

a. A situation may arise where the company is introducing the manufacture of a new line of product. In such case, it may be necessary to employ workers who have no experience in the job. This creates a problem of setting standard time because it is necessary to make adjustment for the inexperience of workers.
b. Changes in technology may necessitate installation of sophisticated machines. When such machines are installed, the precise estimation of output and standard of efficiency achievable will pose a problem until after a long time when the working conditions are settled. Thus, setting standards for these machines and estimating the standard costs will need considerable amount of work.
c. Often manufacturers prefer to product diversification to improve profitability. One of the most important problems that arise with the proposed change in product is re-setting of production facilities. For example, when an old copper part is to be changed into one made of bronze to suit the new product, special care has to be taken to order new tools which in turn, pose the problem of setting up of standard time in respect of the new tools.

d. Standards of material specifications are established and if the materials arenot available as per specifications, the standards may not be achievable.

e. Very often the cost accountant is confronted with the problem of choosingthe type of standards to be adopted. For example, the industrial engineer has furnished the standard time for all direct labour operations as under:

1. Standard time attainable by the best operations is 2 hours per unitof product including allowances for personal fatigue and delay.

2. Attainable good performance for the average trained operator is 2.10 hours per unit of product.

3. Average past performance is 2.60 hours per unit.

The problem is, should direct labour standard hour be based on maximum efficiency or attainable good performance or average past performance? If costs are to represent maximum efficiency, the unit cost used in selling price will relatively be low but a high debit variance may arise if the standard efficiency is not achieved.

If, however, the standard cost is based on attainable good performance, the variances may tend to be nil. If efficiency is to be gauged, maximum efficiency standard will reflect the off standard performance, thereby enabling the departmental head to exercise control.

Similar problems as those mentioned above, may also arise in setting of waste standards. For example, the question may arise as to whether only absolutely unavoidable wastage should be provided or the past average level of wastage maybe provided. This will again have different impact on the standard cost of production.

Price or Rate Standards

Broadly, the price or rate standards can be set on either of the following bases:

a. Actual average or mean price expected to prevail during the comingperiod, say one year; or

b. Normal prices expected to prevail during a cycle of seasons which may be of a number of years.

PROCEDURES OF SETTING MATERIAL PRICE STANDARDS

Material prices are not altogether within the control of the manufacturer; but the purchasing department, on being apprised of production quantities required, should be able, from its knowledge of current market conditions and trends, to state with reasonable accuracy price for the constituent items. The standards for prices of materials should be based on the following factors, if price fluctuations are small and are not serious.

a. Stock of materials on hand and the prices at which they are held;

b. The prices at which orders for future deliveries of materials (agreemententered into) have already been placed,

c. Minimum support price fixed by the appropriate authority and

d. Anticipated fluctuation in price levels

In case there are unsystematic fluctuations in the market price, it may be difficultto determine standard costs of materials; fluctuations in the market price may be of different sorts; prices may be different from month to month, from oneseason to another or from one year to another. There may be a secular trend which, on the whole, is pushing price upwards or downwards. The nature of difficulties encountered in fixing standard costs of materials will naturally be different in each case. In addition, the purchasing policy of the company and the objective to be achieved (from cost accounting) will make a difference.

The difficulty in determining the standard cost of material in such a situation can be resolved as follows:

a. In case prices fluctuate from month to month, the average of prices of a year corrected for the known secular changes and any other expected change can very well serve as the standard price for the next year.

b. If the fluctuations are seasonal, but the whole year's requirements are purchased at one time, the weighted average of the likely prices to be paid should be treated as the standard price. But, if buying is also spread over the whole year, the weighted average of the prices for the whole year should be the standard price.

c. If prices fluctuate from one year to another, a careful estimate of the price likely to prevail next year, based on a statistical study, should be adoptedas the standard price.

PROCEDURES OF SETTING WAGE RATE STANDARD

The type of labour required for performing a specific job would be the most important factor for deciding the rate of wage to be paid to workers. Standardwage rate for skilled and unskilled workers are set based on the following basis:

i. Time taken by the workers to complete a unit of production.

ii. Time or piece rate prevailing in the industry. It can be known from thepeers.

iii. Wage agreement entered into between the management and workers'union.

iv. Law prevailing in the area of operation, law like Payment of minimumwages Act, Payment of bonus Act etc.

PROCEDURES OF SETTING OVERHEAD EXPENSE STANDARDS

In computing the overhead expense standards, consideration should be given to the level of output and the budgeted expenses. A budgeted output is fixed considering practical manufacturing capacity and anticipated sales demand. Expenditures can be budgeted under different heads for the level of output chosen. These expenditures are classified as fixed and variable. Thus, the overhead expense standards are set by computing the optimum level of output for a production departments followed by budgets for fixed and variable overheads. If production is seasonal or it fluctuates during the year, a flexible budget may be prepared to facilitate comparison between the set target and actual expenditure for the period.

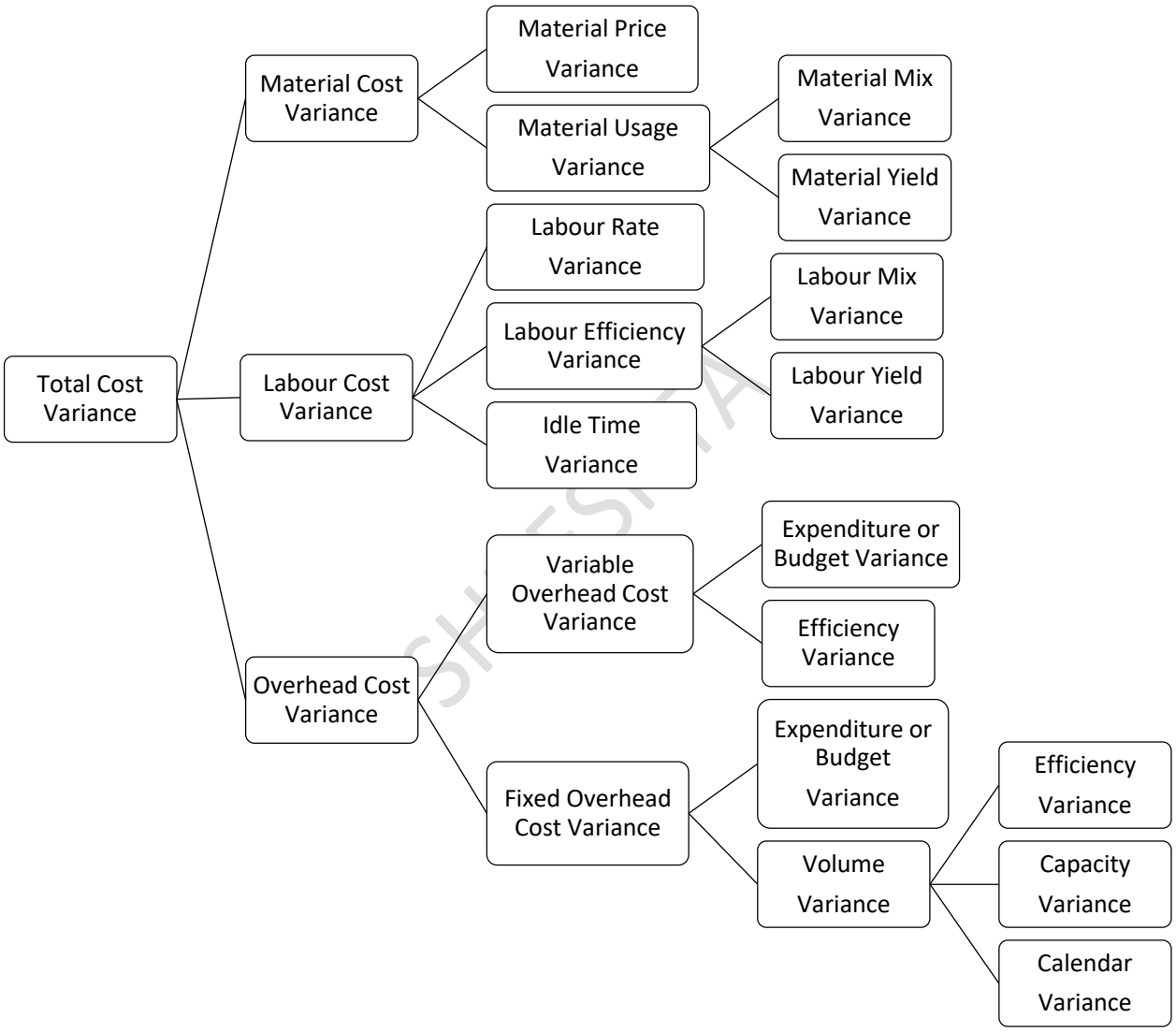
TYPES OF VARIANCES

Controllable and un-controllable variances: For effective cost control it is necessary to investigate into the reasons for cost variances and to take corrective actions. For this purpose variances are classified as controllable and uncontrollable variances. **Controllable variances are those which can be controlled under the normal operating conditions** if a responsibility centre takes preventive measures and acts prudently. **Uncontrollable variances are those which occurs due to conditions which are beyond the control** of a responsibility centre and cannot be controlled even though all preventive measures are in place. Responsibility centres are answerable for all adverse variances which could have been controlled. Controllability is a subjective matter and varies from situation to situation. If the uncontrollable variances are of significant nature and are persistent, the standard may need revision.

Favourable and Adverse variance: Favourable variances are those which are profitable for the company and adverse variances are those which causes loss to the company. While computing cost variances favourable variance means actual cost is less than standard cost. On the other hand, adverse variance means actual cost is exceeding standard cost. The situation will be reversed for sales variance. Favourable variances mean actual is more than budgeted and adverse when actual is less than budgeted. Favourable variance in short denoted by capital 'F' and adverse variances by capital 'A'. Students may note that signs of favourable and adverse variance may or may not match exactly with mathematical signs i.e. (+) or (-).

CLASSIFICATION OF VARIANCES

Variances are broadly classified into two parts namely Revenue variance and Cost variance. At Revenue side variances is calculated by comparing actual sales from budgeted (standard) sales. On the other hand, Cost side reflects variances in cost components. Cost variance classification is shown below with the help of a structured diagram.



COMPUTATION OF VARIANCES

As discussed earlier variances are classified into two parts. Here we will start from cost side and discuss all cost components one by one with the help of appropriate example and illustrations.

Material Cost Variance

Material cost variance is the **difference between standard cost of materialsused and the actual cost of materials**. Mathematically it is written as.

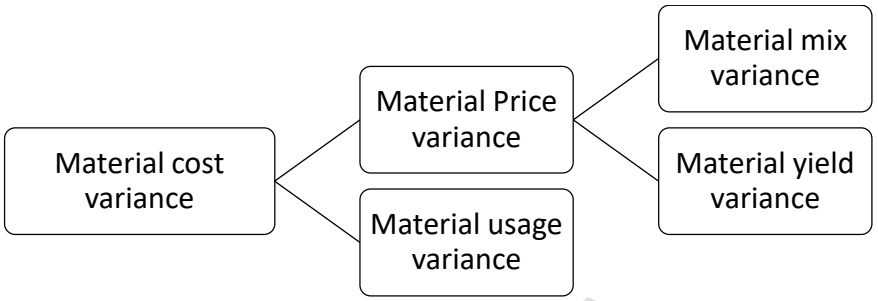
Material Cost Variance = [Standard Cost – Actual Cost]

Or

[(Std. Quantity × Std. Price) – (Actual Quantity × Actual Price)]

(The difference between the **Standard Material Cost** of the actual production volume and the **Actual Cost of Material**)

Reasons for variance: Material cost variance arises mainly because of either difference in material price from the standard price or difference in material consumption from standard consumption or both the reasons. Analysis of material cost variance is done dividing it into two parts namely Material Price variance and Material Usage variance.



Material Price Variance

It measures variance arises in the material cost due to **difference in actual material purchase price from standard material price**. Mathematically it is written as:

Material Price Variance = [Standard Cost of Actual Quantity* – Actual Cost]

Or

Actual Quantity (AQ) × {Std. Price (SP) – Actual Pricea.}

Or

[(SP × AQ) – (AP × AQ)]

(The difference between the **Standard Price** and **Actual Price** for the **Actual Quantity Purchased)**

*Here actual quantity means actual quantity of material **purchased.** If in the question material purchase is not given, it is taken as equal to material consumed.

Explanation: Material price variance can also be calculated taking materialused as actual quantity instead of material purchased. This method is alsocorrect but does not serve the purpose of variance computation. Material price variance may arise from variety of reasons out of which some may be controllable and some may be beyond the control of the purchase department.If price variance arises due to inefficiency of purchase department or any other reason within the control of the company, then it is very important to report variance as early as possible and this can be done by taking purchase quantity as actual quantity for price variance computation.

Responsibility for Material Price Variance: Generally, purchase department purchases materials from the market. Purchase department is expected to perform its function very prudently so that company never suffers loss due to its inefficiency. Purchase department is held responsible for adverse price variance arises due to the factors controllable by the department.

Material Usage Variance

It measures variance in material cost due to usage/ consumption of materials. Itis computed as below:

Material Usage Variance = [Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity*]

Or

Std. Price (SP)× {Std. Quantity (SQ) - Actual Quantity (AQ)}

Or

[(SQ × SP) – (AQ × SP)]

(The difference between the **Standard Quantity** specified for actual production andthe **Actual Quantity** used, at **Standard Price**)

*Here actual quantity means actual quantity of material used.

Responsibility for material usage variance: Material usage is the responsibility of production department and it is held responsible for adverse usage variance.

Reasons for variance: Actual material consumption may differ from the standard quantity either due to difference in proportion used from standard proportion ordue to difference in actual yield from standard yield.

Material usage variance is divided into two parts a. Material usage mix varianceand b. Material yield variance.

Material Mix Variance

Variance in material consumption may arise due to **difference in proportion actually used from the standard mix/ proportion**. It only arises when two or more inputs are used to produce a product. Mathematically,

Material Mix Variance = [Standard Cost of Actual Quantity in Standard Proportion – Standard Cost of Actual Quantity]

Or

Std. Price (SP) × {Revised Std. Quantity (RSQ) – Actual Quantity (AQ)}

Or

[(RSQ × SP) – (AQ × SP)]

(The difference between the **Actual Quantity in standard proportion** and **Actual Quantity in actual proportion**, at Standard Price)

Material Yield Variance (Material Sub-usage Variance)

Variance in material consumption which arises due to yield or productivity of the inputs. It may arise due to use of sub- standard quality of materials, inefficiency of workers or due to wrong processing.

Material Yield Variance = [Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity in standard proportion]

Or

Std. Price (SP) × {Std. Quantity (SQ) – Revised Standard Quantity (RSQ)}

Or

[(SQ × SP) – (RSQ × SP)]

(The difference between the **Standard Quantity specified for actual production** and **Actual Quantity in standard proportion**, at Standard Purchase Price)

Verification of the formulae:

Material Cost Variance= Material Usage Variance + Material Price Variance* Or, Material Cost Variance= (Material Mix Variance + Material Revised usage Variance) + Material price variance

*If material purchased quantity and material consumed quantity is same

Meaning of the terms used in the formulae:

Term	Meaning
Standard Quantity (SQ)	Quantity of **inputs** to be used to produceactual **output.**
Actual Quantity (AQ)	Quantity of **inputs** actually used to produceactual **output.**
Revised Standard Quantity (RSQ)	If **Actual total quantity** of **inputs** were usedin standard proportion.

Labour Cost Variance

Amount paid to employees for their labour is generally known as employee or labour cost. In this chapter labour cost is used to denote employees cost. Labour (employee) cost variance is **the difference between actual labour cost and standard cost.** Mathematically it can be written as:

Labour Cost Variance = [Standard Cost – Actual Cost]

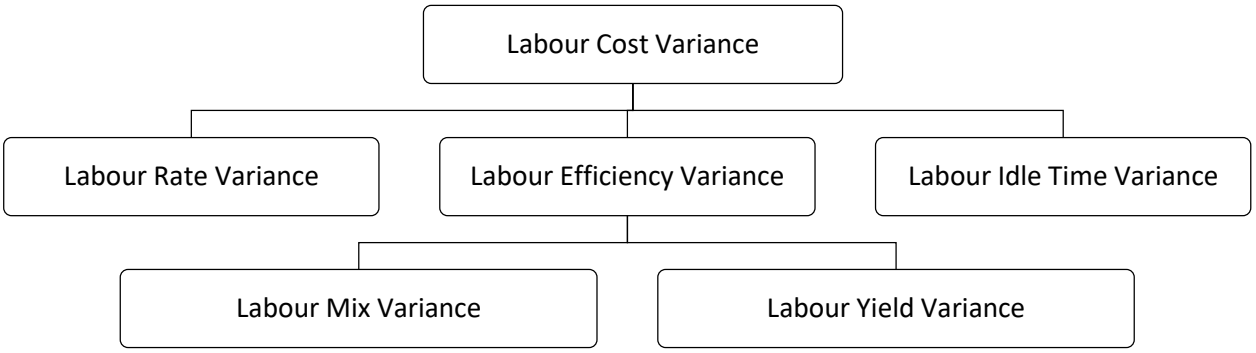
Or

[(SH × SR) – (AH* × AR)]

(The difference between the Standard Labour Cost and the Actual Labour Cost incurred for the production achieved)

* Actual hours paid.

Reasons for variance: Difference in labour cost arises either due to difference inthe actual labour rate from the standard rate or difference in numbers of hours worked from standard hours. Labour cost variance can be divided into three parts namely (i) Labour Rate Variance (ii) Labour Efficiency Variance and (iii) Labour Idle time Variance.



Labour Rate Variance:

Labour rate variance arises due to **difference in actual rate paid from standard rate**. It is very similar to material price variance. It is calculated as below:

Labour Rate Variance = [Standard Cost of Actual Time – Actual Cost]

Or

Actual Hours (AH*) × {Std. Rate (SR) – Actual Rate (AR)}

Or

[(SR×AH*) – (AR × AH*)]

(The difference between the **Standard Rate** per hour and **Actual Rate** per hour forthe **Actual Hours** paid)

* Actual hours paid.

Responsibility for labour rate variance: Generally labour rates are influenced by the external factors which are beyond the control of the organisation. However, personnel manager is responsible for labour rate negotiation.

Labour Efficiency Variance:

Labour efficiency variance arises due to deviation in the working hours from the standard working hours.

Labour Efficiency Variance = [Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time]

Or

Std. Rate (SR) × {Std. Hours (SH) – Actual Hours (AH*)}

Or

[(SH × SR) – (AH# × SR)]

(The difference between the **Standard Hours** specified for actual production and Actual Hours worked at Standard Rate).

Actual Hours worked

Responsibility for labour efficiency variance: Efficiency variance may arise dueto ability of the workers, inappropriate team of workers, inefficiency of production manager or foreman etc. However, production manager or foreman can be held responsible for the adverse variance which otherwise can be controlled.

Labour efficiency variance is further divided into the following variances:

a. Labour Mix Variance or Gang variance

b. Labour Yield Variance (or Labour Revised-efficiency Variance)

Labour Mix Variance:

Labour efficiency **variance which arises due to change in the mix or combination of different skill set** i.e. number of skilled workers, semi-skilled workers and un-skilled workers. Mathematically,

Labour Mix Variance Or Gang Variance = [Standard Cost of Actual Time Worked in Standard Proportion – Standard Cost ofActual Time Worked]

Or

Std. Rate (SR) × {Revised Std. Hours (RSH) – Actual Hours Worked (AH)}

Or

[(RSH × SR) – (AH# × SR)]

(The difference between the **Actual Hours** worked in standard proportion and **Actual Hours** worked in actual proportion, at **Standard Rate**).

Actual Hours worked

Labour Yield Variance:

Labour efficiency variance **which arises due to productivity of workers**.

Labour Yield Variance Or Sub-Efficiency Variance = [Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time Worked in Standard Proportion]

Or

Std. Rate (SR) × {Std. Hours (SH) – Revised Std. Hours (RSH)}

Or

[(SH × SR) – (RSH × SR)]

(The difference between the **Standard Hours** specified for **actual production** and **Actual Hours worked in standard proportion,** at Standard Rate).

Idle Time Variance:

It is calculated for the idle hours. It is difference between paid and worked hours. It is calculated as below:

Labour Idle Time Variance = [Standard Rate per Hour × Actual Idle Hours]

Or

Std. Rate (SR) {Actual Hours Paid – Actual Hours Worked}

Or

[(AH*× SR) – (AH# ×SR)]

(The difference between the **Actual Hours paid** and **Actual Hours worked** at Standard Rate)

* Actual hours paid; # Actual Hours worked

Verification of formulae:

Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance (if hours paid and hours worked is same)

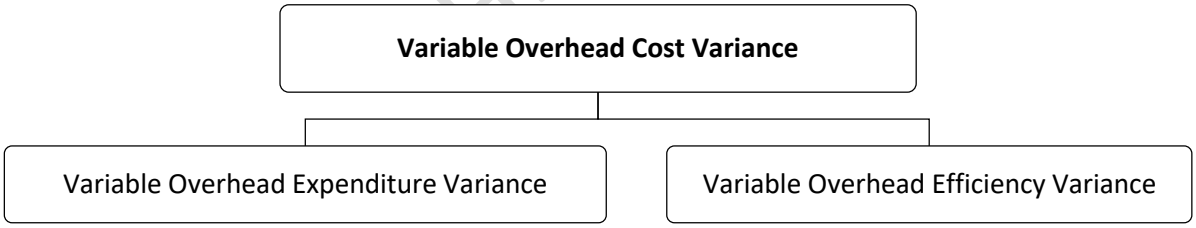
Or

Labour Cost Variance = Labour Rate Variance + Idle Time Variance + Labour Efficiency Variance

Or

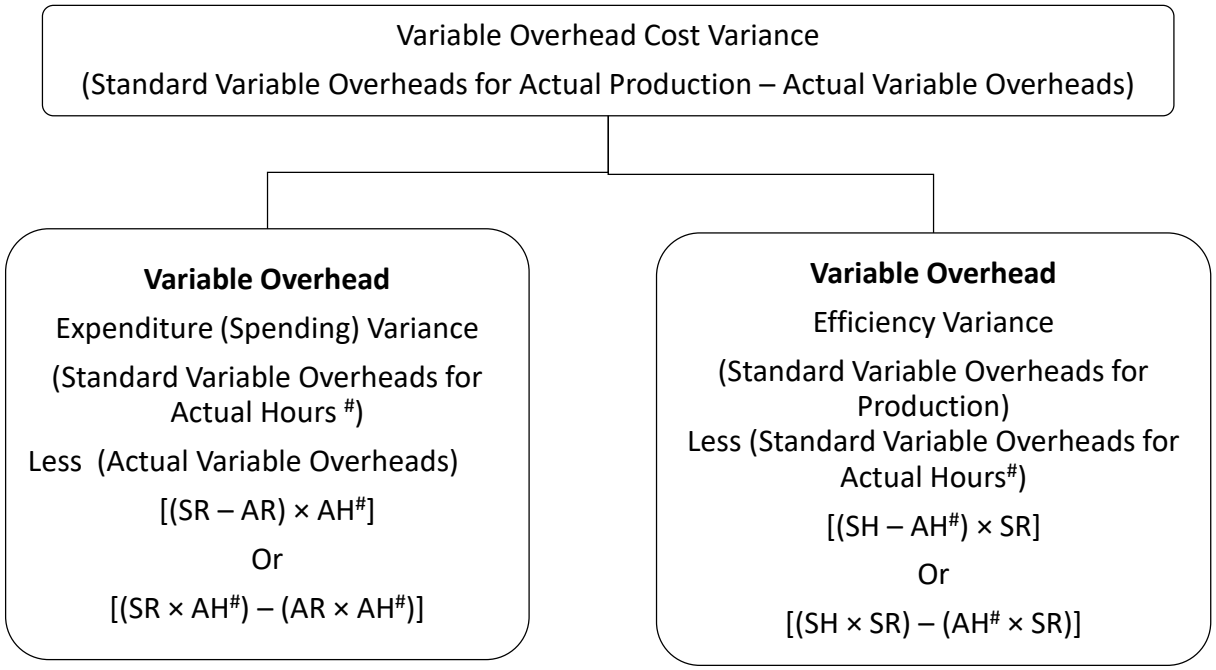
Labour Efficiency Variance = Labour Mix Variance + Labour Yield Variance

Variable Overhead Cost Variance



Variable overheads consist of expenses other than direct material and direct labour which vary with the level of production. If variable overhead consist of indirect materials, then in this case it varies with the direct material used. On the other hand,if variable overhead is depending on number of hours worked then in this case itwill vary with labour hour or machine hours. If nothing is mentioned specificallythen we take labour hour as basis. Variable overhead cost variance calculation is similar to labour cost variance.

Variable overhead cost variance is divided into two parts (i) Variable Overhead Expenditure Variance and (ii) Variable Overhead Efficiency Variance.



Actual Hours (Worked)

Meaning of the terms used in the formulae:

Term	Meaning
Standard Hours (SH)	Hours required producing actual output.
Actual Hours (AH)	Actual Hours taken to produce actual output.
Revised Standard Hours (RSH)	If actual labour hours worked were worked bystandard mix (combination) of labour.
Actual Yield (AY)	Actual Hours worked
Standard Yield (SY)	Actual hours if labour worked in standardratio
Standard Labour Cost (SLC)	Standard labour cost for actual output

Fixed Overhead Cost Variance

The recovery of the fixed components of the estimated overheads depends upon capacity utilization. In case a company produces less than the projected utilization it shall not be able to recover all the budgeted fixed overheads. This unrecovered portion is known as production volume variance. The other variance is because of variations in actual spending when compared with both estimated fixed and estimated variable overheads. Such a variance is known as Overhead expenses variance.

The following detailed discussion shall help you have a clear understanding of these two variances.

1. **Production Volume Variance:** The term fixed overheads implies that theelement of cost does not vary directly in proportion to the output. In other words, fixed overheads do not change within a given range of activity.

However, the unit cost changes even though the fixed overheads are constant intotal within the given range of output. So, higher the level of activity, the lower will be the unit cost or vice versa. **The management is, therefore, faced with a costing difficulty because it requires a representative rate for charging fixed overheads irrespective of changes in volume of output.**

2. **Overhead Expenses Variance:** As discussed above, the Production Volume Variance analyses the unrecovered fixed overheads. Apart from this, there can be variations in the actual spending of both fixed and variable overheads when compared to what was established as a standard. Such variations can be accounted for by analyzing an overhead expenses variance.

   The analysis of overhead variances is different from that of material and labour variances. As overhead is the aggregate of indirect materials, indirect labour and indirect expenses, this variance is considered to be a difficult part of variance analysis. It is important to understand that overhead variance is nothing but underor over-absorption of overhead.

   Fixed Overhead Cost Variance: Fixed overhead cost variance is the **difference between actual fixed overhead and absorbed fixed overhead**. Fixed overhead variance is divided into two parts a. Fixed Overhead Expenditure Variance and b. Fixed Overhead Volume Variance.

   A. Fixed Overhead Expenditure Variance: This is the difference between theactual fixed overhead incurred and budgeted fixed overhead.

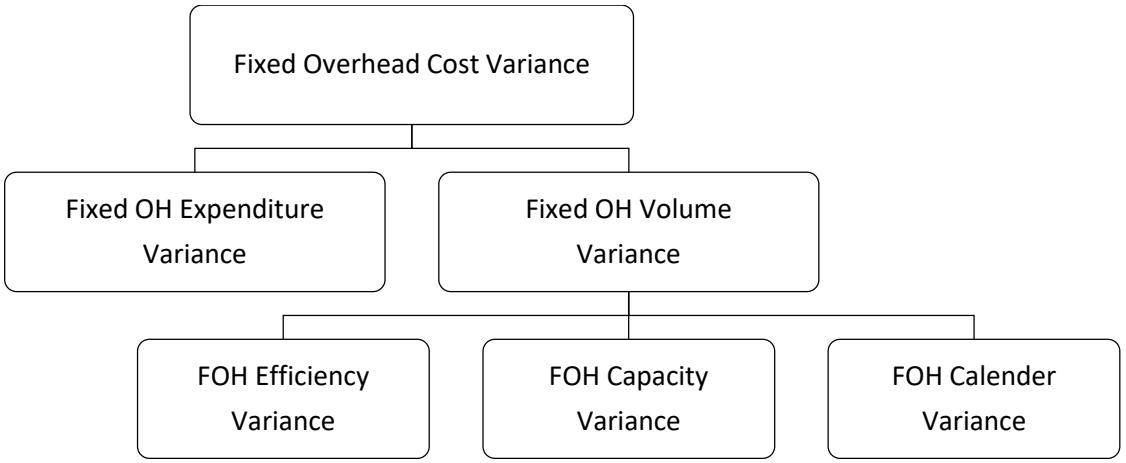
   B. Fixed Overhead Volume Variance: Variance in fixed overhead which arisedue to the volume of production is called fixed overhead volume variance.

   Fixed overhead volume variance is further divided into the three variances:

   a. Efficiency Variance

   b. Capacity Variance and

   c. Calendar Variance



Mathematically these can be written as follows:

Fixed Overhead Cost Variance

(Absorbed Fixed Overheads) Less (Actual Fixed Overheads)(SH × SR) – (AH × AR)

Fixed Overhead Expenditure	Fixed Overhead Volume
Variance (Budgeted Fixed Overheads) Less (Actual Fixed Overheads) Or (BH × SR) – (AH × AR)	Variance (Absorbed Fixed Overheads) Less (Budgeted Fixed Overheads) Or (SH × SR) – (BH × SR)

Fixed Overhead Capacity Variance	Fixed Overhead Calendar Variance	Fixed Overhead Efficiency Variance
SR (AH – BH) Or (AH × SR) – (BH × SR)	Std. Fixed Overhead rate per day (Actual no. of Working days – BudgetedWorking days)	SR (SH – AH) Or (SH × SR) – (AH × SR)

a. Fixed Overhead Efficiency Variance: This is the difference between fixedoverhead absorbed and standard fixed overhead.

b. Fixed Overhead Capacity Variance: This is the difference between standardfixed overhead and budgeted overhead.

c. Fixed Overhead Calendar Variance: This variance arises due to difference innumber of actual working days and the standard working days.

Note: When calendar variance is computed, there will be a modification in the capacity variance. In that case revised capacity variance will be calculated and the formula is:

Revised Capacity Variance = (Actual hours – Revised budgeted hours) × Std. fixedrate per hour

Verification of formulae:

F.O. Cost Variance = F.O. Expenditure Variance + F.O. Volume Variance

F.O. Volume Variance = Efficiency Variance + Capacity Variance + Calendar Variance

Basic terms used in the computation of overhead variance

$$\text{Standard overhead rate (per hour)} = \frac{\text{Budgeted Overhead}}{\text{Budgeted hours}}$$

Or

$$\text{Standard overhead rate (per unit)} = \frac{\text{Budgeted Overhead}}{\text{Budgeted output in units}}$$

Note: Separate overhead rates will be computed for fixed and variable overheads.

Basic calculations before the computation of overhead variances:

The following basic calculation should be made before computing variances.

i. When overhead rate per hour is used:

a. Standard hours for actual output (SHAO)

$$\text{SHAO} = \frac{\text{Budgeted Hours}}{\text{Budgeted Output}} \times \text{Actual Output}$$

b. Absorbed (or Recovered) overhead = Std. hours for actual output × Std. overhead rate per hour

c. Standard overhead = Actual hours × Std. overhead rate per hour

d. Budgeted overhead = Budgeted hours × Std. overhead rate per hour

e. Actual overhead = Actual hours × Actual overhead rate per hour

ii. When overhead rate per unit is used

a. Standard output for actual hours (SOAH)

$$\text{SOAH} = \frac{\text{Budgeted Hours}}{\text{Budgeted Output}} \times \text{Actual Output}$$

b. Absorbed overhead = Actual output × Std. overhead rate per unit

c. Standard overhead = Std. output for actual time × Std. overheadrate per unit

d. Budgeted overhead = Budgeted output × Std. overhead rate per unit

e. Actual overhead = Actual output × Actual overhead rate per unit

f. Overhead cost variance = Absorbed overhead – Actual overhead

g. OCV = (Std. hours for actual output × Std. overheadrate) – Actual overhead

ADVANTAGES AND CRITICISM OF STANDARD COSTING

Advantages of Standard Costing

Following are the advantages of standard costing.

i. **It serves as a basis for measuring operating performance and cost control**. It is possible by setting standards, proper classification and determination of variances. It serves as a signal for prompt corrective action.It helps to report exceptional variances i.e. the only matters which are not proceeding according to plan are reported. This enables the managers to concentrate on essential matters only.

ii. **It aids price fixing**. Standard costing can be used to predict costs. Although actual cost may vary from day to day, standard costs will remain stable overa period of time and, where demand for a product is elastic, this information can be used as a basis for fixing the selling price.

iii. **Introduction of standard costing facilitates evaluation of jobs and introduction of incentives**. Job values can be determined by the use of evaluation and scale of wages fixed according to the

responsibility involvedin each job.

iv. Standard costing **facilitates the estimation of the cost of new products** with greater accuracy.

v. It serves as a **basis for inventory valuation**. Standard costs are used for inventory valuation. A further advantage of this procedure is that material stock can be recorded in terms of quantities only.

vi. Standard costing is also **used for the measurement of profit**. The questionof correct approach of calculating profit is very much related to methods of stock valuation and absorption of fixed overheads. Standard costing eliminates any variations in profit due to changes in stock values from one period to another thus provides a basis for the measurement of profit.

vii. Standard costing is **used in planning, budgeting and decision making**. Standard costs being the pre-determined costs, are particularly useful in planning and budgeting.

viii. Standard costing is **used in standardisation of products, operations and processes**, it improves the overall production efficiency and reduces costs.

ix. It provides objectives and targets to be achieved by each level of management and defines the responsibilities of departmental managers. Thus, the system **serves as an incentive to the departmental head to achieve the targets set by the company.**

x. Standard costing sets a uniform basis for comparison of all elements of costs. Since care is taken in setting standards, the standards become unchanging units of comparison. The standard hour may be used as a basic unit to compare dissimilar products or processes.

xi. The maximum use of working capital, plant facilities and current assets is assured because wastage of materials and loss due to idle time are closely controlled.

Criticism of Standard Costing

The following are some of the criticism which may be leveled against the standard costing system. The arguments have been suitably answered as stated against each by advocates of the standard costing and hence they do not invalidate the usefulness of the system to business enterprises.

i. **Variation in price:** One of the chief problem faced in the operation of the standard costing system is the precise estimation of likely prices or rate to be paid. The variability of prices is so great that even actual prices are not necessarily adequately representative of cost. But the use of sophisticated forecasting techniques should be able to cover the price fluctuation to some extent. Besidesthis, the system provides for isolating uncontrollable variances arising from variations to be dealt with separately.

ii. **Varying levels of output:** If the standard level of output set for pre- determination of standard costs is not achieved, the standard costs are said to benot realised. However, the statement that the capacity utilisation cannot be precisely estimated for absorption of overheads may be true only in some industries of jobbing type. In vast majority of industries, use of forecasting techniques, market research, etc., help to estimate the output with reasonable accuracy and thus

the variation is unlikely to be very large. Prime cost will not be affected by such variation and, moreover, variance analysis helps to measure the effects of idle time.

iii. **Changing standard of technology:** In case of industries that have frequent technological changes affecting the conditions of production, standard costing may not be suitable. This criticism does not affect the system of standard costing. Cost reduction and cost control is a cardinal feature of standard costing because standards once set do not always remain stable. They have to be revised.

iv. **Attitude of technical people:** Technical people are accustomed to think of standards as physical standards and, therefore, they will be misled by standard costs. Since technical people can be educated to adopt themselves to the system through orientation courses, it is not an insurmountable difficulty.

v. **Mix of products:** Standard costing presupposes a pre-determinedcombination of products both in variety and quantity. The mixture of materials used to manufacture the products may vary in the long run but since standard costs areset normally for a short period, such changes can be taken care of by revision of standards.

vi. **Level of Performance:** Standards may be either too strict or too liberal because they may be based on a. theoretical maximum efficiency, b. attainable good performance or c. average past performance. To overcome this difficulty, the management should give thought to the selection of a suitable type of standard.The type of standard most effective in the control of costs is one which represents an attainable level of good performance.

vii. **Standard costs cannot possibly reflect the true value in exchange**. If previous historical costs are amended roughly to arrive at estimates for ad hoc purposes, they are not standard costs in the strict sense of the term and hence they cannot also reflect true value in exchange. In arriving at standard costs, however, the economic and technical factors, internal and external, are brought together and analysed to arrive at quantities and prices which reflect optimum operations. The resulting costs, therefore, become realistic measures of the sacrifices involved.

viii. **Fixation of standards may be costly:** It may require high order of skill and competency. Small concerns, therefore, feel difficulty in the operation of such system.

QUESTIONS FOR CLASSROOM DISCUSSION

PROBLEM – 1

Manufacturing Concern furnishes the following information:

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

CALCULATE:

a. Material usage variance

b. Material price variance

c. Material cost variance.

PROBLEM – 2

The standard cost of a chemical mixture is as follows:

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

A standard loss of 10% of input is expected in production.

The cost records for a period showed the following usage:

90 kg material A at a cost of ₹ 18 per kg 110 kg material B at a cost of ₹ 34 per kg

The quantity produced was 182 kg of good product.

CALCULATE all material variances.

PROBLEM – 3

ABC Ltd. produces an article by lending two basic raw materials. It operates a standardcosting system and the following standards have been set for raw materials:

Material	Standard mix	Standard price (Rs. per kg)
A	40%	4
B	60%	3

The standard loss in processing is 15%. During April, the company produced 1,700 kgs.of finished output. The position of stock and purchases for the month of April are as under:

Material	Stock on 01.04.20x1	Stock on 30.04.20x1	Purchased during April 2021	
	(Kg.)	(Kg.)	(Kg.)	(Rs.)
A	35	5	800	3,400
B	40	50	1,200	3,000

Opening stock of material is valued at standard price.CALCULATE the following variances:

i. Material price variance

ii. Material usage variance

iii. Material yield varianceMaterial mix variance

iv. Total Material cost variance

PROBLEM – 4

The standard and actual figures of a firm are as under:

Standard time for the job	1,000 hours
Standard rate per hour	₹ 50
Actual time taken	900 hours
Actual wages paid	₹ 36,000

CALCULATE variances.

PROBLEM – 5

The standard output of product 'EXE' is 25 units per hour in manufacturing department of a company employing 100 workers. The standard wage rate per labour hour is Rs.6.

In a 42 hours week, the department produced 1,040 units of 'EXE' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were Rs.6.20, Rs.6 and Rs.5.70 respectively to 10, 30 and 60 of the workers.

CALCULATE relevant labour variances.

PROBLEM – 6

Labour type	Std hrs per unit	Std rate	Act hrs	Act rate
Un Skilled	2 hrs	₹ 10	22,000 hrs	₹ 11
Skilled	1 hr	₹ 20	8,000 hrs	₹ 22

Workers produced 11000 units. Find out Labour variances.

PROBLEM – 7

NPX Ltd. uses standard costing system for the manufacturing of its product X. The following is the budget data given in relation to labour hours for the manufacture of 1 unit of Product X:

Labour	**Hours**	**Rate**
Skilled	2	₹ 6
Semi-Skilled	3	₹ 4
Un- Skilled	5	₹ 3
Total	**10**	

In the month of January, 20x1, a total of 10,000 units were produced following are the details:

Labour	**Hours**	**Rate**	**Amount**
Skilled	18,000	₹ 7	₹ 1,26,000
Semi-Skilled	33,000	₹ 3.5	₹ 1,15,500
Un-Skilled	58,000	₹ 4	₹ 2,32,000
Total	**1,09,000**		**₹ 4,73,500**

Actual Idle hours (abnormal) during the month:

Skilled	500
Semi- Skilled	700
Unskilled	800
Total	**2,000**

CALCULATE:

1. Labour Variances.
2. Also, show the effect on Labour Rate Variance if 5,000 hours of Skilled Labour are paid @ ₹ 5.5 per hour and balance were paid @ ₹ 7 per hour.

PROBLEM – 8

The following standards have been set to manufacture a product:

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

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

12,500 units of A at Rs.4.40 per unit18,000 units of B at Rs.2.80 per unit 88,500 units of C at Rs.1.20 per unit.

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

CALCULATE

i. Materials price variance & Usage variance

ii. Labour rate &Efficiency variances.

PROBLEM – 9

From the following information of G Ltd.,

CALCULATE

i. Variable Overhead Cost Variance;

ii. Variable Overhead Expenditure Variance and

iii. Variable Overhead Efficiency Variance:

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

PROBLEM – 10

The cost detail of J&G Ltd. for the month of September, 20x1 is as follows:

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

Required:

CALCULATE

i. Fixed Overhead Cost Variance

ii. Fixed Overhead Expenditure Variance

iii. Fixed Overhead Volume Variance

iv. Fixed Overhead Efficiency Variance and

v. Fixed Overhead Capacity Variance.

PROBLEM – 11

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

In April 2021, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were Rs.1,42,000.

COMPUTE the following Fixed Overhead variance:

1. Efficiency variance

2. Capacity variance

3. Calendar variance

4. Expenditure variance

5. Volume variance

6. Total Fixed overhead variance

PROBLEM – 12

A Manufacturing Concern has provided the following information related to Fixed Overheads:-

Particulars	Standard	Actual
Output in a month	5,000 units	4,800 units
Working Days in a month	25 days	23 days
Fixed Overheads (FOH)	₹ 5,00,000	₹ 4,90,000

Compute: a. FOH Variance, b. FOH Expenditure Variance, c. FOH Volume Variance, d. FOH Efficiency Variance.

PROBLEM – 13

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

Particulars	Standard	Actual
Production	4,000 units	3,800 units
Working days	20	21
Machine hours	8,000 hours	7,800 hours
Fixed Overhead	₹ 4,00,000	₹ 3,90,000
Variable Overhead	₹ 1,20,000	₹ 1,20,000

You are required to CALCULATE the following overhead variances:

a) Variable overhead variances

b) Fixed overhead variances

PROBLEM – 14

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

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

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

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

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

PROBLEM – 15

GAP Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. Following are the details.

Budgeted data:

Material	Qty	Price	(Rs.)	Amount (Rs.)
A	60	20		1200
B	40	30		1200
Inputs	100			2400
Normal loss	20			
Output	80			2400
Actual data:				
Actual output	80 units.			

Material	Qty	Price	(Rs.)	Amount (Rs.)
A	70	?		?
B	?	30		?

Material Price Variance a. Rs.105 A Material cost variance Rs.275A

You are required to CALCULATE:

i. Actual Price of material A

ii. Actual Quantity of material B

iii. Material Price Variance

iv. Material Usage Variance

v. Material Mix Variance

vi. Material Sub Usage Variance

PROBLEM – 16

Following data is extracted from the books of XYZ Ltd. for the month of January:

Estimation

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	800	?	--
Material-B	600	30.00	18,000
			--

Normal loss was expected to be 10% of total input materials.

Actuals- 1480 kg of output produced.

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

Other Information-

Material Cost Variance = Rs.3,625 (F) Material Price Variance = Rs.175 (F)

You are required to CALCULATE:

i. Standard Price of Material-A;

ii. Actual Quantity of Material-B;

iii. Actual Price of Material-A;

iv. Revised standard quantity of Material-A and Material-B; and

v. Material Mix Variance.

PROBLEM – 17

Paras Synthetics uses Standard costing system in the manufacturing of its product 'Star 95 Mask'.

The details are as follows;

Particulars	Amt
Direct Material 0.50 Meter @ ₹ 60 per meter	₹ 30
Direct Labour 1 hour @ ₹ 20 per hour	₹ 20
Variable overhead 1 hour @ ₹ 10 per hour	₹ 10
Total	**₹ 60**

During the month of August, 20x1 10,000 units of 'Star 95 Mask' were manufactured.

Details are as follows:

Direct material consumed 5700 meters @ ₹ 58 per meter

Direct labour Hours ? @ ? ₹ 2,24,400

Variable overhead incurred ₹ 1,12,200

Variable overhead efficiency variance is 2,000 A. Variable overheads are based on Direct Labour Hours.

You are required to calculate the missing data and all the relevant Variances.

ADDITIONAL QUESTIONS FOR PRATICE

QFP 1 (Concept Similar to Problem – 1)

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

Standard Actual

Material quantity 50 units 45 units

Material price per unit Rs.1.00 Rs.0.80

CALCULATE material cost variances.

QFP 2 (Concept Similar to Problem – 2)

For making 10 kg. of CEMCO, the standard material requirements is:

Material	Quantity	Rate per kg. (Rs.)
A	8 kg	6
B	4 kg	4

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

Material	Quantity (Kg.)	Rate per kg. (Rs.)
A	750	7
B	500	5

CALCULATE a. Material Cost Variance; b. Material Price Variance; c.Material usage Variance.

QFP 3 (Concept Similar to Problem – 2)

The standard mix to produce one unit of a product is as follows:

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

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

Material X	640 units @ Rs.17.50 per unit	11,200
Material Y	950 units @ Rs.18.00 per unit	17,100
Material Z	870 units @ Rs.27.50 per unit	23,925
	2,460 units	**52,225**

CALCULATE all material variances.

QFP 4 (Concept Similar to Problem – 2)

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

Raw Materials	Standard		Actual		Quantity of Raw Materials Purchased
	Mix	Price per kg.	Mix	Price per Kg.	
	(%)	(Rs.)	(%)	(Rs.)	(Kg.)
A	50	20	60	21	5,000
B	30	10	20	8	2,000
C	20	5	20	6	1,200

You are required to CALCULATE:

i. Material Price variance

ii. Material Usage Variance

QFP 5 (Concept Similar to Problem – 6)

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

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

During the 40 hours working week, the gang produced 1,800 standard labour hoursof work. CALCULATE:

i. Labour Cost Variance

ii. Labour Rate Variance

iii. Labour Mix Variance

iv. Labour Efficiency Variance

v. Labour Yield Variance

QFP 6 (Concept Similar to Problem – 8)

The following information is available from the cost records of Novell & Co. forthe month of March 20x1:

Materials purchased	20,000 units @ Rs.88,000
Materials consumed	19,000 units
Actual wages paid for 4,950 hrs.	Rs.24,750
Units produced	1,800 units
Standard rates and pieces are:	
Direct material	Rs.4 per unit
Standard output	10 number for one unit
Direct labour rate	Rs.4.00 per hour
Standard requirement	2.5 hours per unit

You are required to CALCULATE relevant material and labour variance for themonth.

QFP 7 (Concept Similar to Problem – 9)

The following data for Pijee Ltd. is given:

	Budget	**Actual**
Production (in units)	400	360
Man hours to produce above	8,000	7,000
Variable overheads (in Rs.)	10,000	9,150

CALCULATE relevant Variable overhead variances.

QFP 8 (Concept Similar to Problem – 10)

Following information is available from the records of a factory:

	Budget	**Actual**
Fixed overhead for the month of June	Rs.10,000	Rs.12,000
Production in June (units)	2,000	2,100
Standard time per unit (hours)	10	–
Actual hours worked in June	–	21,000

CALCULATE:

i. Fixed overhead cost variance,

ii. Expenditure variance,

iii. Volume variance.

QFP 9 (Concept Similar to Problem – 10)

S.V. Ltd. has furnished the following data:

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

Budgeted fixed overhead rate is Rs.1.00 per hour. In July, the actual hoursworked were 31,500.

CALCULATE the following variances:

i. Expenditure variance.

ii. Volume variance.

iii. Total overhead variance.

QFP 10 (Concept Similar to Problem – 11)

The following data has been collected from the cost records of a unit forcomputing the various fixed overhead variances for a period:

Number of budgeted working days	25
Budgeted man-hours per day	6,000
Output (budgeted) per man-hour (in units)	1
Fixed overhead cost as budgeted	Rs.1,50,000
Actual number of working days	27
Actual man-hours per day	6,300
Actual output per man-hour (in-units)	0.9
Actual fixed overhead incurred	Rs.1,56,000

CALCULATE fixed overhead variances:

i. Expenditure Variance

ii. Volume Variance,

iii. Fixed Cost Variance.

QFP 11 (Concept Similar to Problem – 13)

XYZ Ltd. has furnished you the following information for the month of August:

	Budget	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed overhead	Rs.45,000	50,000
Variable overhead	Rs.60,000	68,000
Working days	25	26

CALCULATE overhead variances.

QFP 12 (Concept Similar to Problem – 14)

XYZ Company has established the following standards for factory overheads.

Variable overhead per unit: Rs.10/-

Fixed overheads per month Rs.1,00,000

Capacity of the plant 20,000 units per month. The actual data for the month are as follows:

Actual overheads incurred Rs.3,00,000

Actual output (units) 15,000 units

Required:

CALCULATE overhead variances viz:

i. Production volume variance

ii. Overhead expense variance

QFP 13 (Concept Similar to Problem – 15)

One kilogram of product K requires two chemicals A and B. The following werethe details of product K for the month of June 20x3:

a. Standard mix for chemical A is 50% and chemical B is 50%.

b. Standard price kilogram of chemical A is Rs.12 and chemical B is Rs.15.

c. Actual input of chemical B is 70 kilograms.

d. Actual price per kilogram of chemical A is Rs.15

e. Standard normal loss is 10% of total input

f. Total Material cost variance is Rs.650 adverse.

g. Total Material yield variance is Rs.135 adverse.

You are required to CALCULATE:

i. Total Material mix variance

ii. Total Material usage variance

iii. Total Material price variance

iv. Actual loss of actual input

v. Actual input of chemical A

vi. Actual price per kg. of chemical B

CHAPTER 14: BUDGET AND BUDGETARY CONTROL

INTRODUCTION

An organization has its long-term objectives to achieve. The objectives are broken down into achievable goals and targets. When these goals and targets are translated into business plans, it is necessary to express the plans into quantifiable terms to make it achievable. Budget is a commonly used business language that expresses the business plans in quantifiable terms. When the targets are monitored and compared with the actual results with the objective to narrow down the deviations, make participants responsible and implement the preventive and corrective actions, is known as budgetary control.

Meaning of Budget and Budgeting

Budget: A budget is an instrument of management used as an aid in the planning, programming and control of business activity. The Chartered Institute of Management Accountants (CIMA), UK defines budget as "A financial and/or quantitative statement, prepared and approved prior to a defined period of time of the policy to be pursued during that period for the purpose of attaining a given objective. It may include income, expenditure and employment of capital" The budget is a blue-print of the projected plan of action expressed in quantitative terms for a specified period of time.

Budget and Forecast There is some similarity between the budget and forecast as both relate to a defined period of time. A forecast is an assessment of probable future events. Budget a financial/quantitative plan of a business enterprise to be pursued over a period of time. Therefore, at the planning stage it is necessary to forecast a probable course of action for the business. Budget is a commitment or a target which the management seeks to attain on the basis of the forecasts made. Forecasts are made regarding sales, production cost and financial requirements of the business. A forecast denotes some degree of flexibility while a budget denotes a definite target.

Budgeting: Budgeting is the process of designing, implementing and operating of budget. The main emphasis in budgeting process is the provision of resources to support plans which are being implemented. It is a means of coordinating the combined intelligence of an entire organisation into a plan of action based on past performance and governed by rational judgment of factors that will influence the course of business in the future.

ESSENTIAL CHARACTERISTICS OF BUDGET

The main characteristics of budget are as follows:

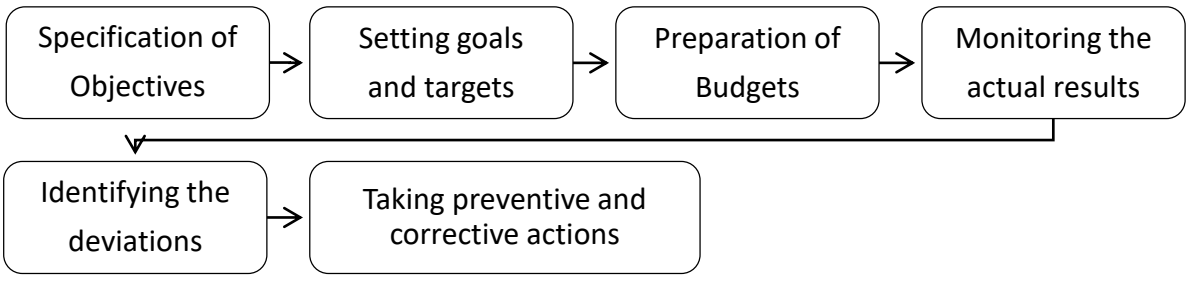
1. A budget is concerned for a definite future period.
2. A budget is a written document.

3. A budget is a detailed plan of all the economic activities of a business.
4. All the departments of a business unit should co-operate for the preparation of a business budget.
5. Budget is a means to achieve business objectives and it is not an end in itself.
6. Budget needs to be updated, corrected and controlled every time circumstances change. Therefore, it is a continuous process.
7. Budget helps in planning, coordination and control.
8. Different types of budgets are prepared by industries according to business requirements.
9. A budget acts as a business barometer.
10. Budget is usually prepared in the light of past experiences.
11. Budget is a constant endeavor of the Management.

ESSENTIAL STEPS FOR PREPARING BUDGET

Essential steps for preparing a budget are as follows:

1. Organizational structure must be clearly defined and responsibility should be assigned to identifiable units within the organization.
2. Setting of clear objectives and reasonable targets. Objectives should be in consonance with the long-term plan of the organization.
3. Objectives and responsibility should be clearly stated and communicated to the management or person responsible.
4. Budgets are prepared for the future periods based on expected course of actions.
5. Budgets are updated for the events that were not kept into the mind while establishing budgets. Hence, budgets should flexible enough for mid- term revision.
6. The entire organization must be committed to the preparation and implementing budgeting.
7. Budgets should be quantifiable and master budget should be broken down into various functional budgets.
8. Budgets should be monitored periodically. Variances of the actual outcomes should be compared with the actuals and variances analyzed and responsibility should be fixed.
9. Budgetary performance needs to be linked effectively to the reward system.



OBJECTIVES OF BUDGETING

Planning

Planning is the beginning of any activity. Planning establishes the objectives of the firm and decides the course of action to achieve it. It is concerned with formulating short-term and long-term plans to achieve a particular end. Planning is a statement of what should be done, how it should be done and when it should be done. The process of preparing budget begins with the establishment of specific targets of performance and is followed by devising plans to achieve such desired goals. These targets include both the overall business targets as well as the specific targets for the individual units within the business. Establishing specific targets for future operations is part of the planning function of management, while executing actions to meet the goals is the directing function of management. It may be explained as

- Budget is prepared in synchronization with the overall objectives of the organization, keeping mission and corporate strategy into account. Individual plans at unit level should be in consonance with organizational plan.
- Budget reflects plans. Therefore, planning should precede the preparation of budget.
- Budgeted plans are quantified and responsibility is assigned to the persons who are responsible for execution of plan.
- Communication of business objectives through budget has helped many a company to reduce expenses during business recession.
- Planning not only motivates employees to attain goals but also improves overall decision making. During the planning phase of the budget process, all viewpoints are considered, options identified, and cost reduction opportunities assessed. This process may reveal opportunities or threats that were not known prior to the budget planning process.

Directing and Coordinating

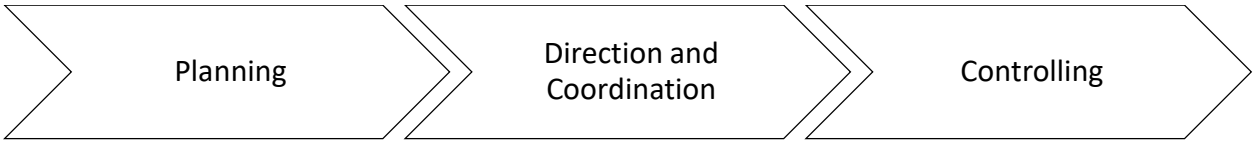
- Once the budget plans are in place, these can be used to direct and coordinate operations in order to achieve the stated targets.
- A business, however, is much more complex and requires more formal direction and coordination.
- The budget offers an important tool to direct and coordinate business activities and units to achieve stated targets of performance.
- The budgetary units in an organisation are called responsibility cente₹ Each responsibility center is led by a manager who has the authority over and responsibility for the unit's performance.
- Objectives of each responsibility centre and degree of performance expected from them are separately communicated.

Controlling

- Control is the process of monitoring, measuring, evaluating and correcting actual results to ensure that a firm's goals and plans are achieved. Control is achieved through the process of feedback.

- As time passes, **the actual performance of an operation can be compared against the planned targets. This provides prompt feedback to employees about their performance.** If necessary, employees can use such feedback to fine-tune their activities in the future.
- Feedback received in the form of budget report from the responsibility centre is helpful to know the performance of the concerned unit.
- Any unforeseen changes into the conditions which were prevailing at the time of preparing budget are taken into account and budgets are revised to show true performance.
- Comparing actual results to the plan helps prevent unplanned expenditures. The budget helps employees to regulate their spending priorities.

The main objective of Budgeting is to help in achieving the overall objective of the organization.



BUDGETARY CONTROL

CIMA has defined the terms 'budgetary control' as the establishment of budgets relating to the responsibilities of executives to the requirements of a policy and the continuous comparison of actual with budgeted results, either to secure by individual action, the objective of that policy or to provide a basis for its revision. It is the system of management control and accounting in which all the operations are forecasted and planned in advance to the extent possible and the actual results compared with the forecasted and planned results.

Budgetary Control Involves

1. Establishment of budgets
2. Continuous comparison of actuals with budgets for achievement of targets.
3. Revision of budgets after considering the changes in the circumstances.
4. Fixation of the responsibility for failure to achieve the budget targets.

Objectives Of Budgetary Control System

1. **Portraying with precision the overall aims of the business** and determining targets of performance for each section or department of the business.
2. **Laying down the responsibilities** of each of the executives and other personnel so that everyone knows what is expected of him and how he will be judged. Budgetary control is one of the few ways in which an objective assessment of executives or department is possible.
3. **Providing a basis for the comparison** of actual performance with the predetermined targets and investigation of deviation, if any, of actual performance and expenses from the budgeted figures.

This naturally helps in adopting corrective measures.

4. **Ensuring optimum use of available resources** to maximise profit or production, subject to the limiting facto₹ Since budgets cannot be properly drawn up without considering all aspects, usually there is good co-ordination when a system of budgetary control operates.
5. **Co-ordinating various activities** of the business, and centralising control and yet enabling management to decentralise responsibility and delegate authority in the overall interest of the business.
6. **Engendering a spirit of careful forethought**, assessment of what is possible and an attempt at it. It leads to dynamism without being reckless. Of course, much depends on the objectives of the firm and the dynamism r of its management.
7. **Providing a basis for revision** of current and future policies.
8. **Drawing up long range plans** with a fair measure of accuracy.
9. **Providing a yardstick** against which actual results can be compared.

Steps for establishing Budgetary Control

The following steps are necessary for establishing a good budgetary control system:

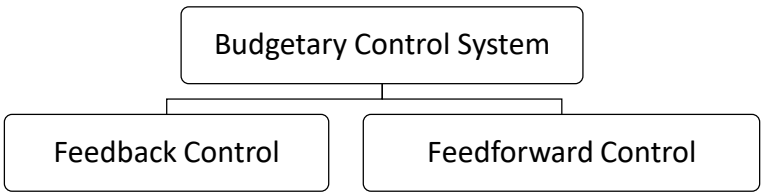
1. **Determining the objectives to be achieved**, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. **Determining the activities that should be undertaken** for the achievement of the objectives.
3. **Drawing up a plan or a scheme** of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. **Laying out a system of comparison** of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. **Ensuring that corrective action will be taken** where the plan has not been achieved and, if that is not possible, for the revision of the plan.

   In brief, it is a system to assist management in the allocation of responsibility and authority, to provide it with aid for making, estimating and planning for the future and to facilitate the analysis of the variation between estimated and actual per- formance.

   In order to ensure effective functioning of budgetary control, it is necessary that the firm should develop a proper basis of measurement or standards with which to evaluate the efficiency of operations, *i.e.,* the firm should have in operation, a system of standard costing.

   The organisation should be so integrated that all lines of authority and responsibility are properly defined. This is essential since the system of budgetary control postulates separation of functions and division of responsibilities and thus requires that the organisation shall be planned in such a manner that everyone, from the Managing Director down to the Shop Foreman, will have his duties properly defined.

Feedback and Feed forward Control



Feedback Control: The feedback system of budgetary control, the actual results for the budgeted period are collected and compared with the budgeted figures. The exercise of variance identification is done after the completion of the budget period. The variances are reported and based on the report corrective actions are taken, responsibility is fixed and based on experience, modification in future targets is implemented. As the name suggests, it is an Ex-post Corrective control system of budget. This system of budgetary control is common in organizations where Management Information System (MIS) is not so robust and where data is obtained only after the finalization of books of account. Though this type of control system is less expensive to maintain but has limitations. Organization has to remain on looser side in today's age of data warfare.

Feedforward Control: This the opposite of feedback control system of budgetary control. It is Ex-Ante Preventive control mechanism of budgetary control. The budgets are set at the inception of the budgeted period and the actual results are continuously monitored and compared. The targets are kept realistic as far as possible and the targets are reviewed and reset if necessary. This budgetary control system requires a robust MIS supported by integrated ERP system enabling an entity to get data as and when desired basis. This system is very expensive and beneficial for the organisations where the business environment is dynamic and information has important role in getting edge in competition and todays data warfare.

Budget Committee and Budget Officer

The budget committee is a group of representatives of various functions in an organisation. As all functions are inter-related and as any change in one's target will have its impact on that of the other, it is necessary to discuss the targets so that a mutually agreed programme is finally decided. This is called coordination in budget-making. It is a powerful force in knitting together various activities of the business and enforcing real control over operations.

The Chief Executive is ultimately responsible for the budget programme but it will be better if the large part of the supervisory responsibility is delegated to an official designated as Budget Officer The budget Officer should have knowledge of the technical side of the business and should report to the president or CEO of the business entity.

The responsibility for successfully introducing and implementing Budgetary Control System rests with the Budget Committee acting through the Budget Officer. The Budget Committee would be composed of all functional heads and a member from the Board to preside over and guide the deliberations.

The main responsibilities of the Budget Committee/Budget Officer are to:

1. **Assist in the preparation of the separate budget for various departments** by coordinating the work of the accounts department, which is normally responsible to compile the budgets—with the relevant functional departments like Sales, Production, Plant maintenance etc.;
2. **Forward the budget to the individual departments heads who are responsible** to implement the budget. The Budget Officer should guide them in overcoming any practical difficulties, in its working;
3. **Prepare the periodical budget reports** for circulation to the individuals concerned;
4. Follow-up action to be taken on the budget reports;
5. **Prepare an overall budget working report** for discussion at the Budget Committee meetings and to ensure follow-up on the lines of action suggested by the Committee;
6. **Prepare periodical reports** for the Board meeting. Comparing budgeted Profit and Loss Account and the Balance Sheet with the actual results attained.

It is necessary that every budget should be thoroughly discussed with the functional heads before it is finalized.

It is the duty of the Budget Officer to see that the periodical budget reports are supplied to the recipients at regular intervals so as to enable them to take remedial action.

The efficiency of the Budget Officer, and through him of the Budget Committee, will be judged more by the smooth working of the system and the agreement between the actual figures and the budgeted figures.

Budgets provides basis for giving an incentive for better performance; It is up to the Budget Officer to see that attention of the different functional heads is drawn to the deviations so as to face the challenge in a successful manner.

Advantages of Budgetary Control System

Points	Description
1. Efficiency	The use of budgetary control system enables the management of a business entity to conduct its business activities in an efficient manner.
2. Control on expenditure	It is a powerful instrument used by business entity for the control of their expenditure. It provides a yardstick for measuring and evaluating the performance of individuals and their departments.
3. Finding deviations	Budget reveals the deviations of the actual from the budgeted figures after making a comparison and communicating the deviation to management.

4. Effective utilization of resources	Effective utilization of various resources like— men, material, machinery and money—is made possible, as the production is planned after taking these into account.
5. Revision of plans	Budget helps in the review of current trends and framing of future policies.
6. Implementation of Standard Costing system	Budget creates suitable conditions for the implementation of standard costing system in a business organization.
7. Cost Consciousness	Budgetary control system encourages cost consciousness and maximum utilization of available resources.
8. Credit Rating	Management which has developed a well-ordered budget plans and which operate accordingly, receive greater favor from credit agencies.

Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralized organization, each unit has its own objective and these units enjoy some degree of discretion. In this type of organization structure, coordination among different units is required. The success of the budgetary control depends upon willing co- operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organization structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.

5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organization is exposed to various uncertain internal and external facto₹ Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.

Components of Budgetary Control System

1. **Physical budgets:** Those budgets which contain information in quantitative terms such as the physical units of sales, production etc. This may include quantity of sales, quantity of production, inventories, and manpower budgets are physical budgets.
2. **Cost budgets:** Budgets which provides cost information in respect of manufacturing, administration, selling and distribution, etc. for example, manufacturing costs, selling costs, administration cost, and research and development cost budgets are cost budgets.
3. **Profit budgets:** A budget which enables the ascertainment of profit. For example, sales budget, profit and loss budget, etc.
4. **Financial budgets:** A budget which facilitates in ascertaining the financial position of a concern, for example, cash budgets, capital expenditure budget, budgeted balance sheet etc.

BUDGETS AND MOTIVATION

When pursuing some target, the end result of achieving the goal should be motivating one. Motivation is a factor which works like fuel to get hope lighted and ignites the aspirations. Therefore, motivation is the driving force which converts the efforts into results and thus the long-term objectives of the any person whether it would be an individual or a corporate.

The same principle of motivation also applies to a business entity to achieve its objectives in the course of pursuing its mission. Budget is a planning exercise which quantifies the desired results into targets. The budget targets are communicated to the executives at different levels and they are asked to strive to get the targes achieved. But the whole exercise is not so simple as it seems in script, implementation it in practicality has bumpy rides. The behavioral aspect of human being comes into character, and it is not so difficult to guess why an executive put his/ her best efforts to achieve the communicated targets. There must be something motivating in achieving the targets, therefore, a budgeting process should have the following consideration to make it motivating one:

Performance measurement: The budget, at first be communicated to all executives so that everybody must be informed the desired performance expected from each of them. Secondly, the achievement of targets should have consideration in measurement and evaluation of performance an executive at individual level and at departmental level. Rewards such as promotion, increment, Performance related pay (Pay), bonus may be appropriate motivation factors.

Achievable Targets: While setting targets, the practical aspects such as availability of resources and realism of figures must be considered. The targes should be balance one, it neither be very easy nor too tough, means it should be realistic one. An unrealistic target has reverse impact and may be demotivate the executives.

Optimum utilization of resources: A budget targets which is easily achievable may under utilize the resources such as potential skills of executives. Pressure sometime forcing to explore innovative ways to get things done. Thus, to keep motivation alive, a balanced approach should be applied for optimum utilization of resources up to its effort zone, though beyond the comfort zone.

Involvement in budgeting process: The budgets which involves the executives from all department can capture the requirement of all the users. The participative budgeting motivates the executives and give them a sense of ownership. Involvement at planning stage of budget can take care of the requirements of the executives and force them accept the targets. However, involvement at every stage of budgeting process may distort the objective of budget and lands nowhere, thus, a balance approach may be followed.

PREPARATION OF BUDGETS

1. **Defining business or organizational objectives:** A budget is a plan for the achievement of certain organizational objectives. It is therefore desirable that these objectives are defined precisely. The organizational objectives should be written down; the areas of control demarcated; and items of revenue and expenditure to be covered by the budget clearly stated. This will give a clear understanding of the plan and its scope to all those who must cooperate to make it successful.
2. **Identification of the key budget factor:** There are usually one or two key budget factors (sometimes there may be more than two) which set a limit to the total activity. For instance, in India sometimes non-availability of power does not allow production to increase in spite of heavy demand. Similarly, lack of demand may limit production. Such a factor is known as key factor. For proper budgeting, it must be identified and its influence on production on sales estimated properly while preparing the budget.
3. **Appointment of controller/officer:** Formulation of a budget usually requires service of a whole time senior executive; He must be assisted in this work by a Budget Committee, consisting of all the heads of departments along with the Managing Director as the Chairman. The Budget Controller/Officer is responsible for coordinating and development of budget programs and preparing the manual of instruction, known as Budget manual.

4. **Budget Manual:** The budget manual is a booklet specifying the objectives of an organization in relation to its strategy. The budget is made to decide how much an organization would earn and spend and in what manner. In the budget, the organization sets its priorities too.

   CIMA, London, defines budget manual as, "A document which sets out the responsibilities of the persons engaged in, the routine of, and the forms and records required for, budgetary control". Effective budgetary planning relies on the provision of adequate information to the individuals involved in the planning process. Many of these information needs are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process.

Contents of a Budget Manual

Typical budget manual may include the following:

i. A statement regarding the objectives of the organization and how they can be achieved through budgetary control;

ii. A statement about the functions and responsibilities of each executive, both regarding preparation and execution of budgets;

iii. Procedures to be followed for obtaining the necessary approval of budgets. The authority of granting approval should be stated in explicit terms. Whether, one two or more signatures are required on each document should be clearly stated;

iv. A form of organization chart to show who are responsible for the preparation of each functional budget and the way in which the budgets are interrelated.

v. A timetable for the preparation of each budget.

vi. The manner of scrutiny and the personnel to carry it out;

vii. Reports, statements, forms and other record to be maintained;

viii. The accounts classification to be employed. It is necessary that the framework within which the costs, revenue and other financial accounts are classified must be identical both in the accounts and budget department;

ix. The reporting of the remedial action;

x. The manner in which budgets, after acceptance and issuance, are to be revised or the matter amended these are included in budgets and on which action can be taken only with the approval of top management

xi. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.

xii. Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.

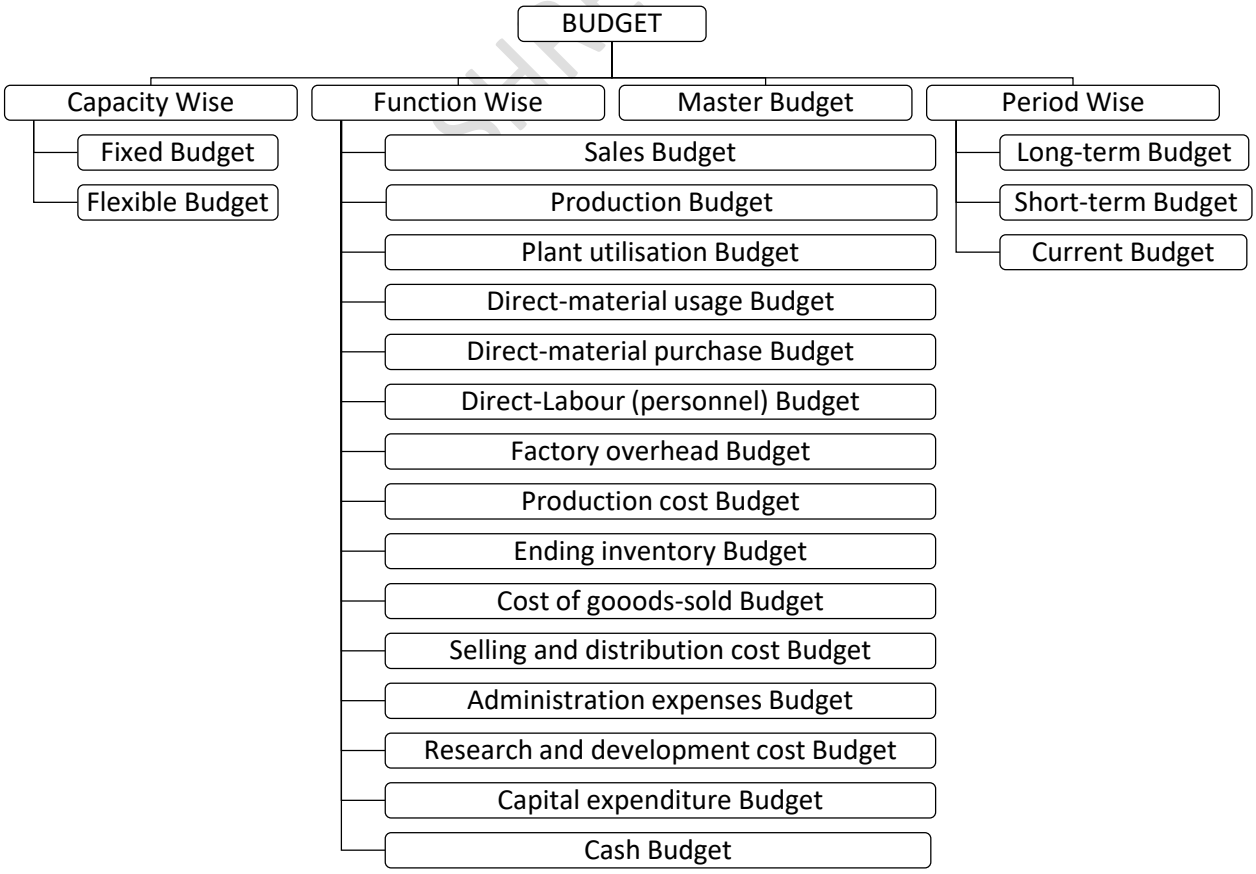
xiii. A list of the organization's account codes, with full explanations of how to use them.

xiv. Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

5. **Budget period:** The period covered by a budget is known as budget period. There is no general rule governing the selection of the budget period. In practice the Budget Committee determines the length of the budget period suitable for the business. Normally, a calendar year or a period co-terminus with the financial year is adopted. The budget period for the calendar or financial year is then divided into shorter periods; it may be monthly or quarterly or for such periods as coincide with period of trading activity of the business.
6. **Standard of activity or output:** For preparing budgets for the future, past statistics, though important, cannot be completely relied upon. The past usually represents a combination of good and bad factors. Therefore, though results of the past should be studied, but these should only be applied when there is a likelihood of similar conditions repeating in the future. Also, while setting the targets for the future, it must be remembered that in a progressive business, the achievement of a year should normally exceed those of earlier years. Therefore, what was good in the past is only fair for the current year and should work for much better in the future.

   In budgeting, fixing the budget of sales, expenses, and of capital expenditure is important since these budgets determine the extent of development activity. For budgeting sales, one must consider the trend of economic activity of the country, recommendations of salesmen, customers and employees, effect of price changes on sales, the provision for advertisement campaign plan capacity etc.

DIFFERENT TYPES OF BUDGETS



Classification on the basis of Capacity or Flexibility

Fixed Budget: A budget prepared on the basis of standard or fixed level of activity is known as fixed budget. It does not change with a change in the level of activities. According to CIMA, "**a fixed budget is a budget designed to remain unchanged irrespective of the level of activity actually attained**". A fixed budget shows the expected results of a responsibility center for only one activity level.

Once the budget is prepared, it is not changed, even if the level of activity changes. Fixed budgeting is used by many service companies and for some administrative functions of manufacturing companies, such as purchasing, engineering, and accounting. Fixed Budget is used as an effective tool of cost control. In case, the level of activity attained is different from the level of activity for budgeting purposes, the fixed budget becomes ineffective. Fixed budget is suitable for fixed expenses. It is also known as a static budget.

Essential conditions:

1. When the nature of business is not seasonal.
2. There is no impact of external factors on the business activities.
3. The demand of the product is certain and stable.
4. Supply orders are received and issued regularly.
5. The market of the product is normally domestic but it can also apply in respect of service export, where fairly regular export orders are received
6. There is no need of special Labour or material in the production of the products.
7. Supply of production inputs is regular.
8. There is a trend of price stability.

Generally, all above conditions are not found in practice. Hence fixed budget is not suitable in business concerns.

Merits and Demerits of fixed budgets are tabulated below:

Merits	Demerits
1. Very simple to understand **2.** Less time consuming	**1.** It does not suite a dynamic organization and may give misleading results. A poor or good performance may remain un- noticed. **2.** It is not suitable for long period. **3.** It is also found unsuitable particularly when the business conditions are changing constantly. **4.** Accurate estimates are not possible.

Flexible Budget

A flexible budget is a budget which, by recognizing the difference in behavior between fixed and variable costs in relation to fluctuations in output, turnover, or other variable factors, is designed to change appropriately with such fluctuations. According to CIMA, "**a flexible budget is defined as a budget which, by recognizing the difference between fixed, semi-variable and variable costs is designed to change in relation to the level of activity attained.**" Unlike static (fixed) budgets, the flexible budgets show the expected results of a responsibility center for different activity levels.

One can view a flexible budget as a series of static budgets for different levels of activity. Such budgets are especially useful in estimating and controlling factory costs and operating expenses. It is more realistic and practicable because it gives due consideration to behavior of revenue and cost at different levels of activity. While preparing a flexible budget, the expenses are classified into three categories *viz.*

i. Fixed,

ii. Variable, and

iii. Semi-variable.

Semi-variable expenses are further segregated into fixed and variable expenses. Flexible budgeting may be resorted to under the following situations:

i. In the case of new business venture, due to its typical nature, it may be difficult to forecast the demand of a product accurately.

ii. Where the business is dependent upon the fluctuations of nature e.g., a person dealing in wool trade may have enough market demand, if temperature goes below the freezing point and much less demand if the weather is relatively warm.

iii. In the case of Labour-intensive industry where the production of the entity is dependent upon the availability of Labour.

Suitability for flexible budget:

1. Seasonal fluctuations in sales and/or production, for example in soft drinks industry;

2. a company which keeps on introducing new products or makes changes in the design of its products frequently;

3. industries engaged in make-to-order business like ship building;

4. an industry which is influenced by changes in fashion; and

5. general changes in sales.

Merits and Demerits of flexible budgets are tabulated below:

Merits	Demerits
1. With the help of flexible budget, the sales, costs and profit may be calculated easily by the business at various levels of production capacity.	**1.** The formulation of flexible budget is possible only when there is proper accounting system maintained, perfect knowledge about the factors of production and various business circumstances is available.
2. In flexible budget, adjustment is very simple according to change in business conditions.	**2.** Flexible Budget also requires the system of standard costing in business.
3. It also helps in determination of production level as it shows budgeted costs with classification at various levels of activity along with sales. Hence the management can easily select the level of production which shows the profit predetermined by the owners of the business.	**3.** It is very expensive and Labour oriented.
4. It also shows the quantity of product to be produced to earn determined profit.	

Difference between Fixed and Flexible Budgets:

Sl. No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is known as rigid or inflexible budget.	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity.
3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analyzed according to its behavior.
4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.

5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets.

Classification on the basis of Function

A functional budget is one which is related to function of the business as for example, production budget relating to the manufacturing function. Functional budgets are prepared for each function and they are subsidiary to the master budget of the business.

The various types of functional budgets to be prepared will vary according to the size and nature of the business.

The various commonly used functional budgets are:

i. Sales Budget
ii. Production Budget
iii. Plant Utilisation Budget
iv. Direct-Material Usage Budget
v. Direct-Material Purchase Budget
vi. Direct Labour (Personnel) Budget
vii. Production or Factory Overhead Budget
viii. Production Cost Budget
ix. Ending Inventory Budget
x. Cost of Goods Sold Budget
xi. Selling and Distribution Cost budget
xii. Administration Expenses Budget
xiii. Research and Development Cost Budget
xiv. Capital Expenditure Budget
xv. Cash Budget

The important functional budgets (also known as schedules to Master Budget) and the master budget are discussed and illustrated below:

Sales Budget:

- **Sales forecast is the commencement of budgeting and hence sales budget assumes primary importance**. The quantity which can be sold may be the principal budget factor in many business undertakings. In any case in order to chalk out a realistic budget programme, there must be an accurate sales forecast.

- **The sales budget is prepared for each product. This includes:**
  1. The quantity of estimated sales and
  2. The expected unit selling price.
  3. These data are often reported by regions or by sales representatives.
- In estimating the quantity of sales for each product, past sales volumes are often used as a starting point. These amounts are adjusted (increased or decreased) for factors that are expected to affect future sales. Such as the factors listed below.
  i. Backlog of unfulfilled sales orders
  ii. Planned advertising and promotion
  iii. Expected industry and general economic conditions
  iv. Productive capacity
  v. Projected pricing
  vi. Findings of market research studies
  vii. Relative product profitability.
  viii. Competition.
- Once an estimate of the sales volume is obtained, **the expected sales revenue can be determined by multiplying the volume by the expected unit sales price.** The sales budget represents the total sales in physical quantities and values for a future budget period. Sales managers are constantly faced with problems like anticipation of customer requirements, new product needs, competitor strategies and various changes in distribution methods or promotional techniques.
- The purposes of sales budget are not to attempt to estimate or guess what the actual sales will be, but rather to develop a plan with clearly defined objectives towards which the operational effort is directed in order to attain or exceed the objective. Hence, sales budget is not merely a sales forecast. A budget is a planning and control document which shows what the management intends to accomplish. Thus, the sales budget is active rather than passive document.
- A sales forecast, is a projection or estimate of the available customer demand. A forecast reflects the environmental or competitive situation facing the company whereas the sales budget shows how the management intends to react to this environmental and competitive situation.
- A good budget hinges on aggressive management control rather than on passive acceptance of whatever the market appears to offer. If the company fails to make this distinction, the budget will remain more a figure-work exercise than a working tool of dynamic management control.
- The sales budget may be prepared under the following classification or combination of classifications:
  i. Products or groups of products.
  ii. Areas, towns, salesmen and agents.
  iii. Types of customers as for example: (i) Government, (ii) Export, (iii) Home sales, (iv) Retail depots.
  iv. Period—months, weeks, etc.

Production Budget

Production Budget is a forecast of the production for the budget period of an organisation. Production budget is prepared in two parts, viz. production volume budget for the physical units of the products to be manufactured and the cost of production or manufacturing budget detailing the budgeted cost under material, Labour, and factory overhead in respect of the products.

Production budget shows the production for the budget period based upon:

1. Sales budget,
2. Production capacity of the factory,
3. Planned increase or decrease in finished stocks, and
4. Policy governing outside purchase.

Production budget is normally stated in units of output. Production should be carefully coordinated with the sales budget to ensure that pro- duction and sales are kept in balance during the period. **The number of units to be manufactured to meet budgeted sales and inventory needs for each product is set forth in the production budget.**

The production facility available and the sales budget will be compared and coordinated to determine the production budget. If production facilities are not sufficient, consideration may be given to such factors as working overtime, introducing shift working, sub-contracting or purchasing of additional plant and machinery. If, however, the production facilities are surplus, consideration should be given to promote advertising, reduction of prices to increase the sales, sub-contracting of surplus capacity, etc.

One of the conditions to be considered in all the compilation of production budget is the level of stock to be maintained.

- The level of stocks will depend upon the following three factors viz.:
  1. Seasonal industries in which stocks have to be built up during off season to cater to the peak season,
  2. A steady and uniform level of production to utilise the plant fully and to avoid retrenchment or lay-off of the workers, and
  3. To produce in such a way that minimum stocks are maintained at any time to avoid locking up of funds in inventory.
- Production budget can, therefore, show:
  1. Stabilized production every month, say, the maximum possible production or
  2. Stabilized minimum quantity of stocks which will reduce inventory costs.
  3. In the case of stabilized production, the production facility will be fully utilized, but the inventory carrying costs will vary according to stocks held. In the case of stabilized stocks method, however, the inventory carrying will be the lowest, but there may be under utilization of capacity.

Plant Utilisation Budget:

Plant utilization budget represents, in terms of working hours, weight or other convenient units of plant facilities required to carry out the programme laid down in the production budget.

The main purposes of this budget are:

1. To determine the load on each process, cost or groups of machines for the budget period.
2. To indicate the processes or cost centres which are overloaded so that corrective action may be taken such as: (i) working overtime (ii) sub- contracting (iii) expansion of production facility, etc.
3. To dovetail the sales production budgets where it is not possible to increase the capacity of any of the overloaded processes.
4. Where surplus capacity is available in any of the processes, to make effort to boost sales to utilize the surplus capacity.

Direct Material usage Budget:

The steps involved in the compilation of direct materials usage budget are as under:

1. The quality standards for each item of material have to be specified. In this connection, standardization of size, quality, colour, etc., may be considered.
2. Standard requirement of each item of materials required should also be set. While setting the standard quality, consideration should be given to normal loss in process. The standard allowance for normal loss may be given on the basis of past performance, test runs, technical estimates etc.
3. Standard prices for each item of materials should be set after giving consideration to stock and contracts entered into.

After setting standards for quality, quantity and prices, the direct materials cost budget can be prepared by multiplying each item of material required for the production by the standard price.

Direct Material Purchase Budget:

- The production budget is the starting point for determining the estimated quantities of direct materials to be purchased.
- Multiplying these quantities by the expected unit purchase price determines the total cost of direct materials to be purchased.

  Two important considerations that govern purchase budgets are as follows:

  i. Economic order quantity.

  ii. Re-order point with safety stocks to cover fluctuations in demand.
- The direct material purchases budget helps management maintain inventory levels within reasonable limits. For this purpose, the timing of the direct materials purchases should he coordinated between the purchasing and production departments.

Direct Labour (Personnel) Budget:

Once sales budget and Production budget are compiled and plant utilization budget is decided detailed amount of the various machine operations involved and services required can be calculated. This will facilitate preparation of an estimate of different grades of Labour required.

From this, the standard hours required to be worked can be calculated the total Labour component thus budgeted can be divided into direct and indirect Labour. Standard rates of wages for each grade of Labour can be introduced and then the direct and indirect Labour cost budget can be prepared.

Merits/advantages

i. It defines the direct and indirect Labour force required.

ii. It enables the personnel department to plan ahead in recruitment and training of workers so that Labour turnover can be reduced to the minimum.

iii. It reveals the Labour cost to be incurred in the manufacture, to facilitate preparation of manufacturing cost budgets and cash budgets for financing the wage bill.

Production or Factory Overhead Budget:

- Production overheads consist of all items such as indirect materials, indirect Labour and indirect expenses. Indirect expenses. These include expenditures on factors such as power, fuel, fringe benefits, depreciation etc. The estimated overheads which are necessary for production in the factory are called factory overhead costs and included in the factory overhead budget.
- Factory overhead budget usually includes the total estimated cost for each item of factory overhead.
- The production overhead budget is useful for working out the pre- determined overhead recovery rates.
- A business may prepare supporting departmental schedules, in which the factory overhead costs are separated into their fixed and variable cost elements. Such schedules enable department managers to direct their attention to those costs for which they are responsible and to evaluate performance of each department.
- A careful study and determination of the behaviour of different types of costs will be essential in preparation of overhead budget.
- A few examples are given below to show how the expenses are estimated.
  1. Fixed expenses are normally policy costs and hence they are based on policy matters.
  2. For estimating indirect Labour, work study is resorted to and an estimate of number of indirect workers required for each level of direct workers employed is made—for example, one supervisor for every twenty direct worker
  3. In regard to the estimate of consumption of indirect materials, the age and condition of the plant and machinery are taken into consideration.

Production Cost Budget:

Production Cost Budget is a forecast of the production for the budget period of an organization. Production budget is prepared in two parts, viz. production volume budget for the physical units of the products to be manufactured and the cost of production or manufacturing budget detailing the budgeted cost under material, Labour, and factory overhead in respect of the products.

Production cost budget covers direct material cost, direct Labour cost and manufacturing expenses. After preparing direct material, direct Labour and production overhead cost budget, one can prepare production cost budget.

Ending Inventory Budget:

This budget shows the cost of closing stock of raw materials and finished goods, etc. required to be maintained by the business entity. This information is required to prepare cost-of-goods-sold budget and budgeted financial statements i.e., budgeted income statement and budgeted balance sheet.

Cost of Goods Sold Budget:

This budget covers direct material cost, direct Labour cost and manufacturing expenses. This is adjusted by addition of the cost of the opening inventory and reducing therefrom the cost of closing inventory of finished products.

Selling and Distribution Cost Budget:

Selling and distribution are the essential aspects of the profit earning function. At the same time, the pre-determination of these costs is very difficult. Selling & Distribution Cost Budget is a forecast of the cost of selling & distribution of goods during the budget period. **Selling cost is defined as the cost of seeking to create and stimulate demand and of securing orders.** These costs are, therefore, incurred to maintain and increase the level of sales. All expenses connected with advertising, sales promotion, sales office, salesmen, credit collection, market research, after sales service, etc. are generally grouped together to form part of the responsibility of the sales manager.

While making a budget, selling costs are divided into fixed and variable. Semi- variable costs should also be separated into variable and fixed elements.

The problems faced in the preparation of selling cost budgets are:

Heavy expenditure on selling and sales promotion may have to be incurred when the volume of sales is falling off. This will increase the percentage of such costs to total sales, and

Sometimes intensive sales and promotion efforts are called for in one year and the benefit of such efforts accrue in the subsequent years. This makes it difficult to establish a proportion of selling cost to sales.

In spite of these problems, some relationship between selling cost and volume of sales has to be established and it is the duty of the Budget Controller to determine the amount of selling costs to be incurred to achieve the desired level of sales volume.

Using the past experience as a guide, consideration should be given to the future trend of sales, possible changes in competition etc., in pre- determination of selling costs.

- Distribution cost has been defined as the cost of the sequence of operations which begins with making the packet of product avail- able for dispatch and ends with making the re-conditioned return of empty package, if any available for re-use. It includes transport cost, storage and warehousing costs, etc.
- Preparation of the advertising cost budget is the responsibility of the sales manager or advertisement manager. When preparing the advertisement cost budget, consideration should be given to the following factors:
  1. The best method of advertisement must be selected; costs will vary according to the method selected.
  2. The maximum amount to be spent in a period, say one year, has to be decided.
  3. Advertising and sales should be co-ordinated. It means that money should be spent on advertisement only when sufficient quantities of the product advertised are ready for sale.
  4. An effective control over advertisement expenditure should be exercised and the effectiveness of the advertisement should be measured.
  5. The choice of the method of advertising a product is based on the effectiveness of the money spent on advertisement in increasing or maintaining sales. If the output sold increases, the production cost will come down because of the economies of large-scale production.
- The amount to be spent on advertisement may be decided on the basis of the following factors:
  a. A percentage on the total sales value of the budget period or on the expected profit may be fixed on the basis of past experience.
  b. A sum which is expected to be incurred by the competitors may be fixed to be spent during the budget period.
  c. A fixed sum per unit of output can be fixed and added to cost.
  d. An amount is fixed on the basis of the ability of the company to spend on advertising.
  e. An advertisement plan is decided upon and the amount to be spent is determined.
- Depending upon the nature of the product and the effectiveness of the media of the advertising the company prepares a schedule of various methods of advertisement, to be used for effective sales promotion. The number of advertisements (insertions) are determined and the cost calculated as per the rates applicable to each of the media selected. This is a sound method.

Administrative Expenses Budget

The administrative expenses are mostly policy costs and are, therefore, fixed in nature. **The most practical method to follow in preparing estimate of these expenses is to follow the past experience with due regard to antic- ipated changes either in general policy or the volume of business**. To bring such expenses under control, it is necessary to review them frequently and to determine at regular intervals whether or not these expenses continue to be adjusted. Examples of such expenses are: board meeting expenses, expenditure incurred on staff employed in human resources and finance departments, audit fees, depreciation of office equipment, insurance, subscriptions, postage, stationery, telephone, telegrams, office supplies, etc.

Research and Development Cost Budget

Research and development expenditure is to be incurred so that the products or methods of production do not become obsolete. The research and development budget is the forecast of all such expenses. **Research is required in order to develop and/or improve products and methods. When research results in definite benefit to the company, development function begins.** After development, formal production can commence on commercial scale and then production function starts. Since the areas of research and development cannot be precisely defined, the costs incurred under both the functions are clubbed together as research and development costs. Research and Development (R & D) plays a vital role in maintaining the business. For example, automobile manufacturers, and those who produce drugs, spend considerable sums on R & D to improve their products.

Research may be either pure research or applied research. Pure research increases knowledge whereas applied research aims at producing definite results like improved methods of production, etc.

Research and development expenses should be controlled carefully and hence a limit on the spending is placed, i.e., the amount to be spent is carefully determined or allocated.

The following are the methods of allocation of R & D expenses.

a. A percentage based on total sales value. This method is good if sales value is steady from year to year.

b. A percentage based on net profit.

c. A total sum is estimated on the basis of past experience and future R & D plans and policies.

d. A sum is fixed on the basis of cash resources available with the company.

e. All factors which affect the importance of R & D are considered. For example, factors like demand for existing products, competition, economic conditions, etc., are considered carefully and a sum is set aside as R& D budget.

Capital Expenditure Budget:

The capital expenditure budget represents the planned outlay on fixed assets like land, building, plant and machinery, etc. during the budget period. This budget is subject to strict management control because it entails large amount of expenditure. The budget is prepared to cover a long period of years and it projects the capital costs over the period in which the expenditure is to be incurred and the expected earnings.

The preparation of capital budget is based on the following considerations:

1. Capital Budget is a budget prepared for capital receipts and expenditure such as investment on land and building, plant and machinery obtaining loans, issue of shares, purchase of assets etc.
2. Future development plans to increase output by expansion of plant facilities.
3. Replacement requests from the concerned departments.
4. Actors like sales potential to absorb the increased output, possibility of price reductions, increased costs of advertising and sales promotion to absorb increased output, etc.
5. Overhead on production facilities of certain departments as indicated by the plant utilisation budget.

Merits/Advantages of capital budgeting

1. Capital budget outlines the capital development programme and estimated capital expenditure during the budget period.
2. It enables the company to establish a system of priorities. When there is a shortage of funds, capital rationing becomes necessary.
3. It serves as a tool for controlling expenditure.
4. It provides the amount of expenditure to be incorporated in the future budget summaries for calculation of estimated return on capital employed.
5. This enables the cash budget to be completed. With other cash commitments capital expenditure commitment should also be considered for the completion of the budget.
6. It facilitates cost reduction programme, particularly when modernisation and renovation is covered by this budget.

Cash Budget:

Cash Budget is a detailed budget of cash receipts and cash payments incorporating both revenue and capital items for the budget period. This budget is usually of two parts giving detailed estimates of (i) cash receipts and (ii) cash disbursements. Estimates of cash-receipts are prepared on a monthly basis and depend upon estimated cash-sales, collections from debtors and anticipated receipts from other sources such as sale of assets, borrowings, etc. Estimates of cash disbursements are based on estimated cash purchases, payments to creditors, employees' remuneration, bonus, advances to suppliers, budgeted capital expenditure for expansion, etc.

Cash budget represents the cash requirements of the business during the budget period. **It is the plan of receipts and payments of cash for the budget period**, analysed to show the monthly flow of cash drawn up in such a way that the balance can be forecasted at regular intervals.

The cash budget is one of the most important elements of the budgeted balance sheet. Information from the various operating budgets, such as the sales budget, the direct materials purchases budget, and the selling and administrative expenses budget, affects the cash budget.

In addition, the capital expenditures budget, dividend policies, and plans for equity or long-term debt financing also affect the cash budget.

The main objectives of preparing cash budget are:

i. The probable cash position, as a result of planned operation, is assessed; and thus, the excess or shortage of cash becomes clear. This helps in arranging short-term borrowings in advance to meet the situations of shortage of cash or making investments when cash is in excess.

ii. Cash can be coordinated in relation to total working capital, sales investment and debt.

iii. A sound basis for credit for current control of cash position is established.

iv. The effect of sudden and seasonal requirements, large stocks, delay in collection of receipts, etc., on the cash position of the organization is revealed and things become under to the management.

Advantages of cash budget:

i. It aids in securing option working capital need for smooth running of the operation and planning for payments to the shareholder

ii. It eases strains of a cash shortage

iii. It facilitates temporary cash investment wherever, and to whatever extent, found in excess

iv. It provides for normal growth

Master Budget:

CIMA, London, defines it as "the summary budget, incorporating its component functional budgets, which is finally approved, adopted and employed." When all the necessary functional budgets have been prepared, the budget officer will prepare the master budget which may consist of budgeted profit and loss account and budgeted balance sheet. These are in fact the budget summaries. When the master budget is approved by the board of directors, it represents a standard for the achievement of which all the departments will work. On the basis of the various budgets (schedules) prepared earlier in this study, we prepare below budgeted income statement and budgeted balance sheet.

Classification on the basis of Time Period:

These types of Budgets are classified on the basis of time periods. These types of budgets reflect the planning period of the organization.

Long term Budget: - Long Term Budget is a budget prepared covering a period of more than a year. The Budgets are prepared to depict long term planning of the business. The period of long-term

Budgets varies between three to ten year. These budgets are useful for those industries where gestation period is long i.e., the business entities manufacturing machinery, electricity etc.

1. **Short term Budget:** These budgets are generally for one or two years and are in the form of monetary terms. The consumer's good industries like Sugar, Cotton, and textile use short term budgets.
2. **Current Budgets: -** The period of current budgets is generally of months and weeks. These budgets relate to the current activities of the business. According to CIMA London "Current budget is a budget which is created which is established for use over a short period of time and is related to current conditions".

ZERO – BASED BUDGETING (ZBB)

Zero-based Budgeting (ZBB) is defined as a method of budgeting which requires each cost element to be specifically justified, though the activities to which the budget relates are not being undertaken for the first time. The cost of each activity has to be justified and without justification, the budget allowance is zero.

Zero based budgeting differs from the conventional system of budgeting because it mainly starts from scratch or zero and not on the basis of trends or historical levels of expenditure. In the customary budgeting system, the last year's figures are accepted as they are, or cut back or increases are granted. Zero based budgeting on the other hand, starts with the premise that the budget for next period is zero so long the demand for a function, process, project or activity is not justified for each rupee from the first rupee spent.

Zero-based Budgeting (ZBB) is an emergent form of budgeting which arises to overcome the limitations of incremental (traditional) budgeting system.

ZBB is an activity-based budgeting system where budgets are prepared for each activity rather than functional department. Justification in the form of cost benefits for the activity is required to be given. The activities are then evaluated and prioritized by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

ZBB is suitable for both corporate and non-corporate entities. In case of non- corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

In case of corporate entities, ZBB is best suited for discretionary costs like research and development cost, training programmes, advertisement etc.

Stages in Zero-based Budgeting:

ZBB involves the following stages:

i. Identification and description of Decision packages

ii. Evaluation of Decision packages

iii. Ranking (Prioritisation) of the Decision packages

iv. Allocation of resources

i. **Identification and description of Decision packages:** Decision packages are the programmes or activities for which decision is required to be taken. The programmes or activities are described for technical specifications, financial impact in the form of cost benefit analysis and other issues like environmental, regulatory, social etc.

ii. **Evaluation of Decision packages:** Once Decision packages are identified and described, it is evaluated against factors like synchronization with organizational objectives, availability of funds, regulatory requirement etc.

iii. **Ranking (Prioritization) of the Decision packages:** After evaluation of the decision packages, it is ranked on the basis priority of the activities. Because of this prioritization feature **ZBB is also known as Priority-based Budgeting**.

iv. **Allocation of resources:** After ranking of the decision packages, resources are allocated for decision packages. Budgets are prepared like it is done first time without taking reference to previous budgets.

Advantages of Zero-based Budgeting:

The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the evaluation of different activities and rank them in order of preference for the allocation of scarce resources.
- It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
- It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of wasteful expenditure can be easily identified and eliminated.
- Departmental budgets are closely linked with corporation objectives.
- The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Zero-based budgeting is superior to traditional budgeting: Zero based budgeting is superior to traditional budgeting in the following manner:

- It provides a systematic approach for evaluation of different activities.
- It ensures that the function undertaken are critical for the achievement of the objectives.
- It provides an opportunity for management to allocate resources to various activities after a thorough – cost benefit analysis.

- It helps in the identification of wasteful expenditure and then their elimination. If facilitates the close linkage of departmental budgets with corporate objectives
- It helps in the introduction of a system of Management by Objectives.

Difference between Traditional Budgeting and Zero- based budgeting:

Following are the points of difference between traditional budgeting and zero- based budgeting:

- Traditional budgeting is accounting oriented. Main stress happens to be on previous level of expenditure. Zero-based budgeting makes a decision- oriented approach. It is very rational in nature and requires all programmes, old and new, to compete for scarce resources.
- In traditional budgeting, first reference is made to past level of spending and then demand for inflation and new programmes. In zero- based budgeting, management focuses attention to only on decision packages, which enjoy priority to other
- In tradition budgeting, some managers deliberately inflate their budget request so that after the cuts they still get what they want. In zero-based budgeting, a rationale analysis of budget proposals is attempted. The managers, who unnecessarily try to inflate the budget request, are likely to be caught and exposed. Management accords its approval only to a carefully devised result-oriented package.
- Traditional budgeting is not as clear and as responsive as zero-base budgeting.
- In traditional budgeting, it is for top management to decide why a particular amount should be spent on a particular decision unit. In Zero-based budgeting, this responsibility is shifted from top management to the manager of decision unit.
- Traditional budgeting makes a routine approach. Zero-based budgeting makes a very straightforward approach and immediately spotlights the decision packages enjoying priority over other

Limitations of Zero-based Budgeting:

- The work involves in the creation of decision-making and their subsequent ranking has to be made on the basis of new data. This process is very tedious to management.
- The activities selected for the purpose of ZBB are on the basis of the traditional functional departments. So, the consideration scheme may not be implemented properly.

PERFORMANCE BUDGETING (PB)

Performance budgeting (PB) involves evaluation of the performance of an organisation in the context of both specific as well as overall objectives of the organisation. This requires complete clarity about both the short-term as well as long-term organisational objectives. The responsibility of the various levels of management should be predetermined in terms of results expected from them and the authority vested in them. In other words, performance budgeting requires fixing of the responsibility of each executive in organisation and the continuous appraisal of his performance. It is, therefore, considered to be synonymous with responsibility accounting.

Performance Budgeting provide a meaningful relationship between estimated inputs and expected outputs as an integral part of the budgeting system. **A performance budget is one which presents the purposes and objectives for which funds are required,** the costs of the programmes proposed for achieving those objectives, and quantitative data measuring the accomplishments and work performed under each programme. Thus, PB is a technique of presenting budgets for costs and revenues in terms of functions. Programmes and activities are correlating the physical and financial aspect of the individual items comprising the budget.

Traditional Budgeting vs. Performance Budgeting:

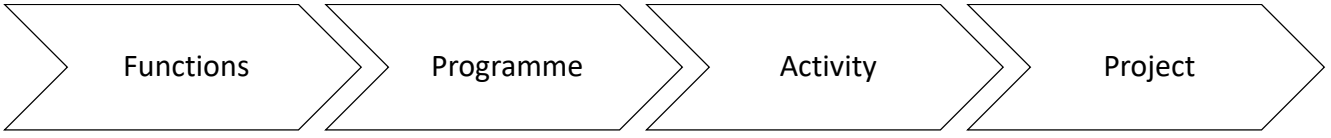
- The traditional budgeting gives more emphasis on the financial aspect than the physical aspects or performance. PB aims at establishing a relationship between the inputs and the outputs.
- Traditional budgets are generally prepared with the main basis towards the objects or items of expenditure i.e., it highlights the items of expenditure, namely, salaries, stores and materials, rates, rents and taxes and so on. In the PB emphasis is more on the functions of the organisation, the programmes to discharge this function and the activities which will be involved in undertaking these programmes.

Steps in Performance Budgeting:

According to the Administrative Reforms Commission (ARC, the following steps are the basic ones in PB:

- Establishing a meaningful functional programme and activity classification of government operations.
- Bring the system of accounting and financial management in accordance with this classification.
- Evolving suitable norms, yardsticks, work units of performance and units costs, wherever possible under each programme and activity for their reporting and evaluation.

The Report of the ARC use the following terms in an integrated sequence:



The team 'function' is used in the sense of 'objective'. For achieving objectives 'programmes' will have to be evolved. In respect of time horizon, it is essentially a replacement of traditional annual fiscal budgeting by a more output-oriented, but still an annual, exercise.

For an enterprise that wants to adopt PB, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal; constraints;
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralised responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets.

Performance Reporting at various levels of management:

Report	**:**	A major part of the management accountant's job consists of preparing reports to provide information for purposes of control and planning. The important consideration in drawing up of reports and determining their scope are the following:
Significance	**:**	Are the facts in the reports reliable? Does it either called for action or demonstrate the effect of action? It is material enough.
Timeliness	**:**	How late can the information be and still be of use? What is the earliest moment at which it could be used if it were available? How frequently is it required?
Accuracy	**:**	How small should be an inaccuracy which does not alter the significance of the information?
Appropriateness	**:**	Is the recipient the right person to take any action that is needed? Is there any other information which is required to support the information to anyone else jointly interested?
Discrimination	**:**	Will anything be lost by omitting the item? Will any of the items gain from the omission? Is the responsibility for suppressing the item acceptable?
Presentation	**:**	Is the report clear and unbiased? Is the form of it is suitable to the subject? Is the form of it suitable to the recipient?

The following are certain types of reports which are to be prepared and submitted to management regularly at predetermined time interval:

1. **Top Management:** (Including Board of Directors and financial managers)

i. Balance Sheet
ii. Profit & Loss Statement
iii. Position of stocks
iv. Disposition of funds or working capital;
v. Capital expenditure and forward commitments together with progress of projects in hands;
vi. Cash-flow statements;
vii. Sales, production, and other appropriate statistics.

2. Sales Management:

i. Actual sales compared with budgeted sales to measure performance by:
- Products,
- Territories
- Individual salesmen, and
- Customer

ii. Standard profit and loss by product:
- For fixing selling prices, and
- To Concentrate on sales of most profitable products.

iii. Selling expenses in relation to budget and sales value analyzed by:
- Products,
- Territories
- Individual salesmen, and
- Customer

iv. Bad debts and accounts which are slow and difficult in collection.
v. Status reports on new or doubtful Customer

3. Production Management:

i. To Buyer: Price variations on purchases analysed by commodities.
ii. To Foreman:
- Operational efficiency for individual operators duly summarized as departmental average;
- Labour utilization report and causes of lost time and controllable time;
- Indirect shop expenses against the standard allowed; and
- Scrap report.

iii. To Works Managers:
- Departmental operating statement;
- General works operating statements (Expenses relating to all works expenses not directly allocable or controllable by departments);
- Plant utilization report;

- Department Scrap report; and
- Material usage report.

4. Special Reports:

These reports may be prepared at the request of general management or at the initiative of the management accountants. The necessity for them may, in some cases, arise on account of the need for more detailed information on matters of interest first revealed; by the routine, reports. These reports may range over a very wide area. Some of the matters in respect of which such reports may be required can be:

i. Taxation legislation and its effect on profits.

ii. Estimates of the earning capacity of a new project.

iii. Break-even analysis

iv. Replacement of capital equipment.

v. Special pricing analysis

vi. Make or buy certain components

vii. Statement of surplus available for payment of bonus under the Labour appellate tribunal formula.

BUDGET RATIO:

Ratio is a mathematical relationship between two or more related figures. Budget ratios provide information about the performance level, i.e., the extent of deviation of actual performance from the budgeted performance and whether the actual performance is favourable or unfavorable. If the ratio is 100% or more, the performance is considered as favourable and if ratio is less than 100% the performance is considered as unfavourable.

The following ratios are usually used by the management to measure development from budget.

Capacity Usage Ratio: This relationship between the budgeted number of working hours and the maximum possible number of working hours in a budget period.

Standard Capacity Employed Ratio: This ratio indicates the extent to which facilities were actually utilized during the budget period.

Level of Activity Ratio: This may be defined as the number of standard hours equivalent to work produced expressed as a percentage of the budget of standard hours

Efficiency Ratio: This ratio may be defined as standard hours equivalent of work produced expressed as a percentage of the actual hours spent in producing the work.

Calendar Ratio: This ratio may be defined as the relationship between the number of working days in a period and the number of working as in the relative budget period.

Budget Ratios:

(i) Efficiency Ratio = $\frac{\text{Standard Hours}}{\text{Actual Hours}} \times 100$

(ii) Activity Ratio = $\frac{\text{Standard Hours}}{\text{Budgeted Hours}} \times 100$

(iii) Calendar Ratio = $\frac{\text{Available working days}}{\text{Budgeted working days}} \times 100$

(iv) Standard Capacity Usage Ratio = $\frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$

(v) Actual Capacity Usage Ratio = $\frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}} \times 100$

(vi) Actual Usage of Budgeted Capacity Ratio = $\frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100$

QUESTIONS FOR CLASSROOM DISCUSSION

PROBLEM – 1

Prepare a quantitative production, material usage & purchases budget from the following data of a month.

Particulars	**Product A**	**Product B**
Budgeted sales quantity	15,000 units	17,500 units
Material consumption p.u:		
Material P (3 per kg)	2 kgs	4 kgs
Material Q (2 per kg)	$3^{1}/_{8}$ kgs	1 kgs

Stocks of products and materials are as under:

Particulars	**Product A**	**Product B**	**Material P**	**Material Q**
	(in units)	**(in units)**	**(in kgs)**	**(in kgs)**
Opening stock	750	875	12000	8000
Closing stock	1750	3375	?	?

The company wishes to operate a JIT material inventory system. As an initial procedure, it wishes to maintain a minimum stock of materials equivalent to 2 days consumption. There are 28 working days in a month.

PROBLEM – 2

The direct Labour hour requirement of three of the products, manufactured in a factory, each involving more than one Labour operation, are estimated as follows:

Direct Labour hour/unit (in minutes)

PRODUCT	**A**	**B**	**C**
Operation X	18	42	30
Operation Y	--	12	24
Operation Z	12	6	--

The factory work 8 hours per day, 6 days a week. The budget quarter is taken as 13 weeks, and during a quarter, lost hours due to leave and holidays and other causes is estimated to be 124 hours. The budgeted hourly rate for the workers manning the operation X, Y and Z are ₹ 2, ₹ 2.550 and ₹ 3 respectively. The budgeted sales of the products during the quarter are A – 9,000 units, B – 15,000 units and C – 12,000 units.

There is an opening stock of 5,000 units of B and 4,000 units of C and it is proposed to build up stock at the end of the budget quarter as A – 1,000 units and C – 2,000 units.

Prepare a manpower budget showing for each operation;

- Direct Labour hours
- Direct Labour cost and
- The number of operatives.

PROBLEM – 3

A single product company estimated its sales for the next year quarter wise as under:

Quarter	Sales (units)
I	30,000
II	37,500
III	41,250
IV	45,000

The opening stocks of finished goods are 10,000 units and the company experts to maintain the closing stocks of finished goods at 16,250 units at the end of the year. The production pattern in each quarter is based on 80% of the sales of the current quarter and 20% of the sales of the next quarter.

The opening stocks of raw materials at the beginning of the year are 10,000 kg. And the closing stock at the end of the year is required to be maintained at 5,000 kg. Each unit of finished output requires 2 kg. of raw materials.

The company proposes to purchases the entire annual, requirement of raw materials in the first three quarters in proportion and at the prices given below:

Quarter	Purchases of raw material	Price per kg
I	30%	₹ 2
II	50%	₹ 3
III	20%	₹ 4

The value of the opening stock of the raw material in the beginning of the year is ₹ 20,000.

You are required to present the following for the next year, quarter wise:

- Production budget (in units)
- Raw material consumption budget (in quantity)
- Raw material purchases budget (in quantity and value)
- Priced stores ledger card of the raw materials using the First in First out method.

PROBLEM – 4

Concorde Ltd. manufactures two products using two types of materials and one grade of Labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product- A	**Product- B**
Budgeted sales (in units)	2,400	3,600
Budgeted material consumption per unit (in kg):		
Material-X	5	3
Material-Y	4	6
Standard Labour hours allowed per unit of product	3	5

Material-X and Material-Y cost ₹ 4 and ₹ 6 per kg and Labours are paid ₹ 25 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 180 direct worker.

The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition the non-productive down-time is budgeted at 20% of the productive hours worked.

There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product-A	400 units
Product-B	200 units
Material-X	1,000 kg.
Material-Y	500 kg.

The anticipated closing stocks for budget period are as below:

Product-A	4 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	6 days consumption

Required:

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

PROBLEM – 5

A company is engaged in the manufacture of specialized sub-assemblies required for certain electronic equipments. The company envisages that in the forthcoming month, December, 20x1, the sales will take a pattern in the ratio of 3:4:2 respectively of sub-assemblies, ACB, MCB and DP.

The following is the schedule of components required for manufacture:

			Component requirements		
Sub-assembly	**Selling price**	**Base Board**	**IC 08**	**IC 12**	**IC 26**
ACB	520	1	8	4	2
MCB	500	1	2	10	6
DP	350	1	2	4	8
Purchase price		₹ 60	₹ 20	₹ 12	₹ 8

The direct Labour time and variable overheads required for each of the assemblies are:

	Labour hours per Sub-assembly		
	Grade A	**Grade B**	**Variable overheads per Sub-assembly (₹)**
ACB	8	16	₹ 36
MCB	6	12	₹ 24
DP	4	8	₹ 24
Direct wages rate per hour	₹ 5	₹ 4	-

The Labourers work 8 hours a day 25 day a month. The opening stocks of Sub-assemblies and components for December, 20x1 are as under:

Sub-assemblies		**Components**	
ACB	800	Based Board	1,600
MCB	1,200	IC 08	1,200
DP	2,800	IC 12	6,000
		IC 26	4,000

Fixed overheads amount to ₹ 7,57,200 for the month and a monthly profit target of ₹ 12 lakhs has been set.

The company is eager for a reduction of closing inventories for December, 20x1 of Sub-assemblies and components by 10% of quantity as compared to the opening stocks prepared the following budget for December 20x1:

i. Sales budget in quantity and value

ii. Production budget in quantity

iii. Component usage budget in quantity

iv. Component purchases budget in quantity and value

v. Manpower budget showing the number of workers and the amount of wages payable.

PROBLEM – 6

K Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 20x2-20x3.

The following information are made available for this purpose:

i. It expects to sell 1,50,000 bags of 'X' during the second quarter of 20x2- 20x3 at the selling price of ₹ 1,200 per bag.

ii. Each bag of 'X' requires 2.5 mtr. of raw – material 'Y' and 7.5 mtr. of raw – material 'Z'.

iii. Stock levels are planned as follows:

iv.

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	45,000	33,000
Raw – Material 'Y' (mtr)	96,000	78,000
Raw – Material 'Z' (mtr)	1,71,000	1,41,000
Empty Bag (Nos.)	1,11,000	84,000

i. Y' cost ₹160 per mtr., 'Z' costs ₹30 per mtr. and 'Empty Bag' costs ₹110 each.

ii. It requires 9 minutes of direct Labour to produce and fill one bag of 'X'. Labour cost is ₹ 70 per hour.

iii. Variable manufacturing costs are ₹ 60 per bag. Fixed manufacturing costs ₹ 40,00,000 per quarter.

iv. Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are ₹ 3,75,000 per quarter.

Required

i. PREPARE a production budget for the said quarter in quantity.

ii. PREPARE a raw – material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.

iii. COMPUTE the budgeted variable cost to produce one bag of 'X'.

PROBLEM – 7

B Ltd. Manufactures two products viz. X and Y and sells them through two divisions, East and West. For the purpose of sales budget to the Budget Committee, the following information has been made available for the year 20x1:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	800 units at ₹ 18	1,200 units at ₹ 18	1,000 units at ₹ 18	1,400 units at ₹ 18
Y	600 units at ₹ 42	1,000 units at ₹ 42	400 units at ₹ 42	800 units at ₹ 42

Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ₹ 2, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ₹ 2 it will have more demand in the market. The company management has agreed to the aforesaid price changes. On the basis of these price changes and the reports of salesmen, the following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over the budgeted sales

Product	East Division	West Division
X	+12.50%	+7.50%
Y	+22.50%	+12.50%

With the help of an intensive advertisement campaign, following additional sales (over and above the above mentioned estimated sales by Divisional Managers) are possible:

Product	East Division	West Division
X	120 units	140 units
Y	80 units	100 units

You are required to PREPARE Sales Budget for 20x2 after incorporating the above estimates and also show the Budgeted Sales and Actual Sales of 20x1.

PROBLEM – 8

Float glass Manufacturing Company requires you to PREPARE the Master budget for the next year from the following information:

Sales:	
Toughened Glass	₹ 6,00,000
Bent Glass	₹ 2,00,000
Direct material cost	60% of sales
Direct wages	20 workers @ ₹ 150 per month
Factory overheads:	
Indirect Labour	–

Works manager	₹ 500 per month
Foreman	₹ 400 per month
Stores and spares	2.5% on sales
Depreciation on machinery	₹ 12,600
Light and power	₹ 3,000
Repairs and maintenance	₹ 8,000
Others sundries	10% on direct wages
Administration, selling and distribution expenses	₹ 36,000 per year

PROBLEM – 9

ABC Ltd. is currently operating at 75% of its capacity. In the past two years, the levels of operations were 55% and 65% respectively. Presently, the production is 75,000 units. The company is planning for 85% capacity level during 20X2-20X3. The cost details are as follows:

	55% **₹**	**65%** **₹**	**75%** **₹**
Direct Materials	11,00,000	13,00,000	15,00,000
Direct Labour	5,50,000	6,50,000	7,50,000
Factory Overheads	3,10,000	3,30,000	3,50,000
Selling Overheads	3,20,000	3,60,000	4,00,000
Administrative Overheads	1,60,000	1,60,000	1,60,000
	24,40,000	**28,00,000**	**31,60,000**

Profit is estimated @ 20% on sales.

The following increases in costs are expected during the year:

	In %
Direct Materials	8
Direct Labour	5
Variable Factory Overheads	5
Variable Selling Overheads	8
Fixed Factory Overheads	10
Fixed Selling Overheads	15
Administrative Overheads	10

PREPARE flexible budget for the period 20x2-20x3 at 85% level of capacity. Also ascertain profit and contribution.

PROBLEM – 10

A factory which expects to operate 7,000 hours, i.e., at 70% level of activity, furnishes details of expenses as under:

Variable expenses	₹1260
Semi-variable expenses	₹1200
Fixed expenses	₹1800

The semi-variable expenses go up by 10% between 85% and 95% activity and by 20% above 95% activity. PREPARE a flexible budget for 80, 90 and 100 per cent activities.

PROBLEM – 11

During the FY 2021-22, P Limited has produced 60,000 units operating at 50% capacity level. The cost structure at the 50% level of activity is as under:

	₹
Direct Material	300 per unit
Direct Wages	100 per unit
Variable Overheads	100 per unit
Direct Expenses	60 per unit
Factory Expenses (25% fixed)	80 per unit
Selling and Distribution Exp. (80% variable)	40 per unit
Office and Administrative Exp. (100% fixed)	20 per unit

The company anticipates that in FY 20x2-20x3, the variable costs will go up by 20% and fixed costs will go up by 15%.

The selling price per unit will increase by 10% to ₹ 880

Required:

i. CALCULATE the budgeted profit/ loss for the FY 2021-22.

ii. PREPARE an Expense budget on marginal cost basis for the FY 20x2-20x3 for the company at 50% and 60% level of activity and FIND OUT the profits at respective levels.

PROBLEM – 12

The accountant of manufacturing company provides you the following details for year 20x1-20X2:

	₹		₹
Direct materials	1,75,000	Other variable costs	80,000
Direct Wages	1,00,000	Other fixed costs	80,000
Fixed factory overheads	1,00,000	Profit	1,15,000
Variable factory overheads	1,00,000	Sales	7,50,000

During the year, the company manufactured two products A and B and the output and costs were:

	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹ 2.00	₹ 3.50
Direct materials per unit	₹ 0.50	₹ 0.75
Direct wages per unit	₹ 0.25	₹ 0.50

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹ 0.25 per unit; and B ₹ 0.30 per unit.

During 20X2-20X3, it is expected that the demand for product A will fall by 25 % and for B by 50%. It is decided to manufacture a further product C, the cost for which is estimated as follows:

	Product C
Output (units)	2,00,000
Selling price per unit	₹ 1.75
Direct materials per unit	₹ 0.40
Direct wages per unit	₹ 0.25

It is anticipated that the other variable costs per unit will be the same as for product A.

PREPARE a budget to present to the management, showing the current position and the position for 20X2-20X3. Comment on the comparative results.

PROBLEM – 13

TQM Ltd. has furnished the following information for the month ending 30th June:

	Master Budget	Actual	Variance
Units produced and sold	80,000	72,000	
Sales (₹)	3,20,000	2,80,000	40,000 a.
Direct material (₹)	80,000	73,600	6,400 (F)
Direct wages (₹)	1,20,000	1,04,800	15,200 (F)
Variable overheads (₹)	40,000	37,600	2,400 (F)
Fixed overhead (₹)	40,000	39,200	800 (F)
Total Cost	**2,80,000**	**2,55,200**	

The Standard costs of the products are as follows:

	Per unit ₹
Direct materials (1 kg. at the rate of ₹1 per kg.)	1.00
Direct wages (1 hour at the rate of ₹ 1.50)	1.50
Variable overheads (1 hour at the rate of ₹ 0.50)	0.50

Actual results for the month showed that 78,400 kg. of material were used and 70,400 Labour hours were recorded.

Required:

i. PREPARE Flexible budget for the month and compare with actual results.

ii. CALCULATE Material, Labour, Sales Price, Variable Overhead and Fixed Overhead Expenditure variances and Sales Volume (Profit) variance.

PROBLEM – 14

The following data is available for DKG and Co:

Standard working hours	8 hours per day of 5 days per week
Maximum capacity	50 employees
Actual working	40 employees
Actual hours expected to be worked per four week	6,400 hours
Standard hours expected to be earned per four weeks	8,000 hours
Actual hours worked in the four-week period	6,000 hours
Standard hours earned in the four-week period	7,000 hours

The related period is of 4 weeks. In this period there was a one special day holiday due to a national event.

CALCULATE the following ratios:

1. Efficiency Ratio

2. Activity Ratio

3. Calendar Ratio

4. Standard Capacity Usage Ratio

5. Actual Capacity Usage Ratio

6. Actual Usage of Budgeted Capacity Ratio

ADDITIONAL QUESTIONS FOR PRATICE

QFP 1 (Concept Similar to Problem – 4)

A department of Company X attains sale of ₹ 6,00,000 at 80 per cent of its normal capacity and its expenses are given below:

Administration costs:	₹
Office salaries	90,000
General expenses	2 per cent of sales
Depreciation	7,500
Rates and taxes	8,750
Selling costs:	
Salaries	8 per cent of sales
Travelling expenses	2 per cent of sales
Sales office expenses	1 per cent of sales
General expenses	1 per cent of sales
Distribution costs:	
Wages	15,000
Rent	1 per cent of sales
Other expenses	4 per cent of sales

PREPARE flexible administration, selling and distribution costs budget, operating at 90 per cent, 100 per cent and 110 per cent of normal capacity.

QFP 2 (Concept Similar to Problem – 4)

Jigyasa Ltd. is drawing a production plan for its two products Minimax (MM) and Heavyhigh (HH) for the year 20x2-20x3. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	**Heavyhigh (HH)**
Budgeted Production units	1,80,000	1,20,000
	(₹)	(₹)
Direct material cost per unit	220	280
Direct Labour cost per unit	130	120
Manufacturing overhead	4,00,000	5,00,000

The estimated units to be sold in the first four months of the year 20x2-20x3 are as under

	April	**May**	**June**	**July**
Minimax	8,000	10,000	12,000	16,000
Heavy high	6,000	8,000	9,000	14,000

PREPARE production budget for the first quarter in month-wise.

CHAPTER 15: SERVICE COSTING

INTRODUCTION

Service sector, being a fastest growing sector and having a significant contribution towards the GDP in India, is a very important sector where the role of the cost and management accounting is inevitable. The competitiveness of a service entity is very much dependent on a robust cost and management accounting system for competitive pricing and identification of value adding activities. Providers of services like transportation, hotels, financial services & banking, insurance, electricity generation, transmission and distribution etc. are very much cost conscious and thrive to provide services in a cost-effective manner. Irrespective of regulatory requirements to maintain cost records and get the records audited, service costing becomes integral and inseparable part of each service entity. In this chapter we will be discussing how costing is done in service sectors like Transportation, Toll roads, Electricity generation, transmission and distribution, Hospitals, Canteen & Restaurants, Hotels & Lodges, Educational institutes, Financial institutions, Insurance, Information Technology (IT) & Information Technology Enabled Services (ITES) etc.

Service costing is also known as operating costing.

Application of Service Costing

Internal:

The service costing is required for in-house services provided by a service cost centre to other responsibility centers as support services. Examples of support services are Canteen and hospital for staff, Boiler house for supplying steam to production departments, Captive Power generation unit, operation of fleet of vehicles for transport of raw material to factory or distribution of finished goods to the market outlets, IT department services used by other departments, research & development, quality assurance, laboratory etc.

External:

When services are offered to outside customers as a profit center inconsonance with organizational objectives as an output like goods or passenger transport service provided by a transporter, hospitality services provided by a hotel, provision of services by financial institutions, insurance and IT companies etc.

Service Costing vs Product Costing

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

i. **Tangibility:** Unlike products, services are intangible and cannot be stored, hence, there is no inventory for the services.
ii. **Cost units**: Use of Composite cost units for cost measurement and to express the volume of outputs.

iii. **Material vs Employee cost:** Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.

iv. **Traceability of costs:** Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

SERVICE COST UNIT AND KPI

To compute the Service cost, it is necessary to understand the unit for which the cost is to be computed. All the costs incurred during a period are collected and analyzed and then expressed in terms of a cost per unit of service.

One specific issue with service costing is the difficulty in defining a realistic cost unit that represents a suitable measure of the service provided. The cost unit to be applied needs to be defined carefully and frequently, a composite cost unit may be deemed more appropriate.

For example, Hotels may use the 'Occupied Room Days' as an appropriate unit for cost ascertainment and control.

Other typical cost unit that may be used include:

Service industry	Unit of cost (examples)
Transport Services	Passenger- km., (In public transportation) Quintal- km., or Tone-km. (In goods carriage)
Electricity Supply service	Kilowatt- hour (kWh)
Hospital	Patient per day, room per day or per bed, per opera-tion etc.
Canteen	Per item, per meal etc.
Cinema	Per ticket.
Hotels	Guest Days or Room Days
Bank or FinancialInstitutions	Per transaction, per services (e.g. per letter of credit,per application, per project etc.)
Educational Institutes	Per course, per student, per batch, per lecture etc.
IT & ITES	Cost per project, per module etc.
Insurance	Per policy, Per claim, Per TPA etc.

The costing should be comprehensive enough to show the effects like off-seasonand peak-season demand, full time, part time, etc.

Key Performance Indicator (KPI)

Key Performance Indicators (KPIs) are the quantitative and qualitative factors which are commonly used to assess the performance of an organization which are important to achieve its goal. Like calculation of cost for a cost unit, calculation of cost or revenue per KPI helps to the performance against industry standards. For example, in case of Telecom industry Average Return per User (ARPU) is a key indicator, shows average revenue generated from a user of its services. The listbelow shows few important KPIs for some Service Industries:

Industry	KPI	Meaning
Transportation	Number of Shipments,	This logistics metric monitors the number of orders that are shipped outof the warehouse.
	Truck Turnaround Rate(Truck Turning),	The time from when a delivery truck enters the warehouse to collect or deliver products to when it exits the facility.
	Lead Time (Order CycleTime)	The amount of time in between order placement by customer and receipt of order.
	On-Time and In-Full (OTIF)	The number of orders delivered according to the schedule and quantityspecified.
Hotel Industry	Cost per Occupied Room (CPOR)	The average cost per occupied room.
	Occupancy Rate	The ratio of rented or used rooms tothe total amount of available rooms.
	Revenue per available room (RevPAR)	The average revenue per availableroom days.
Hospitals/ Health careIndustry	Bed Occupancy Rate	The proportion of hospital beds in useat any one time.
	Staff-To-Patient Ratio	The number of staff resources present to attend to the patients in a hospital over a certain period of time.
	Average Treatment Charge	The average amount that a facilitycharges a patient for a treatment.
IT & ITES sector	Gross Burn Rate	The rate at which the company uses upits available cash to cover operating expenses.
	Customer Acquisition Cost (CAC)	The amount it takes to attract newcustomers.
	Customer Lifetime Value (CLV)	The typical net profit a companygenerates over the entire life cycle of asingle customer.

	Monthly Recurring Revenue (MRR)	The amount earned each month through subscription renewals, new sales, upsells, and fluctuations on a monthly basis.
	Churn Rate	The percentage of customers thatcancel their recurring subscriptions over a given time period.
	Cost Per Feature	How much a specific feature costs yourbusiness, based on usage and cloud costs.
Telecom	Average return per user(ARPU)	How much money a company ismaking for each person using its service.
	Subscriber acquisition cost (SAC)	Costs involved with gaining newsubscribers.
	Network Operating Cost	Expenditure incurred on continualupkeep to telecom's network.
	Gross Revenue Retention (GRR)	How well a company is retaining its customers based on factors such assales price increases, organic customergrowth, and more.
EducationSector	Instructional Costs	The cost of part-time and full-timefaculty members
	Administrative Costs PerStudent.	How much an institution is spending on administrative services on a per-student basis.
	Tuition Costs	Costs accrued by students on asemester or annual basis.
	Student-to-Faculty Ratio	The number of students per facultymember, on a campus-wide basis or bydepartment.
Insurance Sector	Average Cost Per Claim	The average cost of each claim made.
	Components of ClaimCosts (CCC)	Costs which are associated with a claimlike legal fees, time to settle, administration costs, and report delays.
	Cost Per Quote	The costs that the company incurs in order to get a quote in front of a potential client.
	Administrative Costs PerPolicy	The cost of the policy administration tonumber of policies outstanding.
	Average Policy Size	The total amount of premium collectedby the number of policies issued for a given time period.

Methods for ascertaining Service Cost Unit

Composite Cost Unit

Sometime two measurement units are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometer.

Examples of Composite units are Tonne- km., Quintal- km, Passenger-km., Patient- day etc.

Composite unit may be computed in two ways.

i. Absolute (Weighted Average) basis.

ii. Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

Weighted Average or Absolute basis – It is a summation of the productsof qualitative and quantitative factors. For example, to calculate absolute Tonne-Km for a goods transport is calculated as follows.:

$$\sum(\text{Weight Carried} \times \text{Distance})1 + (\text{Weight Carried} \times \text{Distance})2 + \ldots + (\text{Weight Carried} \times \text{Distance})n$$

Similarly, in case of Cinema theatres, price for various classes of seats is fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second Class seat – to ensure proper cost per composite unit.

Simple Average or Commercial Basis – It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Tonne-Km is arrived at by multiplying total distance km., by averageload quantity.

$$\sum(\text{Distance} + \text{Distance} + + \text{Distance n}) \times \left(\frac{W_1 + W_2 + \ldots.. + W_n}{n} \right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

To understand the concept of absolute tonne-km., and commercial tonne-km., the following illustration may be referred.

STATEMENT OF COSTS FOR SERVICE SECTORS

For preparing a statement of cost or a cost sheet for service sector, costs are usually collected and accumulated for a specified period viz. A month, quarter or a year,etc.

The cost statement for services may be prepared either on the basis of functional classification as done for product costing or on the basis of variability. Cost sheet on the basis of variability is prepared classifying all the costs into three different heads:

1. Fixed costs or Standing charges
2. Variable costs or Operating expenses
3. Semi-variable costs or Maintenance expenses

Note: In the absence of information about semi-variable costs, the costs would be shown under fixed and variable heads only.

Treatment of Depreciation- Fixed or Variable?

If related to effluxion of time or calculated on time basis, will be treated as fixed. However, if the depreciation is calculated on the basis of activity level or usage, it will be treated as variable cost.

Treatment of Interest

Interest and finance charges shall be presented in the cost statement as a separate item of cost of sales. In general, interest is treated as fixed cost, unless otherwise given.

APPLICATIONS OF COSTING METHODS IN SERVICE COSTING

Costing techniques vis-a vis Service sector: So far in previous chapters we have learnt how to collect, accumulate and calculate cost for each cost elements like Material, Employee (Labour), Direct expenses and Overheads. We also learnt the various methods of costing like Job & Contract costing, Process & operation costing, Joint products & By products costing. Then again Cost Management techniques like Standard Costing, Budget and budgetary control Marginal costingare also equally applied in service sector.

In general, the service sectors are either Labour or capital intensive or both, that isthe reason the proportion of costs of cost elements differs from manufacturing sectors. A manufacturing sector may have higher material cost than the Labour, butin case of service sector the situation reverses.

The system and techniques for cost collection, accumulation and valuation is similar as that has been learnt in previous chapters for each cost elements. The overhead allocation, apportionment and absorption techniques are also very similar.

Method of costing vis-à-vis Service sector: The choice of method of costingdepends on nature of service provided. For example, Job costing method may be suitable for a business which is engaged in development of customized software, healthcare etc. Process costing may be suitable for utility business like power, water supplies etc., Joint products costing may be suitable for businesses which are providing bundled service like telecom, event management, educational institutesetc.

COSTING OF TRANSPORT SERVICES

Transport organizations can be divided into two categories viz. Goods transportand Passenger transport.

The cost unit for Goods transport organization is Tone– Kilometer – that meanscost of carrying one Tone of goods over a distance of one kilometer.

Cost unit for Passenger transport organization is Passenger– Kilometer – thatmeans cost of carrying one Passenger over a distance of one kilometer.

The costs are shown under the suggestive following heads:

i. **Standing Charges or Fixed costs:** These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following:
   - Insurance
   - License fees
   - Salary to Driver, Conductor, Cleaners, etc if paid on monthly basis
   - Garage costs, including garage rent
   - Depreciation (if related to efflux of time)
   - Taxes
   - Administration expenses, etc.

ii. **Variable costs or Running costs:** These costs are generally associated withthe distance travelled. These costs include the following:
   - Petrol and Diesel
   - Lubricant oils,
   - Wages to Driver, Conductor, Cleaners, etc. if it is related to operations
   - Depreciation (if related to activity)
   - Any other variable costs identified.

iii. **Semi-Variable Costs or Maintenance Costs:** These costs include thefollowing:
   - Repairs and maintenance
   - Tyres
   - Spares, etc.

COSTING OF HOTELS AND LODGES

Service costing is an effective tool in respect if hotel industry. Hotels are run on commercial basis. Hence it is necessary to compute the cost - to fix the price of various services provided by the hotel and to find out the profit or loss at the endof a particular period.

In this case, the costs associated with different services offered should be identified and cost per unit should be worked out. The cost unit may be Guest-day or Room Day. For calculation of cost per Guest Day or Room Day, estimated occupancy rate – at different point of time, for example Peak season or lien season, are taken into account.

COSTING OF HOSPITALS

A Hospital is providing various types of medical services to the patients. Hospitalcosting is applied to decide the cost of these services. A hospital may have different departments catering to varied services to thepatients – such as

- Out Patient
- In Patient
- Medical services like X-Ray, Scanning, etc.
- General services like Catering, Laundry, Power house, etc.
- Miscellaneous services like Transport, Dispensary, etc.

Unit of Cost

Common unit of costs of various departments are as follows:

- Out Patient – Per Out-patient
- In Patient – Per Room Day
- Scanning – Per Case
- Laundry – Per 100 items laundered

Cost Segregation

The cost of hospital can be divided in to fixed costs and variable costs

Fixed costs are based on timelines and irrespective of services provided. Forexample, Staff salaries, Depreciation on Building and Equipment, etc.

Variable costs vary with the level of services rendered. For example, laundrycharges, Cost of food supplied to patients, Power, etc.

COSTING OF IT & ITES

Information Technology (IT) and Information Technology Enabled Services (ITES) organizations provide their customers with services or intangible products. These organizations are highly Labour intensive.

The services of IT and ITES organizations may be used for – provision of services to outside customers or provision of services internally (captive consumption)

In this sector employee (Labour) cost constitutes a significant portion of the total operating costs. The direct employee cost is traceable to services rendered.

In addition to employee cost, significant overhead costs for offering the servicesare incurred and are classified as service overhead. To arrive at the cost incurredfor rendering the services, it is necessary to allocate / apportion such overheads to cost units.

Concept of Project

In general – IT & ITES industries, the jobs undertaken are considered as Project. Each project is unique in nature and varies in size, functionality requirements, duration and staffing requirements. When a project is taken up, a detailed planning is done – by breaking down the project into number of activities and their dependencies. Based on the above, project scheduling are developed. Then the skill level requirement for carrying out each of the activities is identified and the duration of each and every activity would be ascertained. This process is known as effort estimation. Once the skill level and duration is identified, then required man-power is identified for carrying out the activities. Normally, project scheduling and effort estimation is carried out together. The costs of development are primarily the costs of the effort involved, so the effort computation is used in both the cost and the schedule estimate.

Effort Involved

Direct Manpower

In a typical software implementation project, three to four levels of man-power would be directly engaged, as mentioned below: -

- Software Engineers / Functional Consultants / Business Analysts
- Project Leaders
- Project Manager
- Program Manager, etc.

Depending on the nature and complexities of the projects being implemented, the number of persons engaged, their levels and duration of the engagement varies. For example, in a multi-continental, multi-time zone software implementation projects, in addition to the above manpower, Customer Account Manager, Portfolio Manager, etc. may be involved. The costs incurred on the above listed manpower are traceable with a project and hence forming part of direct costs of the project.

Support Manpower

In addition to the above persons, who are directly engaged in project, there could be support persons or indirect manpower, who are indirectly involved in the project. For example, Quality Assurance Team, Testing Team, Version Control team, Staffing Manager, etc. who are indirectly support the projects by providing required level of support services over the life of the projects. It is possible that the indirect manpower may be involved in more than one project, simultaneously. Their time spent, may or may not be traced on any particular project and will be used across multiple projects. If their time can be identified with a project, they will be treated as direct manpower. Accordingly, the cost incurred on them will be treated as direct cost. However, if their time is not traceable with a single project, then it may either be allocated or apportioned to various projects on some suitable basis.

Accordingly, the cost incurred on them will be treated as overhead and the same will be apportioned to various projects on some suitable basis. Effort Cost in these types of organizations are calculated on the basis of cost per Person Day or cost per Person week or cost per Person month. That means cost incurred for a person for rendering services per day or per week or per month. Depending on the requirement of the customer, the periodicity will be defined. For example, implementation of new software may require eight to twelve person months. In such a case, the cost will be calculated on Per Person month basis. On the other hand, implementation of one or two new functionality in already implemented (existing) software may require one- or two-week's efforts. In such a case, the cost will be calculated on per Person week basis.

Parameters in Computation of Total Cost

A. Hardware and software costs involved

- If they are identifiable with a project, then they are directly allocated to the project
- If they are not directly identifiable with a project or not fully allocable to a project, then they are treated as service overhead

B. Travel and training costs

- If they are incurred for a project, then they are directly allocated to the project
- If they are not directly identifiable with a project or allocable over a number of projects, then they are treated as service overhead. For example, Java (software language) training provided to the software engineers, may useful in multiple Java based projects. Hence treated as overhead costs

C. Effort costs

- Effort costs are basically identified with a project. They can be classified as direct cost, unless otherwise specified.
- Effort costs are not just the salaries of the software engineers or programmers who are involved in the project. Organizations compute effort costs in terms of overhead costs where they take the total cost of running the organization and divide this by the number of productive staff.

Therefore, the following costs are all part of the total effort cost:

1. Costs of providing, heating and lighting office space
2. Costs of support staff such as accountants, administrators, system managers, cleaners and technicians
3. Costs of networking and communications
4. Costs of central facilities such as a library or recreational facilities
5. Costs of Social Security and employee benefits such as pensions and health insurance, etc.

In short, effort cost includes Salary of the staff concerned and part of common overhead.

COSTING OF TOLL ROADS

The Construction of roads brings about a variety of benefits that are enjoyed practically by all sectors of the economy. Highway economic analysis is a technique whereby the cost and benefit from a scheme are quantified over a selected time horizon and evaluated by a common yardstick.

The economic analysis involves comparison of project costs and benefits under the "with" and "without" project conditions. The project is further subjected to sensitivity analysis by assessing the effects of adverse changes in the key variables. In addition, the combined effect of these changes is also assessed. This helps to gauge the economic strength of the project to withstand future risks and uncertainties.

Cost Involved

The project cost consists of following two main components:

Capital Costs

The capital cost consists of cost incurred during the construction period. Generally, this sort of road construction projects run across multiple financial years. The total expenditure to be incurred during the construction period is termed as capital cost. The total cost includes the cost of construction of road and other structures and consultancy charges. In addition to this cost, it also includes the cost of construction of tollbooths.

Construction expenses can be broadly classified as follows:

- Preliminary and pre-operative expenses
- Land Acquisition
- Materials
- Labour
- Overheads incurred in the course of actual construction
- Contingency allowance
- Interest during construction period

Operating and Maintenance Costs

Routine maintenance cost would be incurred once the Toll road is operational. Routine maintenance involves Patching of potholes, sealing of cracks, Edge Repair, Surface Renewal, Periodic maintenance for new highways would be met with in accordance with the analysis of the life cycle model carried out for the project.

Annual operating cost includes the cost of operating tollbooths, administrative expenses, emergency services, communications and security services and other costs of operation.

Maintenance cost includes the cost of annual maintenance (routine) and periodic maintenance.

- Annual maintenance cost includes primary maintenance of wearing surface, railings, roadside furniture, etc.
- Periodic maintenance cost includes the cost of overlays (wearing coats), painting of railings, etc.

Operating and Maintenance expenses can be broadly classified as follows:

- Toll collection expenses
- Administrative expenses for day-to-day operation.
- Maintenance expenses, which include routing and periodic maintenance.
- Interest expenses incurred for servicing term loans.

Build-Operate-Transfer (BOT) Approach

In recent years a growing trend emerged among Governments in many countries to solicit investments for public projects from the private sector under BOT scheme. BOT is an option for the Government to outsource public projects to the private sector.

With BOT, the private sector designs, finances, constructs and operate the facility and eventually, after specified concession period, the ownership is transferred to the Government. Therefore, BOT can be seen as a developing technique for infrastructure projects by making them amenable to private sector participation.

The fundamental principle in determining user levy is, 'if the price for a transport facility is set at a level that reflects the benefit, each user gains from improvements in the facility, it will result in traffic flow levels that equate social costs with user benefits.'

Toll Rate

In general, the toll rate should have a direct relation with the benefits that the road users would gain from its improvements. The benefits to road users are likely to be in terms of fuel savings, improvement in travel time and good riding quality.

To compute the toll rate following formula with rounding off to nearest multiple of five has been adopted:

User Fee = Total Distance × Toll Rate per km

COSTING OF EDUCATIONAL INSTITUTIONS

Educational institutions like schools, colleges, technical institutes for education and training, are run to impart education and training to students. The objective of running these institutions may be 'Not-for profit' or 'For profit'. Like other business entities, cost and management accounting is also inevitable for this sector. The Government, Local body of any other organization which provides education and training to students with an objective to benefit and upliftment of the society, are also need cost and management accounting system for cost-social benefit analysis, allocation of funds and budgeting (zero-based budgeting), performance measurement and evaluation etc.

Income of the Educational Institutions:

The source of income of an institute may be classified on the basis of recurrence as follows:

One-time fees: These are the fees which are collected once in a course period or for a definite period like Admission fee, Development fee, Annual fee etc.

Recurring fees: Tuition fee, laboratory, computer and internet fee, library fee, training fee, amenities fee, sports fee, extracurricular activities fee etc.

The Government and other aided institutes may not be permitted to collect various fees like capitation fee and development fees etc. Further, unlike the trading and manufacturing organizations, these are not free to determine fees beyond a prescribed limit.

Other incomes: The indirect income like transport, hostel, mess and canteen for the students and staff are provided by the educational institutions normally on no profit no loss basis.

Expenditure of the Educational Institutions:

Operational Cost:

Following are the major operational costs incurred by an educational institution:

- The salary of the teaching and non-teaching staff
- Laboratory maintenance charges
- Computer maintenance and internet charges,
- Building maintenance,
- Repairs and maintenance of equipment,
- Administrative expenses,
- Finance charges etc.

Cost Centres and basis of cost allocation:

Cost centres in educational institutions are classified as follows:

- Primary or Direct cost centres (like Civil Engineering department, Mechanical Engineering department, etc.)
- Service cost centres (like Laboratory, Library, Sports, etc.)
- Student's Self-Supporting Services (like Transport, Hostel & Mess, etc.)
- Administration Cost centres (like Research & Improvement, Examination)

Costs incurred are allocated to the respective cost centres, if they are identifiable with a cost centre and apportioned to service and administration cost centres on suitable basis.

Research and Development Cost

Educational institutions undertake academic research on various fields of specializations. The costs of such research including personal costs, books etc. are to be collected through a cost centre approach. All costs incurred in that cost centre are collected and set off against the revenue generated from such research projects.

If any balance is left out as undistributed, then such balance costs can be collectively distributed to all other course cost centre as a separate cost element namely “Research costs”.

Cost of Publication of research and other materials

In an educational institution, there will be a separate department for conducting research publication related exercise. The cost incurred would be directly allocated to that department.

COSTING IN INSURANCE COMPANIES

Insurance or assurance industry operates in providing social security to the persons who subscribe for the policy. The Insurance companies are broadly classified as Life insurer and Non-Life Insurer (General Insurance providers). Life insurers provideassurance to the policy holders’ life for the insured value. The Non-life insurers are providing insurance to the policyholder for actual loss up to insured value for the policy.

The insurance companies are need to analyses it various insurance product for profitability.

The product offered by insurance companies may include:

i. Life Insurance policies- with or without maturity benefits

ii. General insurance- Health, Fire, Property, Travel Insurance etc.

iii. Others services- Re-insurance, Fund management- Pension, Gratuity andother etc.

Income of Insurance Companies

Income of insurance companies may include

i. Premium on policy (periodic or onetime)

ii. Commission on re-insurance

iii. Fund administration fee and return on investment of funds etc.

Expenditure of Insurance Companies

The Expenditure of an insurance company can be classified as direct and indirectto a policy or product.

Direct- Commission paid to agents, claim settlement, cost of valuation, premium for re-insurance, legal and other costs etc.

Indirect Cost- Actuarial fees, market and product development costs, administration cost, asset management cost etc.

Method of Costing in an Insurance Company

The cost object in an insurance company may be a product, a policy, a departmentor region, an agent etc.

Activity Based Costing in Insurance Companies

Activity based costing (ABC) is used for analysis of cost-benefit of a product (Direct Product Profitability), policy profitability (Customer Profitability Analysis) etc.

Costs that occur in insurance companies are to be identified with appropriate activities that have caused its occurrence. Then costs must be reassigned from activities to cost objects (insurance contracts and policies, customers, delivery channels) based on identified cost drivers.

Identification of activities and assignment of costs are the most critical for theimplementation of activity-based costing. The activities can be divided into two parts i.e. (i) Pre-product development activities and (ii) Post product development activities.

i. **Pre-product development activities:** These are the activities which are carried out before a product is made. It includes market research, product development like specification of coverage, conditions, amount of premium, insurance contract, policy forms and provision for sales channel etc.
ii. **Post product development activities:** This activity is further divided into parts i.e. a. Selling of policy and b. Processing of claims. a. Selling of policy refers to appointment of distribution of sales channel (direct selling or through agencies), soliciting for policy, processing of applications etc. b. Processing of claim includes claim inception, claim estimation, claim settlement and legal actions.

The activities costs are assigned to the products on the basis of appropriate cost drivers. The cost drivers may include no. of hours spent on processing of an application and claim processing, no. of application, no. of policy, no. of claim etc.

COSTING IN FINANCIAL INSTITUTIONS

In the past two-decade financial institutions have undergone major changes – in terms to increased regulations, competition from new entrants from both locally and globally, innovation of new products and services, technological advancement and increased expectations of new generation customers, etc.

Over and above the challenges posed by the prevailing environment as described above, financial institutions underwent considerable changes in terms of its high quality, sensitive staffing requirements and its productivity.

Manpower cost, other than interest cost and finance charges, is one of the largest single cost components in financial institutions. Hence, it is needless to say, that financial institutions are more interested in understanding and discovering the ways to more accurately allocate such costs to various product ranges offered by them and its customers.

If the financial institution is to survive under the present challenging economicconditions, it will have to add value to its products and services. It is imperative to note that the financial institution needs to know the contribution of its products, services and customers to value creation.

Cost Measurement in Financial Institutions

The objectives of cost measurement include –

- Understand the profitability by products offered and by customers
- Establishing a mechanism for pricing the products, by identifying the productlevel and activity level unit costs
- Understanding productivity issues and their relationship with strategic goalsof the organization

In nutshell, financial institutions need to understand their position in various product lines and to find out how they can stay in competing edge or becomes a leader.

Activity Based Costing in Financial Institutions

Activity based costing can be a useful tool in allocating the cost elements to various products offered and the customers being serviced.

Activity based costing can help financial institutions to –

- Identify and analyze the profitability by product
- Analyze the profitability by customer
- Identify the activity level unit costs and build up product level costs, which inturn forms basis for product level pricing / customer level pricing

Financial institutions can improve their profitability by –

- Concentrating on products that are more profitable
- Focus on high margin customers

Costs that occur in financial institutions are to be identified with appropriate activities that have caused its occurrence. Then costs must be reassigned from activities to cost objects (various loan products offered by the organization, customers, etc.) based on identified cost drivers.

The concepts on activity-based costing as discussed under Costing of Insurance Companies also applicable to financial institutions. Please refer the same.

OTHER SERVICES- COSTING FOR POWER HOUSES

Power houses are engaged either in electricity generation or steam generation use the concepts of service costing i.e., 'Powerhouse Costing.' Service cost statement can be prepared by identifying the costs associated with the power generation or steam generation.

Cost unit is different for electricity generation and steam generation.

The cost unit for electricity generation organization is cost per kilowatt-hour (kWh) – that means cost of generating one kilowatt of power per hour. Please note thatkWh is commonly known as a "Unit".

The costs are shown under the following heads:

i. **Standing Charges or Fixed costs:** These are the fixed costs that remain constant irrespective of the power or stream generated. These costs includethe following:
   - Rent, Rates & Taxes
   - Insurance
   - Depreciation
   - Salaries, if paid on Time (Monthly) basis
   - Administration expenses, etc.

ii. **Variable costs or Running costs:** These costs are generally associated withthe power or stream generated. These costs include the following:
   - Fuel Charges
   - Water Charges
   - Wages / Labour charges, if paid on the basis of production
   - Any other variable costs identified.

iii. **Semi-variable costs or Maintenance costs:** These costs include thefollowing:
   - Meters
   - Furnaces
   - Service materials
   - Tools, etc.

QUESTIONS FOR CLASSROOMDISCUSSION

PROBLEM – 1

A Lorry starts with a load of 20 MT of Goods from Station A. It unloads 8 MT in Station B and balance goods in Station C. On return trip, it reaches Station A with a load of 16 MT, loaded at Station C. The distance between A to B, B to C and C to A are 80 Kms, 120 Kms and 160 Kms, respectively. COMPUTE "Absolute MT Kilometer" and "Commercial MT-Kilometer".

(MT Metric Ton or Ton)

PROBLEM – 2

ABC Transport Company has given a route 40 kilometers long to run bus

1. The bus costs the company a sum of ₹ 10,00,000
2. It has been insured at 3% p.a. and
3. The annual tax will amount to ₹ 20,000
4. Garage rent is ₹ 20,000 per month.
5. Annual repairs will be ₹ 2,04,000
6. The bus is likely to last for 2.5 years
7. The driver's salary will be ₹ 30,000 per month and the conductor's salary will be ₹ 25,000 per month in addition to 10% of takings as commission [To be shared by the driver and conductor equally.
8. Cost of stationery will be ₹ 21,000 per month.
9. Manager-cum-accountant's salary is ₹ 17,000 per month.
10. Petrol and oil will be ₹ 500 per 100 kilometers.
11. The bus will make 3 up and down trips carrying on an average 40 passengers on each trip.
12. 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.

PROBLEM – 3

SMC is a public school having five buses each plying in different directions for the transport of its school students. In view of a larger number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning the first trip picks up senior students and the second trip plying an hour later picks up the junior students. Similarly, in the afternoon the first trip takes the junior students and an hour later the second trip takes the senior students' home.

The distance travelled by each bus one way is 8 km. The school works 25 days in a month and remains closed for vacation in May, June and December. The bus fee, however, is payable by the students for all 12 months in a year. The details of expenses for a year are as under.

Driver's salary	₹ 4,500 per month per driver
Cleaner's salary (Salary payable for all 12 months) (one cleaner employed for all the five buses)	₹ 3,500 per month
License fee, taxes, etc.	₹ 8,600 per bus per annum
Insurance	₹ 10,000 per bus per annum
Repairs & maintenance	₹ 35,000 per bus per annum
Purchase price of the bus	₹ 15,00,000 each
Life of each bus	12 years
Scrap value of buses at the end of life	₹ 3,00,000
Diesel cost	₹ 45.00 per liter

Each bus gives an average mileage of 4 km per liter of diesel

The seating capacity of each bus is 50 students.

The seating capacity is fully occupied during the whole year.

Students picked up and dropped within a range up to 4 km. of distance from the school are charged half fare and fifty per cent of the students travelling in each trip are in this category. Ignore interest.

Since the charges are to be based on average cost you are required to:

1. PREPARE a statement showing the expenses of operating a single bus and the fleet of five buses for a year.
2. WORK OUT the average cost per student per month in respect of -
   a. students coming from a distance of up to 4 km. from the school and
   b. students coming from a distance beyond 4 km. from the school

PROBLEM – 4

GTC has a lorry of 6-ton carrying capacity. It operates a lorry service from city A to city B. It charges ₹ 2,400 per ton from city 'A' to city B and ₹ 2,200 per ton for the return journey from city 'B' to city 'A Goods are also delivered to an intermediate city 'C' but no concession or reduction in rates is given. Distance between the city A to B is 300 km and the distance from city 'A' to 'C' is 140 km.

In January 20x1, the truck made 12 outward journeys for city B. The details of journeys are as follows:

Outward journey	No. of journeys	Load (in ton)
A to B	10	6
A to C	2	6
C to B	2	4

Return journey	No. of journeys	Load (in ton)
B to A	5	8
B to A	6	6
B to C	1	6
C to A	1	0

Annual fixed costs and maintenance charges are ₹ 6,00,000 and ₹ 1,20,000 respectively. Running charges spent during January 20x1 are ₹ 2,94,400 (includes ₹ 12,400 paid as a penalty for overloading)

You are required to:

1. CALCULATE the cost as per a. Commercial ton-kilometre. b. Absolute ton kilometre

2. CALCULATE Net Profit/ Loss for the month of January, 20x1

PROBLEM – 5

A chemical factory runs its boiler on furnace oil obtained from Indian Oil and Bharat Petroleum, whose depots are situated at a distance of 12 km and 8 km from the factory site. Transportation of furnace oil is made by the company's own tank Lorries of 5-tonne capacity each. Onward trips are made only on full load and the Lorries return empty. The filling-in time takes an average of 40 minutes for Indian Oil and 30 minutes for Bharat Petroleum. But the emptying time in the factory is only 40 minutes for all. From the records available, it is seen that the average speed of the company's Lorries works out to 24 km per hour. The varying operating charges average 60 paise per km covered and fixed charges give an incidence of ₹ 7.50 per hour operation.

Calculate the cost per tonne-mile from each source.

PROBLEM – 6

A company is considering three alternative proposals for conveyance facilities for its sales personnel who has to do considerable travelling, approximately 20,000 kilometers every year. The proposals are as follows:

i. Purchase and maintain its own fleet of cars. The average cost of a car is ₹ 6,00,000.

ii. Allow the Executive to use his own car and reimburse expenses at the rate of 10 per kilometer and also bear insurance costs.

iii. Hire cars from an agency at ₹ 1,80,000 per year per car. The company will have to bear the costs of petrol, taxes and tyres.

The following further details are available:

Petrol ₹ 6 per km.	Repairs and maintenance 0.20 per km.
Tyre ₹ 0.12 per km.	Insurance ₹ 1,200 per car per annum
Taxes ₹ 800 per car per annum	Life of the car: 5 years with an annual mileage of 20,000 km.

Resale value: ₹ 80,000 at the end of the fifth year.

WORK OUT the relative costs of three proposals and rank them.

PROBLEM – 7

Mr. X owns a bus which runs according to the following schedule:

i.	Delhi to Chandigarh and back, the same day.	
	Distance covered:	250 km. one way.
	Number of days run each month:	8
	Seating capacity occupied	90%.
ii.	Delhi to Agra and back, the same day.	
	Distance covered:	210 km. one way
	Number of days run each month:	10
	Seating capacity occupied	85%
iii.	Delhi to Jaipur and back, the same day.	
	Distance covered:	270 km. one way
	Number of days run each month:	6
	Seating capacity occupied	100%
iv.	Following are the other details:	
	Cost of the bus	Rs. 12,00,000
	Salary of the Driver	Rs. 24,000 p.m.
	Salary of the Conductor	Rs. 21,000 p.m.
	Salary of the part-time Accountant	Rs. 5,000 p.m.
	Insurance of the bus	Rs. 4,800 p.a.
	Diesel consumption 4 km. per litre at	Rs. 56 per litre
	Road tax	Rs. 15,915 p.a.
	Lubricant oil	Rs. 10 per 100 km.
	Permit fee	Rs. 315 p.m.
	Repairs and maintenance	Rs. 1,000 p.m.
	Depreciation of the bus	@ 20% p.a.
	Seating capacity of the bus	50 persons.

Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings.

The fares are to be indicated per passenger for the journeys:

i. Delhi to Chandigarh **ii.** Delhi to Agra and **iii.** Delhi to Jaipur.

PROBLEM – 8

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹ 10,000 per month along with 5% of the total taking. It has three types of suites for its customers, viz, single room, double rooms and triple rooms.

The following information is given:

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of a double room's suite is to be fixed at 2.5 times of the single room suite and that of triple room's suite as twice of the double room's suite.

The other expenses for the year 20x1 are as follows:

Staff salaries	₹ 14,25,000
Room attendants' wages	₹ 4,50,000
Lighting, heating and power	₹ 2,15,000
Repairs and renovation	₹ 1,23,500
Laundry charges	₹ 80,500
Interior decoration	₹ 74,000
Sundries	₹ 1,53,000

Provide profit 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite

PROBLEM – 9

A lodging home is being run in a small hill station with 100 single rooms. The home offers concessional rates during six off-season months in a year when the number of visitors is limited. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent.

The following are the cost estimates and other details for the year ending on 31st March 20x1. (Assume a month to be of 30 days).

i. Occupancy during the season is 80% while in the off-season it is 40% only.

ii. Total investment in the home is 200 lakhs of which 80% relate to buildings and balance for furniture and equipment.

iii. Expenses:

Staff salary (Excluding room attendants):	₹ 5,50,000
Repairs to building	₹ 2,61,000
Laundry charges	₹ 80,000
Interior	₹ 1,75,000
Miscellaneous expenses	₹ 1,90,800

iv. Annual depreciation is to be provided for buildings @ 5% and on furniture and equipment @ 15% on a straight-line basis.

v. Room attendants are paid 10 per room day on the basis of occupancy of the rooms in a month.

vi. Monthly lighting charges are ₹ 120 per room, except in four months in winter when it is 30 per room.

You are required to WORK OUT the room rent chargeable per day both during the season and the off-season months on the basis of the foregoing information.

PROBLEM – 10

ABC Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, it required

Rent per month	₹ 75,000
Supervisors - 2 persons	₹ 25,000 Per month - each
Nurses - 4 persons	₹ 20,000 per month - each
Ward Boys - 4 persons	₹ 5,000 per month - each

Doctors paid ₹ 2,50,000 per month-paid on the basis of the number of patients attended and the time spent by them.

Other expenses for the year are as follows:

Repairs (Fixed)	₹ 81,000
Food to Patients (Variable)	₹ 8,80,000
Other services to patients (Variable)	₹ 3,00,000
Laundry charges (Variable)	₹ 6,00,000
Medicines (Variable)	₹ 7,50,000
Other fixed expenses	₹ 10,80,000
Administration expenses allocated	₹ 10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied.

The hospital hired 750 beds at a charge of 100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required

- CALCULATE profit per patient day, if the hospital recovers on an average ₹ 2,000 per day from each patient
- FIND OUT Breakeven point for the hospital.

PROBLEM – 11

Following are the data pertaining to InfoTech Pvt. Ltd. for the year 20x1-x2:

Particulars	Amount
Salary to Software Engineers (5 persons)	₹ 15,00,000
Salary to Project Leaders (2 persons)	₹ 9,00,000
Salary to Project Manager	₹ 6,00,000
Repairs & maintenance	₹ 3,00,000
Administration overheads	₹ 12,00,000

The company executes a Project XYZ, the details of the same as are as follows:

- Project duration - 6 months
- One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas the Project Manager spends 2 months of effort, during the execution of the project.
- Travel expenses incurred for the project - ₹ 1,87,500
- Two Laptops were purchased at a cost of ₹ 50,000 each, for use in the project and the life of the same is estimated to be 2 years. PREPARE Project cost sheet.

PROBLEM – 12

BHG Toll Plaza Ltd built a 60 km. long highway and now operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that a total of 12 crore vehicles (only single type of vehicle) will be using the highway during the 10 years toll collection tenure.

Toll Operating and Maintenance costs for the month of April 20x1 are as follows:

i. Salary to

Collection Personnel (3 Shifts and 4 persons per shift)	₹ 550 per day per person
Supervisor (2 Shifts and 1 person per shift)	₹ 750 per day per person
Security Personnel (3 Shifts and 6 persons per shift)	₹ 450 per day per person
Toll Booth Manager (2 Shifts and 1 person per shift)	₹ 900 per day per person

ii. Electricity - ₹ 8,00,000

iii. Telephone - ₹ 1,40,000

iv. Maintenance cost - ₹ 30 Lakh

Monthly depreciation and amortization expenses will be ₹ 1.5 crores. Further, the company needs 25% profit over the total cost to cover interest and other costs.

Required:

- CALCULATE cost per kilometer per month.
- CALCULATE the toll rate per vehicle.

PROBLEM – 13

SLS Infrastructure built and operates 110 km. highways on the basis of Built Operate-Transfer (BOT) for a period of 25 years. A traffic assessment carried out to estimate the traffic flow per day shows the following figures:

SL No.	Type of vehicle	Daily traffic volume
1	Two wheelers	44,500
2	Car and SUVS	3,450
3	Bus and LCV	1,800
4	Heavy commercial vehicles	816

The following is the estimated cost of the project

SL No.	Activities	Amount (In lakhs)
1	Site clearance	₹ 170.70
2	Land development and filling work	₹ 9,080.35
3	Sub base and base courses	₹ 10,260.70
4	Bituminous work	₹ 35,070.80
5	Bridge, flyovers, underpasses, pedestrian subway, footbridge	₹ 29,055.60
6	Drainage and protection work	₹ 9,040.50
7	Traffic sign, marking and road appurtenance	₹ 8,405.00
8	Maintenance, repairing and rehabilitation	₹ 12,429.60
9	Environmental management	₹ 982.00
	Total Project cost	₹ 1,14,495.25

An average cost of ₹ 1,120 lakh has to be incurred on administration and toll plaza operation.

On the basis of the vehicle specifications (i.e., weight, size, time-saving etc.), the following weights have been assigned to the passing vehicles:

Sl. No.	Type of vehicle	%
1	Two wheelers	5%
2	Car and SUVs	20%
3	Bus and LCV	30%
4	Heavy commercial vehicles	45%

Required:

i. CALCULATE the total project cost per day of the concession period.

ii. COMPUTE toll fee to be charged for, per vehicle of each type, if the company wants to earn a profit of 15% on the total cost.

[Note: Concession period is a period for which infrastructure is allowed to operate and recovers its investment]

PROBLEM – 14

AD Higher Secondary School (AHSS) offers courses for 11 & 12 standards in three streams i.e. Arts Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes, but for accounting purposes, it treats higher secondary as a separate responsibility center. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year.

Particulars	Amount
Teachers' salary (25 teachers x 35,000 x 12 months)	₹ 1,05,00,000
Principal's salary	₹ 14,40,000
lab attendants' salary (2 attendants x 15,000 x 12 months)	₹ 3,60,000
Salary to library staff	₹ 1,44,000
Salary to peons (4 peons x 10,000 x 12 months)	₹ 4,80,000
Salary to other staffs	₹ 4,80,000
Examinations expenditure	₹ 10,80,000
Office & Administration cost	₹ 15,20,000
Annual day expenses	₹ 4,50,000
Sports expenses	₹ 1,20,000

Other information:

i.

Particulars	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 Hrs	120 Hrs	240 Hrs	60 Hrs
Time spent by principal for administration	208 Hrs	312 Hrs	480 Hrs	1,400 Hrs
Teachers for 11 & 12 standard	4	5	6	10

iii. One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

iv. There is another teacher who teaches mathematics for science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year; it includes 160 classes for commerce students.

v. One peon is fully dedicated to the higher secondary section. Other peons dedicate their 15% time to the higher secondary section.

vi. All school students irrespective of section and age participate in annual functions and sports activities.

Required:

a. CALCULATE cost per student per annum for all three streams.

b. If the management decides to take a uniform fee of 1,000 per month from all higher secondary students, CALCULATE streamwise profitability.

c. If management decides to take 10% profit on cost. COMPUTE fee to be charged from the students of all three streams respectively,

PROBLEM – 15

Sanziet Life care Ltd. operates in the life insurance business. Last year it launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'.

The company has incurred the following expenditures during the last year for the policy.

Particulars	Amount
Policy development cost	₹ 11,25,000
Cost of marketing of the policy	₹ 45,20,000
Sales support expenses	₹ 11,45,000
Policy issuance cost	₹ 10,05,900
Policy servicing cost	₹ 35,20,700
Claims management cost	₹ 1,25,600
IT cost	₹ 74,32,000
Postage and logistics	₹ 10,25,000
Facilities cost	₹ 15,24,000
Employees cost	₹ 5,60,000
Office administration cost	₹ 16,20,400

Number of policies sold- 528

Total insured value of policies 1,320 crores.

Required:

i. CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely a. Marketing and Sales support. b. Operations, c. IT and d. Support functions.

ii. CALCULATE cost per policy.

iii. CALCULATE cost per rupee of insured value.

PROBLEM – 16

The loan department of a bank performs several functions in addition to the home loan application processing task. It is estimated that 25% of the overhead costs of the loan department are applicable to the processing of home-loan applications.

The following information is given concerning the processing of a loan application:

Particulars	Amount
Direct professional Labour: Loan processor monthly salary: (4 employees@ ₹ 60,000 each)	₹ 2,40,000
Loan department overhead costs (monthly):	
Chief loan officer's salary	₹ 75,000
Telephone expenses	₹ 7,500
Depreciation Building	₹ 28,000
Legal advice	₹ 24,000
Advertising	₹ 40,000
Miscellaneous	₹ 6,500
Total overhead costs	₹ 1,81,000

You are required to COMPUTE the cost of processing home loan applications on the assumption that five hundred home loan applications are processed each month.

PROBLEM – 17

PREPARE the cost statement of Ignus Thermal Power Station showing the cost of electricity generated per kWh, from the data provided below pertaining to the year 20x2-20x3.

Total units generated 20,00,000 kWh

	Amount ₹
Operating labour	30,00,000
Repairs & maintenance	10,00,000
Lubricants, spares and stores	8,00,000
Plant supervision	6,00,000
Administration overheads	40,00,000

5 kWh. of electricity generated per kg of coal consumed @ Rs. 4.25 per kg. Depreciation charges @ 5% on capital cost of ₹ 5,00,00,000.

PROBLEM – 18

Solar Power Ltd. has a power generation capacity of 1000 Megawatt per day. On an average it operates at 85% of its installed capacity. The cost structure of the plant is as under:

	Cost particulars	Amount (Rs. in Lakh)
1.	Employee cost per year	2500
2.	Solar panel maintenance cost per year	250
3.	Site maintenance cost per year	150
4.	Depreciation per year	5940

CALCULATE cost of generating 1kW of power.[1 Megawatt = 1,000 kW]

CHAPTER 16: COSTING THEORY

Basic Concepts

Q1. Why are cost and management accounting information are required by the staff at operational level? Describe. May'18

Answer

Operational level staffs - The operational level staffs like supervisors, foreman, team leaders are requiring information

i. to know the **objectives and performance goals** for them
ii. to know **product and service specifications** like volume, quality and process etc.
iii. to know the **performance parameters** against which their performance is measured and evaluated.
iv. to know **divisional (responsibility centre) profitability** etc.

Q2. Explain Opportunity Cost

Answer

This cost refers to the **value of sacrifice made or benefit of opportunity foregone** in accepting an alternative course of action. For example, a firm financing its expansion plan by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.

Q3. Discuss on Discretionary Cost Centre and Investment Centre. RTP May'18; RTP Nov 20

Answer

Discretionary Cost Centre: The cost centre whose output **cannot be measured in financial terms,** thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and corelated with cost incurred on inputs.

Investment Centres: These are the responsibility centres which are not only responsible for profitability but also **has the authority to make capital investment decisions.** The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.

Q4. Discuss the essential features of a good cost accounting system. RTP Nov'18; MTP Oct'19

Answer

The essential features, which a good cost and management accounting system should possess, are as follows:

i. **Informative and simple:** Cost and management accounting system should be tailor-made, practical, simple and capable of meeting the requirements of a business concern. The system of costing should not sacrifice the utility by introducing meticulous and unnecessary details.

ii. **Accurate and authentic:** The data to be used by the cost and management accounting system should be accurate and authenticated; otherwise, it may distort the output of the system and a wrong decision may be taken.

iii. **Uniformity and consistency:** There should be uniformity and consistency in classification, treatment and reporting of cost data and related information. This is required for benchmarking and comparability of the results of the system for both horizontal and vertical analysis.

iv. **Integrated and inclusive:** The cost and management accounting system should be integrated with other systems like financial accounting, taxation, statistics and operational research etc. to have a complete overview and clarity in results.

v. **Flexible and adaptive:** The cost and management accounting system should be flexible enough to make necessary amendments and modification in the system to incorporate changes in technological, reporting, regulatory and other requirements.

vi. **Trust on the system:** Management should have trust on the system and its output. For this, an active role of management is required for the development of such a system that reflects a strong conviction in using information for decision making.

Q5. Distinguish between Cost Control and Cost Reduction. RTP Nov'18; MTP Aug'18; RTP May'19; MTP April'19; May'19

Answer

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	**1.** Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to better them continuously
2. Cost control seeks to attain lowest possible cost under existing conditions.	**2.** Cost reduction recognises no condition as permanent, since a change will result in lower cost.

3. In case of cost control, emphasis is on past and present	**3.** In case of cost reduction, it is on present and future.
4. Cost control is a preventive function	**4.** Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	**5.** Cost reduction has no visible end.

Q6. Explain the difference between controllable & uncontrollable costs? RTP Nov'18; MTP Mar'19

Answer:

Controllable costs and Uncontrollable costs:

Cost that can be **controlled**, typically **by** a cost, profit or investment centre **manager** is called **controllable cost**. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre.

Costs which **cannot be influenced** by the action of a specified member of an undertaking are known as **uncontrollable costs**.

Q7. Differentiate between Cost Accounting and Management Accounting. RTP Nov'19; RTP May'20

Answer

		Cost Accounting	Management Accounting
i.	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
ii.	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
iii.	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
iv.	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
v.	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
vi.	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.

Q8. Discuss cost classification based on variability. MTP Mar'18

Answer

Cost classification based on variability

i. **Fixed Costs –** These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output.
   For example, rent, insurance of factory building etc., remain the same for different levels of production.
ii. **Variable Costs –** These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.
iii. **Semi-variable Costs –** These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

Q9. Discuss the four different methods of costing along with their applicability to concerned industry? MTP Mar'18

Answer:

Four different methods of costing along with their applicability to concerned industry have been discussed as below:

i. **Job Costing:** The objective under this method of costing is to ascertain the cost of each job order. A job card is prepared for each job to accumulate costs. The cost of the job is determined by adding all costs against the job it has incurred. This method of costing is used in printing press, foundries and general engineering workshops, advertising etc.
ii. **Batch Costing:** This system of costing is used where small components/ parts of the same kind are required to be manufactured in **large quantities**. Here batch of similar products is treated as a job and cost of such a job is ascertained as discussed under (1), above. If in a cycle manufacturing unit, rims are produced in batches of 2,500 units each, then the cost will be determined in relation to a batch of 2,500 units.
iii. **Contract Costing:** If a job is very big and takes a long time for its completion, then method used for costing is known as Contract Costing. Here the cost of each contract is ascertained separately. It is suitable for firms engaged in the construction of bridges, roads, buildings etc.
iv. **Operating Costing:** The method of Costing used in service rendering undertakings is known as operating costing. This method of costing is used in undertakings like transport, supply of water, telephone services, hospitals, nursing homes etc.

Q10. Discuss the prerequisite of installing cost accounting system. MTP Aug'18

Answer:

Before setting up a system of cost accounting the under mentioned factors should be studied:

i. **Objective:** The objective of costing system, for example whether it is being introduced for fixing prices or for insisting a system of cost control.

ii. **Nature of Business or Industry:** The Industry in which business is operating. Every business industry has its own peculiarity and objectives. According to its cost information requirement cost accounting methods are followed. For example, an oil refinery maintains process wise cost accounts to find out cost incurred on a particular process say in crude refinement process etc.

iii. **Organisational Hierarchy:** Costing system should fulfil the information requirements of different levels of management. Top management is concerned with the corporate strategy, strategic level management is concerned with marketing strategy, product diversification, product pricing etc. Operational level management needs the information on standard quantity to be consumed, report on idle time etc.

iv. **Knowing the product:** Nature of product determines the type of costing system to be implemented. The product which has **by-products** requires costing system which account for by-products as well. In case of **perishable or short self-life**, marginal costing method is required to know the contribution and minimum price at which it can be sold.

v. **Knowing the production process:** A good costing system can never be established without the complete knowledge of the production process. Cost apportionment can be done on the most appropriate and scientific basis if a cost accountant can **identify degree of effort or resources consumed in a particular process**. This also includes some basic technical know-how and process peculiarity.

vi. **Information synchronisation:** Establishment of a department or a system requires substantial amount of organisational resources. While drafting a costing system, information needs of **various other departments should be taken** into account. For example, in a typical business organisation accounts department needs to submit monthly stock statement to its lender bank, quantity wise stock details at the time of filing returns to tax authorities etc.

vii. **Method of maintenance of cost records:** The manner in which Cost and Financial accounts could be **inter-locked** into a single integral accounting system and how the results of separate sets of accounts i.e. cost and financial, could be **reconciled by** means of control accounts.

viii. **Statutory compliances and audit:** Records are to be maintained to comply with statutory **requirements** and applicable cost accounting standards to be followed.

ix. **Information Attributes:** Information generated from the Costing system should possess all the attributes of information i.e. complete, accurate, timeliness, relevant etc. to have an effective management information system (MIS).

Q11. State the limitations of cost and management accounting.

Answer

Like other branches of accounting, cost and management accounting is also having certain limitations. The **limitations** of cost and management accounting are as follows:

1. **Expensive:** It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work, and hence additional money.
2. **Requirement of Reconciliation:** The results shown by cost accounts differ from those shown by financial accounts. Thus, Preparation of reconciliation statements is necessary to verify their accuracy.
3. **Duplication of Work:** It involves duplication of work as organization has to maintain two sets of accounts i.e., Financial Account and Cost Account.
4. **Inefficiency:** Costing system itself does not control costs but its usage does.

Q12. Discuss the impact of Information Technology in Cost Accounting.

Answer:

The impact of IT in cost accounting may include the followings:

i. After the introduction of ERPs, different functional activities get integrated and as a consequence a single entry into the accounting system **provides custom made reports** for every purpose and saves an organisation from preparing different sets of documents. **Reconciliation** process of results of both cost and financial accounting systems **become simpler** and less sophisticated.

ii. A move towards **paperless** environment can be seen where documents like **Bill of Material**, **Material Requisition Note**, **Goods Received Note**, labour utilisation report etc. are no longer required to be prepared in multiple copies, the related department can get e-copy from the system.

iii. Information Technology with the help of internet (including intranet and extranet) helps in **resource procurement and mobilisation**. For example, production department can get materials from the **stores without issuing material requisition note** physically. Similarly, purchase orders can be initiated to the suppliers with the help of extranet. This enables an entity to shift towards Just-in-Time (JIT) approach of inventory management and production.

iv. Cost information for a cost centre or cost object is ascertained with **accuracy** in **timely** manner. Each cost centre and cost object is **codified** and all related costs are **assigned** to the cost object or cost centre. This process **automates the cost accumulation and ascertainment process**. The cost information can be customised as per the requirement. For example, when an entity manufacture or provide services, it can know information job-wise, batch-wise, process-wise, cost centre wise etc.

v. **Uniformity** in preparation of report, budgets and standards can be achieved with the help of IT. ERP software plays an important role in bringing uniformity irrespective of location, currency, language and regulations.

vi. Cost and revenue **variance reports** are generated **in real time basis** which enables the management to take control measures immediately.

IT enables an entity to monitor and analyse each process of manufacturing or service activity closely to eliminate non value added activities.

Q13. Explain the difference between product cost and period cost.

Answer:

Product costs are those costs that are identified with the goods purchased or produced for resale. In a manufacturing organisation they are attached to the product and that are included in the inventory valuation for finished goods, or for incomplete goods. Product cost is also known as inventoriable cost. Under absorption costing method it includes direct material, direct labour, direct expenses, directly attributable costs (variable and non-variable) and other production (manufacturing) overheads. Under marginal costing method Product Costs includes all variable production costs and the all-fixed costs are deducted from the contribution.

Periods costs are the costs, which are not assigned to the products but are charged as expense against revenue of the period in which they are incurred. General Administration, marketing, sales and distributor overheads are recognized as period costs.

Q14. Mention and explain types of responsibility centres. Nov'18

Answer:

There are four types of responsibility centres:

i. **Cost Centres:** The responsibility centre which is held accountable for incurrence of costs which are under its control. The performance of this responsibility centre is measured against pre-determined standards or budgets. The cost centres are of two types:

a. Standard Cost Centre and b. Discretionary Cost Centre

ii. **Revenue Centres:** The responsibility centres which are accountable for generation of revenue for the entity. Sales Department for example, is the responsible for achievement of sales target and revenue generation. Though, revenue centres does not have control on the all expenditures it incurs but some time expenditures related with selling activities like commission to sales person etc. are incurred by revenue centres.

iii. **Profit Centres:** These are the responsibility centres which have both responsibility of generation of revenue and incurrence of expenditures. Since, managers of profit centres are accountable for both costs as well as revenue, profitability is the basis for measurement of performance of these responsibility centres. Examples of profit centres are decentralised branches of an organisation.

iv. **Investment Centres:** These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres is measured based on Return on Investment (ROI) besides profit.

Q15. Narrate the objectives of cost accounting. RTP Nov 23

Answer

The main objectives of introduction of a Cost Accounting System in a manufacturing organization are as follows:

i. **Ascertainment of cost:** The main objective of a Cost Accounting system is to ascertain cost for cost objects. Costing may be post completion or continuous but the aim is to arrive at a complete and accurate cost figure to assist the users to compare, control and make various decisions.

ii. **Determination of selling price:** Cost Accounting System in a manufacturing organisation enables to determine desired selling price after adding expected profit margin with the cost of the goods manufactured.

iii. **Cost control and Cost reduction:** Cost Accounting System equips the cost controller to adhere and control the cost estimate or cost budget and assist them to identify the areas of cost reduction.

iv. **Ascertainment of profit of each activity:** Cost Accounting System helps to classify cost on the basis of activity to ascertain activity wise profitability.

v. **Assisting in managerial decision making:** Cost Accounting System provides relevant cost information and assists managers to make various decisions.

Q16. Distinguish between cost allocation and cost absorption. RTP Nov 23

Answer

Cost allocation is the allotment of whole item of cost to a cost centre or a cost unit. In other words, it is the process of identifying, assigning or allowing cost to a cost centre or a cost unit.

Cost absorption is the process of absorbing all indirect costs or overhead costs allocated or apportioned over particular cost center or production department by the units produced.

Q17. Health Wealth Hospital is interested in estimating the cost for each patient stay. The hospital offers general health care facility i.e. only basic services. RTP Nov 22

You are required to:

1. CLASSIFY each of the following costs as either direct or indirect with respect to each patient.
2. CLASSIFY each of the following costs as either fixed or variable with respect to hospital costs per day.

	Direct	Indirect	Fixed	Variable
Electronic monitoring				
Meals for patients				
Nurses' salaries				
Parking maintenance				
Security				

Answer

Item	Direct	Indirect	Fixed	Variable
Electronic monitoring	YES			YES
Meals for patients	YES			YES
Nurses' salaries		YES	YES	
Parking maintenance		YES	YES	
Security		YES	YES	

Q18. What are cost units? Write the cost unit basis against each of the following Industry/Product- Automobile, Steel, Cement, Chemicals, Power and Transport. RTP Nov 22

Answer

Cost units are usually the units of physical measurement like number, weight, area, volume, length, time and value.

Industry or Product	Cost Unit Basis
Automobile	Number
Steel	Ton
Cement	Ton/ per bag etc.
Chemicals	Litre, gallon, kilogram, ton etc.
Power	Kilo-watt hour (kWh)
Transport	Passenger- kilometer

Q19. Define cost objects and give examples of any four cost objects May23

Answer

Definition of cost objects

Cost object is anything for which a separate measurement of cost is required. Cost object may be a product, a service, a project, a customer, a brand category, an activity, a department or a programme etc.

Examples of cost objects

Product	Smart phone, Tablet computer, SUV Car, Book etc.
Service	An airline flight from Delhi to Mumbai, Concurrent audit assignment, Utility bill payment facility etc.
Project	Metro Rail project, Road projects etc.
Activity	Quality inspection of materials, Placing of orders etc.
Process	Refinement of crudes in oil refineries, melting of billets or ingots in rolling mills etc.
Department	Production department, Finance & Accounts, Safety etc.

Q20. Suggest any one basis of re-apportionment of service department overheads over production departments in the following instances: May 23

Cost of Service Department	Basis
i. Maintenance and Repair Shop **ii.** Hospital and Dispensary **iii.** Fire Protection **iv.** Stores Department **v.** Transport Department **vi.** Computer Section **vii.** Power House (Electric Power Cost) **viii.**Inspection **ix.** Tool Room **x.** Time- keeping	

Answer

a) Basis of re-apportionment of service department overheads over production departments

Cost of the Service Departments:	Basis
i. Maintenance and Repair shop	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked

ii. Hospital and Dispensary	No. of employees, No. of direct workers etc.
iii. Fire Protection	Capital values
iv. Stores Department	No. of requisitions, Weight or value of Materials issued.
v. Transport Department	Crane hours, Truck hours, Truck mileage, Truck tonnage, Truck ton- hours, Tonnage handled. No. of packages of Standard size
vi. Computer Section	Computer hours, Specific allocation to departments
vii. Power House (Electric Power Cost)	Horse power, Kwh, Horse power × Machine hours, Kwh × Machine hours
viii. Inspection	Inspection hours, number of inspections.
ix. Tool room	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked
x. Time-keeping	No. of card punched, No. of employees

Q21. Mention the cost units (physical measurements) for the following Industry/product. Nov 22

i. Automobile

ii. Gas

iii. Brick works

iv. Power

v. Steel

vi. Transport (by road)

vii. Chemical

viii. Oil

ix. Brewing

x. Cement

Answer

Industry or Product	Cost Units
Automobile	Number
Gas	Cubic feet
Brick works	1,000 bricks
Power	Kilo-watt hour (kWh)
Steel	Tonne
Transport (by road)	Passenger- kilometer or Tonne-kilometer
Chemical	Litre, gallon, kilogram, tonne etc.
Oil	Barrel, tonne, litre

Brewing	Barrel
Cement	Ton/ per bag etc.

Q22. Write down the treatment of following items associated with purchase of materials. May 22

i. Cash discount

ii. IGST

iii. Demurrage

iv. Shortage

v. Basic Custom Duty

Answer

Treatment of items associated with purchase of materials is tabulated as below

S. No.	Items	Treatment
i.	Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.
ii.	Integrated Goods and Service Tax (IGST)	Integrated Goods and Service Tax (IGST) is paid on inter- state supply of goods and provision of services and collected from the buyers. It is excluded from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase.
iii.	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase
iv.	Shortage	Shortage in materials are treated as follows: Shortage due to normal reasons: Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, or due to any unavoidable conditions etc. are the reasons of normal loss. Shortage due to abnormal reasons: Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account.
v.	Basic Custom Duty	Basic Custom duty is paid on import of goods from outside India. It is added with the purchase cost.

Cost Sheet

Q1. State Direct Expenses with examples.

Answer:

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in **an economically feasible manner to a cost object**. The following costs are examples for direct expenses:

i. Royalty paid/ payable for production or provision of service;

ii. Hire charges paid for hiring specific equipment;

iii. Cost for product/ service specific design or drawing;

iv. Cost of product/ service specific software;

v. Other expenses which are directly related with the production of goods or provision of service.

Q2. Explain how Direct Expenses are measured and their treatment in cost accounting. May'19

Answer:

Measurement of Direct Expenses

The direct expenses are measured at invoice or agreed price net of rebate or discount but includes duties and taxes (for which input credit not available), commission and other directly attributable costs.

In case of sub-contracting, where goods are get manufactured by job workers independent of the principal entity, are measured at agreed price. Where the principal supplies some materials to the job workers, the value of such materials and other incidental expenses are added with the job charges paid to the job workers.

Treatment of Direct Expenses

Direct Expenses forms part the prime cost for the product or service to which it can be directly traceable and attributable. In case of lump-sum payment or one-time payment, the cost is amortised over the estimated production volume or benefit derived. If the expenses incurred are of insignificant amount i.e., not material, it can be treated as part of overheads.

Q3. State the advantages of Cost-Sheets MTP Oct'18

Answer:

The main advantages of a Cost Sheet are as follows:

i. It provides the **total cost** figure as well as **cost per unit** of production.

ii. It helps in cost comparison.

iii. It facilitates the **preparation of cost estimate**s required for submitting tenders.

iv. It provides sufficient help in arriving at the figure of **selling price**.

v. It facilitates cost control by disclosing **operational efficiency**.

Overheads

Q1. Explain Single and Multiple Overhead Rates. MTP Mar'18

Answer:

Single and Multiple Overhead Rates:

Single overhead rate: It is one single overhead absorption rate for the whole factory. It may be computed as follows:

$$\text{Single overhead Rate} = \frac{\text{Overhead costs for the entire factory}}{\text{Total quantity of the base selected}}$$

The base can be total output, total labour hours, total machine hours, etc.

The single overhead rate may be **applied in factories which produces only one major product on a continuous basis**. It may also be used in factories where the **work performed in each department is fairly uniform and standardized**.

Multiple overhead rate:

It involves computation of separate rates for each production department, service department, cost center and each product for both fixed and variable overheads. It may be computed as follows:

Multiple overhead rate =

$$\left(\frac{\text{Overhead allocated / apportioned to each department / Cost centre or product}}{\text{Corresponding base}}\right)$$

Under multiple overheads rate, jobs or products are charged with varying amount of factory overheads depending on the type and number of departments through which they pass. However, the number of overheads rate which a firm may compute would depend upon two opposing factors viz. the degree of accuracy desired and the clerical cost involved.

Q2. Discuss with example the level of activity method of segregating semi-variable costs into fixed and variable costs. MTP Oct'18

Answer

Level of activity method: Under this method, the variable overhead may be determined by comparing two levels of output with the amount of expenses at those levels. Since the fixed element does not change, the **variable element may be ascertained with the help of the following formula.**

$$\frac{\text{Change in the amount of expense}}{\text{Change in the quantity of output}}$$

Suppose the following information is available:

	Production Units	Semi-variable expenses (₹)
January	100	260
February	140	300
Difference	40	40

The variable cost:

$$\frac{\text{"Change in Semi-variable expenses"}}{\text{"Change in production volume"}} = \frac{\text{Rs.}40}{40\text{units}} = \text{Rs.}1/\text{unit}$$

Thus, in January, the variable cost will be 100 × Rs.1 = Rs.100 and the fixed cost element will be (Rs.260 – Rs.100) or Rs.160. In February, the variable cost will be 140 × Rs.1 = Rs.140 whereas the fixed cost element will remain the same, i.e., Rs.160.

Q3. Explain the difference between Allocation and Apportionment of expenses. MTP Oct`18

Answer

The **difference between the allocation and apportionment is** important to understand because the purpose of these two methods is the identification of the items of cost-to-cost units or centers. However, the main difference between the above methods is given below.

1. Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually.
   On the other hand, apportionment deals with the **proportions of an item of cost** for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.
2. Allocation is a **direct process of charging** expenses to different cost centres whereas apportionment is an **indirect process** because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.
3. The allocation or apportionment of an expense is not dependent on its nature, but the relationship between the expense and the cost centre decides that whether it is to be allocated or apportioned.
4. **Allocation is a much wider** term than apportionment.

Q4. State the bases of apportionment of following overhead costs: Nov'18

i. Air-conditioning

ii. Time keeping

iii. Depreciation of plant and machinery

iv. Power/steam consumption

v. Electric power (Machine operation)

Answer

Overhead Cost	Bases of Apportionment
i. Air- conditioning	Floor area, or volume of department
ii. Time keeping	Number of workers
iii. Depreciation of plant and machinery	Capital values
iv. Power/steam consumption	Technical estimates
v. Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed. Kilo-watt hours.

Q5. Explain the treatment of over and under absorption of overheads in cost accounts. RTP Nov 23

Answer

Treatment of over and under absorption of overheads are:

i. Writing off to costing P&L A/c: Small difference between the actual and absorbed amount should simply be transferred to costing P&L A/c, if difference is large then investigate the causes and after that abnormal loss/ gain shall be transferred to costing P&L A/c.

ii. Use of supplementary Rate: Under this method the balance of under and over absorbed overheads may be charged to cost of W.I.P., finished stock and cost of sales proportionately with the help of supplementary rate of overhead.

iii. Carry Forward to Subsequent Year: Difference should be carried forward in the expectation that next year the position will be automatically corrected.

Activity Based Costing

Q1. What is meant by Activity Based Management (ABM) and discuss how Activity Based Management can be used in the business? May 23

Answer:

Meaning of Activity Based Management (ABM)

The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC.

Activity based management can be used in the following ways:

i. **Cost Reduction:** ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added.

ii. **Business Process Re-engineering:** Business process re-engineering involves examining business processes and making substantial changes to how organisation currently operates. ABM is a powerful tool for measuring business performance, determining the cost of business output and is used as a means of identifying opportunities to improve process efficiency and effectiveness.

iii. **Benchmarking:** Benchmarking is a process of comparing of ABC-derived activity costs of one segment of company with those of other segments. It requires uniformity in the definition of activities and measurement of their costs.

iv. **Performance Measurement:** Many organisations are now focusing on activity performance as a means of facing competitors and managing costs by monitoring the efficiency and effectiveness of activities.

Cost Accounting System

Q1. "Is reconciliation of cost accounts and financial accounts necessary in case of integrated accounting system?" Explain. MTP Mar'19

Answer:

In integrated accounting system cost and financial accounts are kept in the same set of books. Such a system will have to afford full information required for Costing as well as for Financial Accounts. In other words, information and data should be recorded in such a way so as to enable the firm to ascertain the cost (together with the necessary analysis) of each product, job, process, operation or any other identifiable activity. It also ensures the ascertainment of marginal cost, variances, abnormal losses and gains. In fact, all information that management requires from a system of Costing for doing its work properly is made available. **The integrated accounts give full information in such a manner so that the profit and loss account and the balance sheet can be prepared** according to the requirements of law and the management maintains full control over the liabilities and assets of its business. Hence, reconciliation is not required.

Q2. Explain integrated accounting system and state its advantages. May'19

Answer:

Integrated Accounting System: Integrated Accounts is the name given to a system of accounting, **whereby cost and financial accounts are kept in the same set of books**. Obviously, then there will be no separate sets of books for Costing and Financial records. Integrated accounts provide or meet out fully the information requirement for Costing as well as for Financial Accounts. For Costing it provides information useful for ascertaining the cost of each product, job, and process, operation of any other identifiable activity and for carrying necessary analysis. Integrated accounts provide relevant information which is necessary for preparing profit and loss account and the balance sheets as per the requirement of law and also helps in exercising effective control over the liabilities and assets of its business.

Advantages of Integrated Accounting System

The main advantages of Integrated Accounts are as follows:

i. **No need for Reconciliation -** The question of reconciling costing profit and finan-cial profit does not arise, as there is only one figure of profit.
ii. **Less efforts -** Due to use of one set of books, there is a significant saving in efforts made
iii. **Less time consuming -** No delay is caused in obtaining information as it is provided from books of original entry.
iv. **Economical process -** It is economical also as it is based on the concept of "Centralisation of Accounting function".

Q3. Indicate, for following items, whether to be shown in the Cost Accounts or Financial Accounts Nov 22

i. Preliminary expenses written off during the year

ii. Interest received on bank deposits

iii. Dividend, interest received on investments

iv. Salary for the proprietor at notional figure though not incurred

v. Charges in lieu of rent where premises are owned

vi. Rent receivables

vii. Loss on sale of Fixed Assets

viii. Interest on capital at notional figure though not incurred

ix. Goodwill written off

x. Notional Depreciation on the assets fully depreciated for which book value is Nil.

Answer

S. No.	Items	Accounts
i.	Preliminary expenses written off during the year	Financial Accounts
ii.	Interest received on bank deposits	Financial Accounts
iii.	Dividend, interest received on investments	Financial Accounts
iv.	Salary for the proprietor at notional figure though not incurred	Cost Accounts
v.	Charges in lieu of rent where premises are owned	Cost Accounts
vi.	Rent receivables	Financial Accounts
vii.	Loss on the sales of Fixed Assets	Financial Accounts
viii.	Interest on capital at notional figure though not incurred	Cost Accounts
ix.	Goodwill written off	Financial Accounts
x.	Notional Depreciation on the assets fully depreciated for which book value is nil	Cost Accounts

Job Costing

Q1. State the differences between Job costing and Batch costing. May'18; RTP Nov'18; MTP Oct'19; MTP May'20

Answer

Sr. No	Job Costing	Batch Costing
1	Method of costing used for non- standard and non- repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job.	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality.

Unit and Batch Costing

Q1. State how Economic Batch Quantity is determined? MTP Mar'18

Answer

In batch costing the most important problem is the determination of 'Economic Batch Quantity' The determination of economic batch quantity involves two types of costs viz, (i) set up cost and (ii) carrying cost. With the increase in the batch size, there is an increase in the carrying cost but the set-up cost per unit of the product is reduced; this situation is reversed when the batch size is reduced. Thus, **there is one particular batch size for which both set up and carrying costs are minimum**. This size of a batch is known as economic or optimum batch quantity.

Economic batch quantity can be determined with the help of a table, graph or mathematical formula. The mathematical formula usually used for its determination is as follows:

Material Cost

Q1. Explain 'Just in Time' (JIT) approach of inventory management. May'18

Answer

Just in Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

i. Produce goods **only when it is required** and

ii. the products should be delivered to customers at the time only when they want.

It is also known as **'Demand pull' or 'Pull through' system** of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:

Q2. Explain obsolescence and circumstances under which materials become obsolete. State the steps to be taken for its treatment. Nov'18

Answer

Obsolescence: Obsolescence is defined as "the loss in the intrinsic value of an asset due to its supersession".

Materials may become obsolete under any of the following circumstances:

i. where it is a **spare part**, or a component of a machinery used in manufacture and **that machinery becomes obsolete**;

ii. where it is used in the manufacture of a **product which has become obsolete**;

iii. where the material itself is replaced by **another material due to either improved quality or fall in price**.

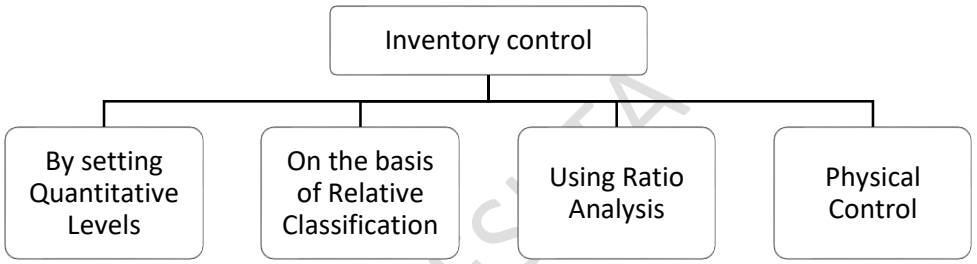
Treatment: In all three cases, the value of the obsolete material held in stock is a total loss and immediate steps should be taken to **dispose it off at the best available price**. The loss arising out of obsolete materials on abnormal loss **does not form part of the cost of manufacture**.

Q3. Define Inventory Control and give its objectives. Nov'19

Answer

Inventory Control: The Chartered Institute of Management Accountants (CIMA) defines Inventory Control as "The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks."

The **objective** of inventory control is **to make a balance between sufficient stock and over - stock.** The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. A trade-off between Stock-out and Over-stocking is required. The management may employ various methods of Inventory control to have a balance. Management may adopt the following **basis** for Inventory control:



Q4. Distinguish between Bill of Materials and Material Requisition Note. MTP Oct'19

Answer:

Bills of Material	Material Requisition Note
1. It is document or list of materials prepared by the engineering/ drawing department.	**1.** It is prepared by the foreman of the consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	**2.** It is a document authorizing Store-Keeper to issue material to the consuming department.
3. It often serves the purpose of a Store Requisition as it shows the complete schedule of materials required for a particular job i.e., it can replace stores requisition.	**3.** It cannot replace a bill of material.
4. It can be used for the purpose of quotation.	**4.** It is useful in arriving historical cost only.
5. It helps in keeping a quantitative control on materials drawn through Stores Requisition	**5.** It shows the material actually drawn from stores.

Employee Cost

Q1. Discuss the remedial steps to be taken to minimize the labour turnover. MTP Oct'19

Answer

The following steps are useful for minimizing labour turnover:

a. **Exit interview:** An interview to be arranged with each outgoing employee to ascertain the reasons of his leaving the organization.
b. **Job analysis and evaluation:** to ascertain the requirement of each job.
c. Organization should make use of a **scientific system of recruitment, placement and promotion for employees**.
d. Organization should create **healthy atmosphere, providing education, medical and housing facilities** for workers.
e. Committee for **settling workers grievances**.

Q2. How would you account for idle capacity cost in Cost Accounting? RTP Nov23

Answer

Idle capacity costs are treated in the following ways in Cost Accounts:

i. **If the idle capacity cost is due to unavoidable reasons:** A supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilised.
ii. **If the idle capacity cost is due to avoidable reasons:** Such as faulty planning, etc. the cost should be charged to Costing Profit and Loss Account.
iii. **If the idle capacity cost is due to trade depression, etc.:** Being abnormal in nature the cost should also be charged to the Costing Profit and Loss Account.
iv. **If the idle capacity cost is due to seasonal factors**, then the cost should be charged to cost of production by inflating overhead rate.

Q3. Explain the treatment of Overtime Premium in following situations: May 22

i. SV & Co. wants to grab some special orders, and overtime is required to meet the same.
ii. Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.
iii. S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.
iv. Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.
v. A customer requested the company MN Ltd. to expedite the job because of his urgency of work.

Answer

Treatment of Overtime premium in different situations

Situation	Treatment
i. SV & Co. wants to grab some special orders, and overtime is required to meet the same.	If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
ii. Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.	If overtime is worked in a department due to the fault of another department, the overtime premium should be charged to the latter department (Y).
iii. S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.	The overtime premium is treated as a part of employee cost and job is charged at an effective average wage rate.
iv. Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.	Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.
v. A customer requested the company MN Ltd. to expedite the job because of his urgency of work.	Where overtime is worked at the request of the customer, overtime premium is also charged to the job/ customer directly.

Process & Operation Costing

Q1. Explain the term Equivalent units used in process industries. RTP Nov'19

Answer

Equivalent Units: Equivalent units or equivalent production units, means **converting the incomplete production units into their equivalent completed units**. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, labour and overheads. It is important that the estimate of percent- age of completion should be as accurate as possible. The formula for computing equivalent completed units is:

Equivalent completed units = (Actual number of units in the process of manufacture × Percentage of Work completed)

For instance, if 25% of work has been done on the average of units still under process, then 200 such units will be equal to 50 completed units and the cost of work-in process will be equal to the cost of 50 finished units.

Q2. How will you treat normal loss, abnormal loss and abnormal gain in process costing? Explain May' 23

Answer

Treatment of normal loss, abnormal loss and abnormal gain in process costing

Treatment of Normal loss in Cost Accounts: The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realised by the sale of normal process loss units should be credited to the process account.

Treatment of Abnormal loss in Cost Accounts: The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

Treatment of Abnormal Gain in Cost Accounts: The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and Loss account. The cost of abnormal gain is computed on the basis of normal production.

Joint & By Products

Q1. Describe net realizable value method of apportioning joint costs to by- products MTP Aug'18

Answer:

Net Realisable Value method: The realisation on the disposal of the by-product may be deducted from the total cost of production so as to arrive at the cost of the main product. For example, the amount realised by the sale of molasses in a sugar factory goes to reduce the cost of sugar produced in the factory.

When the by-product requires some additional processing and expenses are incurred in making it saleable to the best advantage of the concern, the expenses so incurred should be deducted from the total value realised from the sale of the by-product and only **the net realisations should be deducted from the total cost of production to arrive at the cost of production of the main product**. Separate accounts should be maintained for collecting additional expenses incurred on:

i. further processing of the by-product, and

ii. selling, distribution and administration expenses attributable to the by-product.

Q2. How are By-products treated in Costing? Nov'18

Answer:

By-product cost can be dealt in cost accounting in the following ways:

a. When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

   1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The **credit to the Costing Profit and Loss Account** here is treated either as miscellaneous income or as additional sales revenue.

   2. The sale proceeds of the by-product may be treated **as deductions from the total costs.** The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

b. When the by-products are of considerable total value: Where by-products are of consider- able total value, they **may be regarded as joint products** rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis.

c. Where they require further processing: In this case, the net realisable value of the **by-product at the split-off point** may be arrived at by subtracting the further processing cost from the realisable value of by-products and then treated based on small value or large value as above.

Q3. How apportionment of joint costs up to the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? Discuss (RTP MAY 21)

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products up to the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately.

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
- Selling & distribution expenses, if any
- Post-split off costs.

The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q4. DISCUSS the treatment of by-product cost in cost accounting. (RTP May 20)

Answer

By-product cost can be dealt in cost accounting in the following ways:

i. When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

   1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.

   2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

ii. When the by-products are of considerable total value: Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred up to the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

iii. Where they require further processing: In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products.

If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (i). In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (ii).

Q5. Distinguish between Joint products and By-products.

Answer

i. Joint products and By-products: Joint Products are defined as the products which are
ii. produced simultaneously from same basic raw materials by a common process or processes
iii. but none of the products is relatively of more importance or value as compared with the other.
iv. For example, spirit, kerosene oil, fuel oil, lubricating oil, wax, tar and asphalt are the examples
v. of joint products.
vi. By products, on the other hand, are the products of minor importance jointly produced with
vii. other products of relatively more importance or value by the common process and using the
viii. same basic materials. These products remain inseparable up to the point of split off. For
ix. example in Dairy industries, batter or cheese is the main product, but butter milk is the by-product.

Points of Distinction:

1. Joint products are the products of equal economic importance, while the by-products are of lesser importance.
2. Joint products are produced in the same process, whereas by-products are produced from the scrap or the discarded materials of the main product.
3. Joint products are not produced incidentally, but by-products emerge incidentally also.

Q6. How apportionment of joint costs upto the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? Discuss.

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products up to the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately.

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
- Selling & distribution expenses, if any
- Post-split off costs.

➢ The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q7. Describe briefly, how joint costs up to the point of separation may be apportioned amongst the joint products under the following methods: (PM)

i. **Average unit cost method**
ii. **Contribution margin method**
iii. **Market value at the point of separation**
iv. **Market value after further processing**
v. **Net realizable value method.**

Answer

Methods of apportioning joint cost among the joint products:

i. Average Unit Cost Method: Under this method, total process cost (upto the point of separation) is divided by total units of joint products produced. On division average cost per unit of production is obtained. The effect of application of this method is that all joint products will have uniform cost per unit.

ii. **Contribution Margin Method:** Under this method joint costs are segregated into two parts – variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. If the products are further processed, then all variable cost incurred be added to the variable cost determined earlier. Then contribution is calculated by deducting variable cost from their respective sales values. The fixed costs are then apportioned over the joint products on the basis of contribution ratios.

iii. **Market Value at the Time of Separation:** This method is used for apportioning joint costs to joint products up to the split off point. It is difficult to apply if the market values of the products at the point of separation are not available. The joint cost may be apportioned in the ratio of sales values of different joint products.

iv. **Market Value after further Processing:** Here the basis of apportionment of joint costs is the total sales value of finished products at the further processing. The use of this method is unfair where further processing costs after the point of separation are disproportionate or when all the joint products are not subjected to further processing.

v. **Net Realisable Value Method:** Here joint costs is apportioned on the basis of net realisable value of the joint products,

Net Realisable Value = Sale value of joint products (at finished stage)

(-) estimated profit margin

(-) selling & distribution expenses, if any

(-) post-split off cost

Marginal Costing

Q1. What are the limitations of marginal costing? May'19

Answer

Limitations of Marginal Costing

i. **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. **Most of the expenses are neither totally variable nor wholly fixed.** For example, various amenities provided to workers may have no relation either to volume of production or time factor.

ii. **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.

iii. **Scope for Low Profitability: Sales staff may mistake marginal cost for total cost** and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.

iv. Faulty valuation: Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in- progress. In order to show the correct position fixed overheads, have to be included in work-in-progress.

v. **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption **that fixed cost will remain static throughout is not correct**. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. **The variable costs do not remain constant per unit of output**. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.

vi. **Marginal costing ignores time factor and investment: The marginal cost of two jobs may be the same** but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

vii. **Understating of W-I-P:** Under marginal costing stocks and work in progress are understated.

Q2. Differentiate between "Marginal and Absorption Costing". (Nov 20)

Answer

S. No.	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.

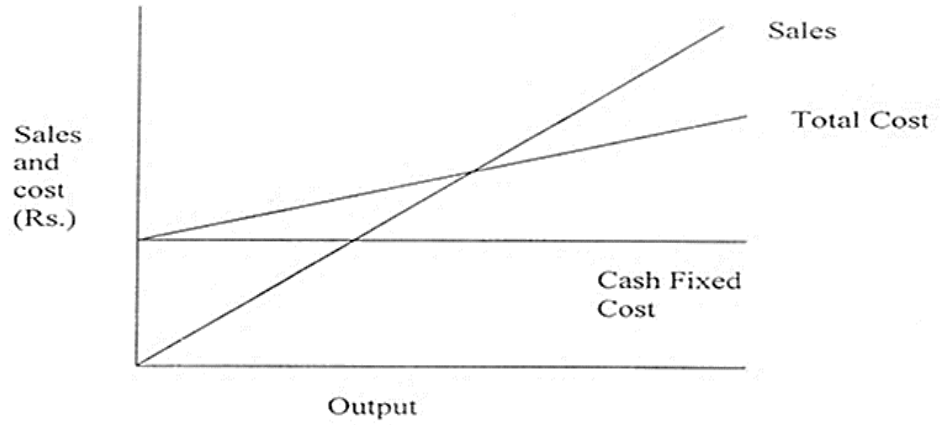
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

Q3. Explain and illustrate cash break-even chart.

Answer

In cash break-even chart, only cash fixed costs are considered. Non-cash items like depreciation etc. are excluded from the fixed cost for computation of break-even point. It depicts the level of output or sales at which the sales revenue will equal to total cash outflow. It is computed as under:

Cash BEP (Units) = Cash Fixed Cost/ Contribution per Units



Q4. Write short notes on Angle of Incidence.

Answer

This angle is formed by the intersection of sales line and total cost line at the break- even point. This angle shows the rate at which profits are being earned once the break-even point has been reached. The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favorable position.

Q5. Discuss basic assumptions of Cost Volume Profit analysis.

Answer

CVP Analysis: - Assumptions

i. Changes in the levels of revenues and costs arise only because of changes in the number of products (or service) units produced and sold.

ii. Total cost can be separated into two components: Fixed and variable

iii. Graphically, the behaviour of total revenues and total cost are linear in relation to output level within a relevant range.

iv. Selling price, variable cost per unit and total fixed costs are known and constant.

All revenues and costs can be added, sub traded and compared without taking into account the time value of money.

Q6. Elaborate the practical application of Marginal Costing.

Answer

Practical applications of Marginal costing:

i. **Pricing Policy:** Since marginal cost per unit is constant from period to period, firm decisions on pricing policy can be taken particularly in short term.

ii. **Decision Making:** Marginal costing helps the management in taking a number of business decisions like make or buy, discontinuance of a particular product, replacement of machines, etc.

Ascertaining Realistic Profit: Under the marginal costing technique, the stock of finished goods and work-in-progress are carried on marginal cost basis and the fixed expenses are written off to profit and loss account as period cost. This shows the true profit of the period.

Standard Costing

Q1. Describe three distinct groups of variances that arise in standard costing.

Answer

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

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

ii. Variances of prices and rates: These are the variances, which arise due to changes in procurement price

iii. Variances due to volume: These represent the effect of difference between actual activity and standard level of activity. and standard price.

Q2. "Calculation of variances in standard costing is not an end in itself, but a means to an end." Discuss.

Answer

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

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

A detailed probe into the variance particularly the controllable variances helps the management to ascertain:

i. the amount of variance

ii. the factors or causes of their occurrence

iii. the responsibility to be laid on executives and departments and

iv. corrective actions which should be taken to obviate or reduce the variances.

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

Q3. Describe the various steps involved in adopting standard costing system in an organization

Answer

The Steps of standard costing is as below:

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

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

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

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

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

Budget & Budgetary Control

Q1. State the limitations of Budgetary Control System. (JAN 21)

Answer

Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralised organisation, each unit has its own objective and these units enjoy some degree of discretion. In this type of organisation structure, coordination among different units is required. The success of the budgetary control depends upon willing co-operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organisation structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.
5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organization is exposed to various uncertain internal and external factors. Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.

Q2. What are the important points an organization should consider if it wants to adopt Performance Budgeting? (NOV 20)

Answer

For an enterprise that wants to adopt Performance Budgeting, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal constraints.
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralized responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets.

Q3. Explain the meaning of Budget Manual. (NOV 19)

Answer

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results.
- A form of organization chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- A timetable for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A list of the organization's account codes, with full explanations of how to use them.
- Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

Q4. DESCRIBE the salient features of budget manual. (RTP May 21)

Answer

Salient features of Budget Manual

- Budget manual contains much information which is required for effective budgetary planning.
- A budget manual is a collection of documents that contains key information for those involved in the planning process.

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results is included in Budget Manual.
- Budget Manual contains a form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- In contains a timetable for the preparation of each budget.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion is included in Budget Manual.

Q5. Describe the steps necessary for establishing a good budgetary control system.

Answer

The following steps are necessary for establishing a good budgetary control system:

1. Determining the objectives to be achieved, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. Determining the activities that should be undertaken for the achievement of the objectives.
3. Drawing up a plan or a scheme of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. Laying out a system of comparison of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. Ensuring that corrective action will be taken where the plan has not been achieved and, if that is not possible, for the revision of the plan.

Q6. Explain briefly the concept of 'flexible budget'.

Answer

Flexible Budget: A flexible budget is defined as "a budget which, by recognizing the difference between fixed, semi-variable and variable cost is designed to change in relation to the level of activity attained". In flexibility budgetary control system, a series of budgets are prepared one for the each of a number of alternative production levels or volumes. Flexible budgets represent the amount of expense that is reasonably necessary to achieve each level of output specified. In other words, the allowances given under flexibility budgetary control system serve as standards of what costs should be at each level of output.

Q7. Discuss the components of budgetary control system

Answer

Components of budgetary control system

The policy of a business for a defined period is represented by the master budget the details of which are given in a number of individual budgets called functional budgets. The functional budgets are broadly grouped under the following heads:

a. Physical Budgets – Sales Quantity, Product Quantity., Inventory, Manpower budget.

b. Cost Budgets – Manufacturing Cost, Administration Cost, Sales & Distribution cost, R & D Cost.

c. Profit Budget.

Q8. List the eight functional budgets prepared by a business.

Answer

The various commonly used Functional budgets are:

- Sales Budget
- Production Budget
- Plant Utilisation Budget
- Direct Material Usage Budget
- Direct Material Purchase Budget
- Direct Labour (Personnel) Budget
- Factory Overhead Budget
- Production Cost Budget.

Q9. Distinguish between Fixed and flexible budget

Answer

Difference between Fixed and Flexible Budgets

	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is rigid	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions	It consists of various budgets for different level of activity.
3.	If the budgeted and actual activity levels differ significantly, then cost ascertainment and price fixation do not give a correct picture.	It facilitates the cost ascertainment and price fixation at different levels of activity.

4.	Comparisons of actual and budgeted targets are meaningless particularly when there is difference between two levels.	It provided meaningful basis of comparison of actual and budgeted targets.

Q10. Explain the Essentials of budget

Answer

Essentials of budget

- It is prepared in advance and is based on a future plan of actions
- It relates to a future period and is based on objectives to be attained.
- It is a statement expressed in monetary and/ or physical units prepared for the implementation of policy formulated by management.

Q11. State the considerations on which capital expenditure budget is prepared.

Answer

The preparation of Capital Expenditure Budget is based on the following considerations:

1. Overhead on production facilities of certain departments as indicated by the plant utilisation budget.
2. Future development plans to increase output by expansion of plant facilities.
3. Replacement requests from the concerned departments
4. Factors like sales potential to absorb the increased output, possibility of price reductions, increased costs of advertising and sales promotion to absorb increased output, etc.

Q12. Describe the steps involved in the budgetary control technique

Answer

There are certain steps involved in the budgetary control technique. They are as follows:

i. **Definition of objectives:** A budget being a plan for the achievement of certain operational objectives, it is desirable that the same are defined precisely. The objectives should be written out; the areas of control demarcated; and items of revenue and expenditure to be covered by the budget stated.

ii. **Location of the key (or budget) factor:** There is usually one factor (sometimes there may be more than one) which sets a limit to the total activity. Such a factor is known as key factor. For proper budgeting, it must be located and estimated properly.

iii. **Appointment of controller:** Formulation of a budget usually required whole time services of a senior executive known as budget controller; he must be assisted in this work by a Budget Committee, consisting of all the heads of department along with the Managing Director as the Chairman.

iv. **Budget Manual:** Effective budgetary planning relies on the provision of adequate information which are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process.

v. **Budget period:** The period covered by a budget is known as budget period. The Budget Committee determines the length of the budget period suitable for the business. It may be months or quarters or such periods as coincide with period of trading activity.

vi. **Standard of activity or output:** For preparing budgets for the future, past statistics cannot be completely relied upon, for the past usually represents a combination of good and bad factors. Therefore, though results of the past should be studied but these should only be applied when there is a likelihood of similar conditions repeating in the future.

Q13. Explain 'Activity Based Budgeting'. Nov'18

Answer

Activity Based Budgeting (ABB)

- Activity based budgeting analyse the **resource input or cost** for each activity.
- It provides a framework for **estimating the amount of resources** required in accordance with the budgeted level of activity.
- Actual results can be **compared** with budgeted results to highlight both in financial and non-financial terms those activities with major discrepancies from budget for potential reduction in supply of resources.
- It is a planning and control system which seeks to support the objectives of **continuous improvement**.
- It means planning and controlling the expected activities of the organization to derive a **cost-effective budget** that meet forecast workload and agreed strategic goals.
- ABB is the **reversing of the ABC process** to produce financial plans and budgets.

Q14. State the advantages of Zero-based budgeting. RTP May'18; May' 18; RTP Nov'20

Answer:

The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the **evaluation of different activities and rank them** in order of preference **for the allocation of scarce resources**.
- It ensures that the **various functions undertaken by the organization are critical** for the achievement of its objectives and are being performed in the best possible way.
- It provides an opportunity to the management to allocate resources for various activities only after having a **thorough cost-benefit-analysis**. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of **wasteful expenditure can be easily identified** and eliminated.

- Departmental budgets are closely **linked with corporation objectives**.
- The technique can also be used for the introduction and implementation of the system of **'management by objective.'** Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Q15. Explain the meaning of Budget Manual. RTP Nov'19

Answer:

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory **explanation of the budgetary planning and control process**, including a statement of the budgetary objective and desired results.
- A **form of organization chart** to show **who is responsible** for the preparation of each functional budget and the way in which the budgets are interrelated.
- A **timetable** for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- **Copies of all forms** to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A **list of the organization's account codes**, with full explanations of how to use them.

Q16. Explain the difference between fixed budget and flexible budget. MTP Aug'18

Answer:

Sl.No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus, it is known as rigid or inflexible budget	It can be re-casted on the basis of activity level to be achieved. Thus, it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity
3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analysed according to its behaviour.

4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.
5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets.

Q17. What are the cases when a flexible budget is found suitable? May'19

Answer:

Flexible budgeting may be resorted to under following situations:

i. In the case of **new business venture** due to its typical nature it may be difficult to forecast the demand of a product accurately.

ii. Where the business is dependent upon the **mercy of nature** e.g., a person dealing in wool trade may have enough market if temperature goes below the freezing point.

iii. In the case of **labour - intensive industry** where the production of the concern is dependent upon the availability of labour.

Suitability for flexible budget:

i. **Seasonal fluctuations** in sales and/or production, for example in soft drinks industry;

ii. A company which keeps on introducing **new products or makes changes** in the design of its products frequently;

iii. Industries engaged in **make-to-order business** like ship building;

iv. An industry which is influenced by **changes in fashion**; and

v. **General changes in sales**.

Q18. Define Zero Base Budgeting and mention its various stages. Nov'19

Answer:

Zero-based Budgeting: (ZBB) is an emergent form of budgeting which arises **to overcome the limitations of incremental (traditional) budgeting system**. Zero- based Budgeting (ZBB) is defined as 'a method of budgeting which requires each cost element to be specifically justified, although the activities to which the budget relates are being undertaken for the first time, without approval, the budget allowance is zero'.

ZBB is an activity-based budgeting system where **budgets are prepared for each activity rather than functional department.** Justification in the form of **cost benefits for the activity** is required to be given. The activities are then **evaluated and prioritized** by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

ZBB is **suitable for both corporate and non-corporate entities.** In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

ZBB involves the following stages:

i. **Identification** and description of Decision packages
ii. **Evaluation** of Decision packages
iii. **Ranking** (Prioritisation) of the Decision packages
iv. **Allocation** of resources

Service Costing

Q1. Describe Operation costing with two examples of industries where operation costing is applied. RTP May'18; RTP Nov'20

Answer

This product costing system is used when an entity produces **more than one variant of final product using different materials but with similar conversion activities.** Which means conversion activities are similar for all the product variants but materials differ significantly.

Operation Costing method is also known as **Hybrid product costing system** as materials costs are accumulated by job order or batch wise but conversion costs i.e., labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

The two examples of industries are Ready made garments and Jewellery making.

Q2. Describe Composite Cost unit as used in Service Costing and discuss the ways of computing it. Nov'19

Answer

Composite Cost Unit: Sometime **two measurement units** are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometre.

Examples of Composite units are Ton- km., Quintal- km, Passenger-km., Patient-day etc.

Composite unit may be computed in two ways:

i. Absolute (Weighted Average) basis.

ii. Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

i. **Weighted Average or Absolute basis –** It is summation of the products of qualitative and quantitative factors. For example, to calculate absolute Ton-Km for a goods transport is calculated as follows:

Σ (Weight Carried × Distance)1 + (Weight Carried × Distance)2 +…….. + (Weight Carried × Distance)n

Similarly, in case of Cinema theatres, price for various classes of seats are fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second-Class seat – to ensure proper cost per composite unit.

ii. **Simple Average or Commercial basis –** It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Ton-Km is arrived at by multiplying total distance km., by average load quantity.

$$\sum(\text{Distance}_1 + \text{Distance}_2 + \ldots\ldots\ldots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \ldots + W_n}{n}\right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

Q3. DIFFERENTIATE between Service costing and Product costing. (May 21)

Answer

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

i. Unlike products, services are intangible and cannot be stored, hence, there is no inventory for the services.

ii. Use of Composite cost units for cost measurement and to express the volume of outputs.

iii. Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.

iv. Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

Q4. Explain standing charges and running charges in the case of transport organisations. LIST three examples of both. (Nov 20)

Answer

Standing Charges: These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following: -

- Insurance
- License fees

- Salary to Driver, Conductor, Cleaners, etc. if paid on monthly basis
- Garage costs, including garage rent
- Depreciation (if related to efflux of time)
- Taxes
- Administration expenses, etc.

Running Charges: These costs are generally associated with the distance travelled. These costs include the following-

- Petrol and Diesel
- Lubricant oils,
- Wages to Driver, Conductor, Cleaners, etc. if it is related to operations
- Depreciation (if related to activity)
- Any other variable costs identified.

CHAPTER 17: MULTIPLE CHOICE QUESTIONS (MCQs)

Introduction to Cost and Management Accounting

1. **_____ is anything for which a separate measurement is required.**
   - **a.** Cost unit
   - **b.** Cost object
   - **c.** Cost driver
   - **d.** Cost centre

2. **Which of the following is true about Cost control:**
   - **a.** It is a corrective function
   - **b.** It challenges the set standards
   - **c.** It ends when targets achieved
   - **d.** It is concerned with future

3. **Cost units used in power sector is:**
   - **a.** Kilometer (K.M)
   - **b.** Kilowatt-hour (kWh)
   - **c.** Number of electric points
   - **d.** Number of hours

4. **Processes Costing method is suitable for**
   - **a.** Transport sector
   - **b.** Chemical industries
   - **c.** Dam construction
   - **d.** Furniture making

5. **Distinction between direct cost and indirect cost is an example of ……. classification**
   - **a.** By Element
   - **b.** By Function
   - **c.** By Controllability
   - **d.** By Variability

6. **The advantage of using IT in Cost Accounting does not include:**
   - **a.** Integration of various functions
   - **b.** Stock needs to be reconciled with Goods Received Note
   - **c.** Reduction in multicity of documents
   - **d.** Customised reports can be prepared.

7. **A taxi provider charges minimum Rs. 80 thereafter Rs. 12 per kilometer of distance travelled, the behaviour of conveyance cost is:**
   - **a.** Fixed Cost
   - **b.** Semi-variable Cost
   - **c.** Variable Cost
   - **d.** Administrative cost.

8. **A Ltd. has three production department, and each department has two machines, which of the following cannot be treated as cost centre for cost allocation:**
   - **a.** Machines under the production department
   - **b.** Production departments
   - **c.** Both Production department and machines
   - **d.** A Ltd.

9. **Which of the following is an example of functional classification of cost:**
   - **a.** Direct Material Cost
   - **b.** Fixed Cost
   - **c.** Administrative Overheads
   - **d.** Indirect Overheads.

10. **Ticket counter in a Railway Station is an example of**
   - **a.** Cost Centre
   - **b.** Revenue Centre
   - **c.** Profit Centre
   - **d.** Investment Centre

Answers to the MCQs

1.	**b.**	**2.**	**c.**	**3.**	**b.**	**4.**	**b.**	**5.**	**a.**	**6.**	**b.**
7.	**b.**	**8.**	**d.**	**9.**	**c.**	**10.**	**b.**				

Cost Sheet

1. **Generally, for the purpose of cost sheet preparation, costs are classified on the basis of:**
   - **a.** Functions
   - **b.** Variability
   - **c.** Relevance
   - **d.** Nature

2. **Which of the following does not form part of prime cost:**
   - **a.** Cost of packing
   - **b.** Cost of transportation paid to bring materials to factory
   - **c.** GST paid on raw materials (input credit cannot be claimed)
   - **d.** Overtime premium paid to workers.

3. **A Ltd. received an order, for which it purchased a special frame for manufacturing, it is a part of:**
   - **a.** Direct Materials
   - **b.** Direct expenses
   - **c.** Factory Overheads
   - **d.** Administration Overheads

4. **Salary paid to plant supervisor is a part of**
   - **a.** Direct expenses
   - **b.** Factory overheads
   - **c.** Quality control cost
   - **d.** Administration cost

5. **Depreciation of director's laptop is treated as a part of:**
   - **a.** Administration Overheads
   - **b.** Factory Overheads
   - **c.** Direct Expenses
   - **d.** Research & Development cost.

6. **A manufacture has set-up a lab for testing of products for compliance with standards, salary of this lab staffs are part of:**
   - **a.** Works overheads

b. Quality Control Cost

c. Direct Expenses

d. Research & Development Cost.

7. Audit fees paid to auditors is part of:

a. Administration Cost

b. Production cost

c. Selling & Distribution cost

d. Not shown in cost sheet.

8. Salary paid to factory store staff is part of:

a. Factory overheads

b. Production Cost

c. Direct Employee cost

d. Direct Material Cost.

9. Canteen expenses for factory workers are part of:

a. Factory overhead

b. Administration Cost

c. Marketing cost

d. None of the above.

10. A company pays royalty to State Government on the basis of production, it is treated as:

a. Direct Material Cost

b. Factory Overheads

c. Direct Expenses

d. Administration cost.

Answers to the MCQs

1.	**a.**	**2.**	**a.**	**3.**	**b.**	**4.**	**b.**	**5.**	**a.**	**6.**	**b.**
7.	**a.**	**8.**	**a.**	**9.**	**a.**	**10.**	**c.**				

Overheads – Absorption Costing Method

1. **"Fixed overhead costs are not affected in monetary terms during a given period by a Change in output". But this statement holds good provided:**
   - **a.** Increase in output is not substantial
   - **b.** Increase in output is substantial
   - **c.** Both a. and b.
   - **d.** None of the above

2. **Capacity is defined as actually utilized capacity of a plant.**
   - **a.** Theoretical
   - **b.** Installed
   - **c.** Practical
   - **d.** Normal

3. **The allotment of whole items of cost-to-cost centres or cost units is called:**
   - **a.** Overhead absorption
   - **b.** Cost apportionment
   - **c.** Cost allocation
   - **d.** None of the above

4. **Primary packing cost is a part of:**
   - **a.** Direct material cost
   - **b.** Production Cost
   - **c.** Selling overheads
   - **d.** Distribution overheads

5. **Director's remuneration and expenses form part of:**
   - **a.** Production overhead
   - **b.** Administration overhead
   - **c.** Selling overhead
   - **d.** Distribution overhead

6. **Which of the following is not the classification of overhead based on its functionality?**
   - **a.** Factory Overhead

b. Administrative Overhead

c. Fixed Overhead

d. Selling Overhead

7. Bad debt is an example of:

a. Distribution overhead

b. Production overhead

c. Selling overhead

d. Administration overhead

8. Normal capacity of a plant refers to the difference between:

a. Maximum capacity and practical capacity

b. Practical capacity and normal capacity

c. Practical capacity and estimated idle capacity as revealed by long term sales trend.

d. Maximum capacity and actual capacity

9. The difference between actual factory overhead and absorbed factory overhead will be usually at the minimum level, provided pre- determined overhead rate is based on:

a. Maximum capacity

b. Direct Labour hours

c. Machine hours

d. Normal capacity

10. Which of the following overhead cost may not be apportioned on the basis of direct wages?

a. Worker's Holiday Pay

b. Perquisites to worker

c. ESI contribution

d. Managerial Salaries

Answers to the MCQs

1.	**a.**	**2.**	**c.**	**3.**	**c.**	**4.**	**b.**	**5.**	**b.**	**6.**	**c.**
7.	**c.**	**8.**	**c.**	**9.**	**d.**	**10**	**d.**				

Activity Based Costing

1. **A cost driver is:**
   - **a.** An item of production overheads
   - **b.** A common cost which is shared over cost centres
   - **c.** Any cost relating to transport
   - **d.** An activity which generates costs

2. **In activity-based costing, costs are accumulated by activity using:**
   - **a.** Cost drivers
   - **b.** Cost objects
   - **c.** Cost pools
   - **d.** Cost benefit analysis

3. **A cost driver:**
   - **a.** Is a force behind the overhead cost
   - **b.** Is an allocation base
   - **c.** Is a transaction that is a significant determinant of cost
   - **d.** All of the above

4. **Which of the following is not a correct match:**

Activity	Cost Driver
a. Production Scheduling	Number of Production runs
b. Dispatching	Number of dispatch orders
c. Goods receiving	Goods received orders
d. Inspection	Machine hours

5. **Transactions undertaken by support department personnel are the appropriate cost drivers. Find the one which is not appropriate:**
   - **a.** The number of purchase, supplies and customers' orders drives the cost associated with new material inventory, work-in-progress and finished goods inventory
   - **b.** The number of productions runs undertaken drives production scheduling, inspection and material handling
   - **c.** The quality of raw material issued drives the cost of receiving department costs
   - **d.** The number of packing orders drives the packing costs

6. **Steps in ABC include:**
   - **a.** Identification of activities and their respective costs
   - **b.** Identification of cost driver of each activity and computation of an allocation rate per activity
   - **c.** Allocation of overhead cost to products/ services based on the activities involved
   - **d.** All of the above

7. **Which of the following is not a benefit of ABC?**
   - **a.** Accurate cost allocation
   - **b.** Improved decision making
   - **c.** Better control on activity and costs
   - **d.** Reduction of prime cost

8. **The steps involved for installation of ABC in a manufacturing company include the following except:**
   - **a.** Borrowing fund
   - **b.** Feasibility study
   - **c.** Building up necessary IT infrastructure and training of line employees
   - **d.** Strategy and value chain analysis

9. **Which of the following statements are true: (1) Activity based Management involves activity analysis and performance measurement. (2) Activity based costing serves as a major source of information in ABM.**
   - **a.** (1) True; (2) False
   - **b.** (1) True; (2) True
   - **c.** (1) False; (2) True
   - **d.** (1) False; (2) False

10. **The key elements of activity-based budgeting are:**
   - **a.** Type of activity to be performed
   - **b.** Quantity of activity to be performed
   - **c.** Cost of activity to be performed
   - **d.** All of the above

Answers to the MCQs

1.	**d.**	**2.**	**c.**	**3.**	**d.**	**4.**	**d.**	**5.**	**c.**	**6.**	**d.**
7.	**d.**	**8.**	**a.**	**9.**	**b.**	**10.**	**d.**				

Cost Accounting System

1. **Under the Non-integrated accounting system**
   - **a.** Same ledger is maintained for cost and financial accounts by accountants
   - **b.** Separate ledgers are maintained for cost and financial accounts
   - **c.** a. and b. both
   - **d.** None of the above

2. **Notional costs**
   - **a.** May be included in Integrated accounts
   - **b.** May be included in Non- integrated accounts
   - **c.** Cannot be included in Non-integrated accounts
   - **d.** None of the above

3. **Under Non-integrated accounting system, the account made to complete double entry is**
   - **a.** Stores ledger control account
   - **b.** Work in progress control account
   - **c.** Finished goods control account
   - **d.** General ledger adjustment account

4. **Integrated systems of accounts are maintained**
   - **a.** In separate books of accounts for costing and financial accounting purposes
   - **b.** In same books of accounts
   - **c.** Both a. & b.
   - **d.** None of the above

5. **Under Non-integrated system of accounting, purchase of raw material is debited to which account**
   - **a.** Material control account / Stores ledger control account
   - **b.** General ledger adjustment account
   - **c.** Purchase account
   - **d.** None of the above

6. **Under Non-integrated accounts, if materials worth Rs. 1,500 are purchased for a special job, then which account will be debited:**
   - **a.** Special job account / Work in Process account
   - **b.** Material Control account
   - **c.** Cost Control account
   - **d.** None of the above

7. **Which account is to be debited if materials worth Rs. 500 are returned to vendor under Non-integrated accounts:**
   - **a.** Cost ledger control account
   - **b.** Finished goods control account
   - **c.** WIP control account
   - **d.** None of the above

8. **Which of the following items is included in cost accounts?**
   - **a.** Notional rent
   - **b.** Donations
   - **c.** Transfer to general reserve
   - **d.** Rent receivable

9. **When costing loss is Rs. 5,600, administrative overhead under-absorbed being Rs.600, the loss as per financial accounts should be**
   - **a.** Rs. 5,600
   - **b.** Rs. 6,200
   - **c.** Rs. 5,000
   - **d.** None of the above

10. **Which of the following items should be added to costing profit to arrive at financial profit?**
    - **a.** Over-absorption of works overhead
    - **b.** Interest paid on debentures
    - **c.** Income tax paid
    - **d.** All of the above

Answers to the MCQs

1.	**b.**	**2.**	**b.**	**3.**	**d.**	**4.**	**b.**	**5.**	**a.**	**6.**	**a.**
7.	**a.**	**8.**	**a.**	**9.**	**b.**	**10.**	**a.**				

Job costing

1. **In case product produced or jobs undertaken are of diverse nature, the systemof costing to be used should be:**
   - **a.** Process costing
   - **b.** Operating costing
   - **c.** Job costing
   - **d.** None of the above

2. **The production planning department prepares a list of materials and storesrequired for the completion of a specific job order, this list is known as:**
   - **a.** Bin card
   - **b.** Bill of material
   - **c.** Material requisition slip
   - **d.** None of the above

3. **Job costing is similar to that under Batch costing except with the difference thata:**
   - **a.** Job becomes a cost unit.
   - **b.** Batch becomes the cost unit instead of a job
   - **c.** Process becomes a cost unit
   - **d.** None of the above.

4. **In job costing which of the following documents are used to record the issue ofdirect material to a job':**
   - **a.** Goods received note
   - **b.** Material requisition
   - **c.** Purchase order
   - **d.** Purchase requisition

5. **The most suitable cost system where the products differ in type of materialsand work performed is :**
   - **a.** Job Costing
   - **b.** Process Costing
   - **c.** Operating Costing
   - **d.** None of these.

6. **Which of the following statements is true:**

   a. Job cost sheet may be used for estimating profit of jobs.

   b. Job costing cannot be used in conjunction with marginal costing.

   c. A production order is an order received from a customer for particularjobs.

   d. None of these.

7. **Which of the following statements is true:**

   a. Job cost sheet may be prepared for facilitating routing and scheduling ofthe job

   b. Job costing can be suitably used for concerns producing uniformly anyspecific product

   c. Job costing cannot be used in companies using standard costing

   d. Neither a. nor b. nor c.

Answers to the MCQs

1.	**c.**	**2.**	**b.**	**3.**	**a.**	**4.**	**b.**	**5.**	**a.**	**6.**	**a.**
7.	**d.**										

Unit and Batch Costing

1. **Different businesses in order to determine cost of their product or service offering follow:**
   - **a.** Different methods of Costing
   - **b.** Uniform Costing
   - **c.** Different techniques of costing
   - **d.** None of the above

2. **In order to determine cost of the product or service, following are used:**
   - **a.** Techniques of costing like Marginal, Standard etc.
   - **b.** Methods of Costing
   - **c.** Comparatives
   - **d.** All of the above

3. **Unit Costing is applicable where:**
   - **a.** Product produced are unique and no 2 products are same
   - **b.** Dissimilar articles are produced as per customer specification
   - **c.** homogeneous articles are produced on large scale
   - **d.** Products made require different raw materials

4. **In case product produced or jobs undertaken are of diverse nature, the system of costing to be used should be:**
   - **a.** Process costing
   - **b.** Operating costing
   - **c.** Job costing
   - **d.** None of the above

5. **Job Costing is:**
   - **a.** Applicable to all industries regardless of the products or services provided
   - **b.** Technique of costing
   - **c.** Suitable where similar products are produced on mass scale
   - **d.** Method of costing used for non- standard and non- repetitive products.

6. **The production planning department prepares a list of materials and stores required for the completion of a specific job order, this list is known as:**

a. Bin card

b. Bill of material

c. Material requisition slip

d. None of the above

7. Batch costing is a type of:

a. Process costing

b. Job Costing

c. Differential costing

d. Direct costing

8. Batch costing is similar to that under job costing except with the difference that a:

a. Job becomes a cost unit.

b. Batch becomes the cost unit instead of a job

c. Process becomes a cost unit

d. None of the above

9. The main points of distinction between job and contract costing includes:

a. Length of time to complete.

b. Big jobs

c. Activities to be done outside the factory area

d. All of the above

10. Economic batch quantity is that size of the batch of production where:

a. Average cost is minimum

b. Set-up cost of machine is minimum

c. Carrying cost is minimum

d. Both b. and c.

Answers to the MCQs

1.	**a.**	**2.**	**b.**	**3.**	**c.**	**4.**	**c.**	**5.**	**d.**	**6.**	**b.**
7.	**b.**	**8.**	**b.**	**9.**	**d.**	**10.**	**d.**				

Material cost

1. **Direct material can be classified as**
   - **a.** Fixed cost
   - **b.** Variable cost
   - **c.** Semi-variable cost.
   - **d.** Prime Cost

2. **In most of the industries, the most important element of cost is**
   - **a.** Material
   - **b.** Labour
   - **c.** Overheads
   - **d.** Administration Cost

3. **Which of the following is considered to be the normal loss of materials?**
   - **a.** Loss due to accidents
   - **b.** Pilferage
   - **c.** Loss due to breaking the bulk
   - **d.** Loss due to careless handling of materials.

4. **In which of following methods of pricing, costs lag behind the current economic values?**
   - **a.** Last-in-first out price
   - **b.** First-in-first out price
   - **c.** Replacement price
   - **d.** Weighted average price

5. **Continuous stock taking is a part of**
   - **a.** Annual stock taking
   - **b.** Perpetual inventory
   - **c.** ABC analysis.
   - **d.** Bin Cards

6. **In which of the following methods, issues of materials are priced at pre-determined rate?**
   - **a.** Inflated price method

b. Standard price method

c. Replacement price method

d. Market price method.

7. When material prices fluctuate widely, the method of pricing that gives absurd results is

a. Simple average price

b. Weighted average price

c. Moving average price

d. Inflated price.

8. When prices fluctuate widely, the method that will smooth out the effect of fluctuations is

a. Simple average

b. Weighted average

c. FIFO

d. LIFO

9. Under the FSN system of inventory control, inventory is classified on the basis of:

a. Volume of material consumption

b. Frequency of usage of items of inventory

c. Criticality of the item of inventory for production

d. Value of items of inventory

10. Form used for making a formal request to the purchasing department to purchase materials is a

a. Material Transfer Note

b. Purchase Requisition Note

c. Bill of Materials

d. Material Requisition Note

Answers to the MCQs

1.	**b.**	**2.**	**a.**	**3.**	**c.**	**4.**	**b.**	**5.**	**b.**	**6.**	**b.**
7.	**a.**	**8.**	**b.**	**9.**	**b.**	**10.**	**b.**				

Employee cost and Direct Expenses

1. **Idle time is the time under which-**
   - **a.** Full wages are paid to workers
   - **b.** No productivity is given by the workers
   - **c.** Both a. and b.
   - **d.** None of the above

2. **Cost of idle time due to non- availability of raw material is-**
   - **a.** Charged to overhead costs
   - **b.** Charged to respective jobs
   - **c.** Charged to costing profit and loss account
   - **d.** None of the above

3. **Time and motion study is conducted by-**
   - **a.** Time keeping department
   - **b.** Personnel department
   - **c.** Payroll department
   - **d.** Engineering department

4. **Identify, which one of the following, does not account for increasing labour productivity-**
   - **a.** Job satisfaction
   - **b.** Motivating workers
   - **c.** High labour turnover
   - **d.** Proper supervision and control

5. **Labour turnover is measured by-**
   - **a.** Number of persons replaced ÷ average number of workers
   - **b.** Numbers of persons separated ÷ number of workers at the beginning of the year
   - **c.** (Number of persons replaced + number of persons separated) ÷ (number of persons at the beginning + the number of persons at the end of the year)
   - **d.** None of the above

6. **Time booking refers to a method wherein of an employee is recorded.**
   - **a.** Attendance
   - **b.** Food expenses
   - **c.** Health status
   - **d.** Time spent on a particular job

7. **Employee Cost includes-**
   - **a.** Wages and salaries
   - **b.** Allowances and incentives
   - **c.** Payment for overtime
   - **d.** All of the above

8. **If the time saved is less than 50% of the standard time, then the wages under Rowan and Halsey premium plan on comparison gives-**
   - **a.** More wages to workers under Rowan plan than Halsey plan
   - **b.** More wages to workers under Halsey plan than Rowan plan
   - **c.** Equal wages under two plans
   - **d.** None of the above

9. **Standard time of a job is 60 hours and guaranteed time rate is Rs.0.30 per hour. What is the amount of wages under Rowan plan if job is completed in 48 hours?**
   - **a.** Rs. 16.20
   - **b.** Rs. 17.28
   - **c.** Rs. 18.00
   - **d.** Rs. 14.40

10. **Important factors for control of employee cost can be-**
    - **a.** Time and Motion Study
    - **b.** Control over idle time and overtime
    - **c.** Control over employee turnover
    - **d.** All of the above

11. Out of the following methods attendance is marked by recognizing an employee based on physical and behavioural traits-

a. Punch Card Attendance method

b. Bio- Metric Attendance system

c. Attendance Register method

d. Token Method

12. If overtime is required for meeting urgent orders, the overtime premium should be charged as-

a. Respective job

b. Overhead cost

c. Costing P& L A/c

d. None of above

Answers to the MCQs

1.	**c.**	**2.**	**c.**	**3.**	**d.**	**4.**	**c.**	**5.**	**a.**	**6.**	**d.**
7.	**d.**	**8.**	**a.**	**9.**	**b.**	**10**	**d.**	**11**	**b.**	**12**	**a.**

Process & Operation costing

1. **The type of process loss that should not be allowed to affect the cost of goodunits is:**
   - **a.** Abnormal loss
   - **b.** Normal loss
   - **c.** Seasonal loss
   - **d.** Standard loss

2. **200 units were introduced in a process in which 20 units is the normal loss. Ifthe actual output is 150 units, then there is:**
   - **a.** No abnormal loss
   - **b.** No abnormal gain
   - **c.** Abnormal loss of 30 units
   - **d.** Abnormal gain of 30 units

3. **100 units are processed at a total cost of Rs. 160, normal loss is 10%, & scrap units are sold @ Rs. 0.25 each. If the output is 80 units, then the value of abnormalloss is:**
   - **a.** Rs. 2.50
   - **b.** Rs. 16
   - **c.** Rs. 17.50
   - **d.** Rs. 17.75

4. **When average method is used in process costing, the opening inventory costsare:**
   - **a.** Subtracted from the new costs
   - **b.** Added to the new costs
   - **c.** Kept separate from the costs of the new period
   - **d.** Averaged with other costs to arrive at total cost

5. **Spoilage that occurs under inefficient operating conditions and is ordinarilycontrollable is called:**
   - **a.** Normal spoilage
   - **b.** Abnormal spoilage
   - **c.** Normal defectives
   - **d.** None of the above

6. **The cost of normal process loss is -**
   - **a.** Absorbed by good units produced and amount realised by the sale of lossunits should be debited to the process account.

b. Debited to costing profit and loss account.

c. Absorbed by good units produced.

d. Debited to costing profit and loss account and amount realised by the saleof loss units should be credited to the process account.

7. The value of abnormal loss is equal to:

a. Total cost of materials

b. Total process cost less realizable value of normal loss

c. Total process cost less cost of scrap

d. Total process cost less realizable value of normal loss less value oftransferred out goods.

8. Inter-process profit is calculated, because:

a. a process is a cost centres

b. each process has to report profit

c. the efficiency of the process is measured

d. the wages of employees are linked to the process profitability.

9. Under Weighted Average (Average) Method:

a. The cost to complete the opening WIP is ignored.

b. The cost to complete the opening WIP and other completed units are calculated separately.

c. The cost of opening work-in-process and cost of the current period are aggregated and the aggregate cost is divided by output in terms of completed units.

d. Closing stock of work in process is valued at current cost.

10. A process account is debited by abnormal gain, the value is determined as:

a. Equal to the value of normal loss

b. Cost of good units less realizable value of normal loss

c. Cost of good units less realizable value of actual loss

d. Equal to the value of good units less closing stock

11. Lean Labs develops 55mm film using a four-step process that moves progressivelythrough four departments. The company specializes in overnight service and has the largest drug store chain as its primary customer. Currently, direct labor, directmaterials, and overhead are accumulated by departments.

The cost accumulation system that best describes the system Lean Labs is using is:

a. Operation costing.

b. Activity-based costing.

c. Job-order costing.

d. Process costing.

12. When compared with normal spoilage, abnormal spoilage:

a. Arises more frequently from factors that are inherent in the manufacturingprocess.

b. Is given the same accounting treatment as normal spoilage.

c. Is generally thought to be more controllable by purchase department than production department.

d. Is not typically influenced by the "tightness" of production standards.

13. Assume 550 units were worked on during a period in which a total of 500 good units were completed. Normal spoilage consisted of 30 units; abnormal spoilage, 20 units. Total production costs were Rs. 2,200. The company accounts for abnormalspoilage separately on the income statement as loss due to abnormal spoilage. Normal spoilage is not accounted for separately. What is the cost of the good unitsproduced?

a. Rs. 2,080 **b.** Rs. 2,115 **c.** Rs. 2,200 **d.** Rs. 2,332

14. IC Limited uses process costing systems and inspects its goods post manufacturing.An engineer noticed on May 31st the following:

Good units completed	**15,000**
Normal spoilage (units)	**300**
Abnormal spoilage (units)	**100**

Unit costs were: Material Rs. 2.50 and conversion costs (Labour & overheads) Rs. 6.00. The number of units that company would transfer to its finished goods stockand the related cost of these units are:

a. 15,000 units transferred at a cost of Rs. 127,500

b. 15,000 units transferred at a cost of Rs. 130,050

c. 15,000 units transferred at a cost of Rs. 135,000

d. 15,300 units transferred at a cost of Rs. 130,050

Answers to the MCQs

1.	**a.**	**2.**	**c.**	**3.**	**c.**	**4.**	**b.**	**5.**	**b.**	**6.**	**c.**
7.	**d.**	**8.**	**c.**	**9.**	**c.**	**10.**	**b.**	**11.**	**d.**	**12.**	**d.**
13.	**b.**	**14.**	**b.**								

Joint Products and By Products

1. **In sugar manufacturing industries molasses is also produced along with sugar. Molasses may be of smaller value as compared with the value of sugarand is known as:**
   - **a.** Common product
   - **b.** By- product
   - **c.** Joint product
   - **d.** None of them

2. **Method of apportioning joint costs on the basis of output of each jointproduct at the point of split off is:**
   - **a.** Sales value method
   - **b.** Physical unit method
   - **c.** Average cost method
   - **d.** Marginal cost and contribution method

3. **In the Net realisable value method, for apportioning joint costs over the jointproducts, the basis of apportionment would be:**
   - **a.** Selling price per unit of each of the joint products
   - **b.** Selling price multiplied by units sold of each of the joint products
   - **c.** Sales value of each joint product less further processing costs ofindividual products
   - **d.** Both b. and c.

4. **The main purpose of accounting of joint products and by- products is to:**
   - **a.** Determine the opportunity cost
   - **b.** Determine the replacement cost
   - **c.** Determine profit or loss on each product line
   - **d.** None of the above

5. **Under net realizable value method of apportioning joint costs to jointproducts, the selling & distribution cost is:**
   - **a.** Added to joint cost
   - **b.** Deducted from further processing cost
   - **c.** Deducted from sales value
   - **d.** Ignored

6. **Which of the following is a co-product:**
   - **a.** Diesel and Petrol in an oil refinery
   - **b.** Edible oils and oil cakes
   - **c.** Curd and butter in a dairy
   - **d.** Mustard oil and Sunflower oil in an oil processing company.

7. **Which of the following is an example of by-product**
   - **a.** Diesel and Petrol in an oil refinery
   - **b.** Edible oils and oil cakes
   - **c.** Curd and butter in a dairy
   - **d.** Mustard seeds and mustard oil.

8. **Which of following method can be used when the joint products are ofunequal quantity and used for captive consumption:**
   - **a.** Technical estimates, using market value of similar goods
   - **b.** Net Realisable value method
   - **c.** Physical Units method
   - **d.** Market value at split-off method.

9. **Which of the following statement is not correct in relation to Co-products:**
   - **a.** Co-products may also have joint products
   - **b.** Costing for co-products are done according to process costing method
   - **c.** Co-products do not have any by-products
   - **d.** Co-products are treated as a separate cost object for costing purpose.

10. **When a by-product does not have any realisable value, the cost of by-product is:**
    - **a.** Transferred to Costing Profit & Loss A/c
    - **b.** By-product cost is borne by the good units
    - **c.** By-product cost is ignored
    - **d.** By-product cost is determined taking value of similar goods

11. **SG Ltd manufactures two products from a joint milling process. The two products developed are Mine support (MS) and Commercial building (CB). A standard production run incurs joint costs of Rs. 1,00,000 and results in 60,000 units of MS and 90,000 units of CB. Each MS sells for Rs. 200 per unit, and each CB sells for Rs. 450 per unit.**
    Assuming no further processing work is done after the split-off point, the amount of joint cost allocated to Commercial building (CB) on a physical quantity allocation basis would be:

a. Rs. 60,000.

b. Rs. 180,000.

c. Rs. 225,000.

d. Rs. 120,000.

12. Kay Company manufactures two hair care lotions, Livi and Sili, out of a joint process. The joint (common) costs incurred are Rs. 6,30,000 for a standard production run that generates 1,80,000 gallons of Livi and 1,20,000 gallonsof Sili. Livi sells for Rs. 240 per gallon, and Sili sells for Rs. 390 per gallon.

If additional processing costs beyond the split-off point are Rs. 140 per gallon for Livi and Rs. 90 per gallon for Sili, the amount of joint cost of each production run allocated to Livi on a physical-quantity basis is:

a. Rs. 340,000.

b. Rs. 378,000.

c. Rs. 232,000.

d. Rs. 580,000.

13. For the purpose of allocating joint costs to joint products, the sales price atpoint of sale, reduced by cost to complete after split-off, is assumed to beequal to the:

a. Joint costs

b. Sales price less a normal profit margin at point of sale

c. Net sales value at split off

d. Total costs.

Answers to the MCQs

1.	**b.**	**2.**	**b.**	**3.**	**d.**	**4.**	**c.**	**5.**	**c.**	**6.**	**d.**
7.	**b.**	**8.**	**a.**	**9.**	**c.**	**10.**	**b.**	**11.**	**a.**	**12.**	**b.**
13.	**c.**										

Marginal Costing

1. **Under marginal costing the cost of product includes:**
   - **a.** Prime costs only.
   - **b.** Prime costs and variable overheads.
   - **c.** Prime costs and fixed overheads.
   - **d.** Prime costs and factory overheads.

2. **Reporting under marginal costing is accomplished by:**
   - **a.** Treating all costs as period costs.
   - **b.** Eliminating the work-in-progress inventory account.
   - **c.** Matching variable costs against revenue and treating fixed costs as period costs.
   - **d.** Including only variable costs in income statement.

3. **Period costs are:**
   - **a.** Variable costs.
   - **b.** Fixed costs.
   - **c.** Prime costs.
   - **d.** Overheads costs.

4. **When sales and production (in units) are same then profit under:**
   - **a.** Marginal costing is higher than that of absorption costing.
   - **b.** Marginal costing is lower than that of absorption costing.
   - **c.** Marginal costing is equal to that of absorption costing.
   - **d.** None of the above.

5. **When sales exceed production (in units) then profit under:**
   - **a.** Marginal costing is higher than that of absorption costing.
   - **b.** Marginal costing is lower than that of absorption costing.
   - **c.** Marginal costing is equal than that of absorption costing.
   - **d.** None of above.

6. **The main difference between marginal costing and absorption costing is regarding the treatment of:**
   - **a.** Prime cost.
   - **b.** Fixed overheads.
   - **c.** Direct materials.
   - **d.** Variable overheads.

7. **Under profit volume ratio, the term profit:**
   - **a.** Means the sales proceeds in excess of total costs.
   - **b.** Means the same thing as is generally understood.
   - **c.** Is a misnomer, it in fact refers to contribution i.e. (sales revenue-variable costs).
   - **d.** None of the above.

8. **Factors which can change the break-even point:**
   - **a.** Change in fixed costs.
   - **b.** Change in variable costs.
   - **c.** Change in the selling price.
   - **d.** All of the above.

9. **If P/V ratio is 40% of sales then what about the remaining 60% of sales:**
   - **a.** Profit.
   - **b.** Fixed cost.
   - **c.** Variable cost.
   - **d.** Margin of safety.

10. **The P/V ratio of a product is 0.6 and profit is Rs. 9,000. The margin of safety is:**
   - **a.** Rs. 5,400
   - **b.** Rs. 15,000
   - **c.** Rs. 22,500
   - **d.** Rs. 3,600

Answers to the MCQs

1.	**b.**	**2.**	**c.**	**3.**	**b.**	**4.**	**c.**	**5.**	**a.**	**6.**	**b.**
7.	**c.**	**8.**	**d.**	**9.**	**c.**	**10.**	**b.**				

Standard Costing

1. **Under standard cost system the cost of the product determined at the beginningof production is its:**
   - **a.** Direct cost
   - **b.** Pre-determined cost
   - **c.** Historical cost
   - **d.** Actual cost

2. **The deviations between actual and standard cost is known as:**
   - **a.** Multiple analysis
   - **b.** Variable cost analysis
   - **c.** Variance analysis
   - **d.** Linear trend analysis

3. **The standard which is attainable under favourable conditions is:**
   - **a.** Theoretical standard
   - **b.** Expected standard
   - **c.** Normal standard
   - **d.** Basic standard

4. **The standard most suitable from cost control point of view is:**
   - **a.** Normal standard
   - **b.** Theoretical standard
   - **c.** Expected standard
   - **d.** Basic standard

5. **Overhead cost variances is:**
   - **a.** The difference between overheads recovered on actual output - actual overhead incurred.
   - **b.** The difference between budgeted overhead cost and actual overhead cost.
   - **c.** Obtained by multiplying standard overhead absorption rate with the difference between standard hours for actual output and actual hours worked.
   - **d.** None of the above

6. **Which of the following variance arises when more than one material is usedin the manufacture of a product:**
   - **a.** Material price variance
   - **b.** Material usage variance

c. Material yield variance

d. Material mix variance

7. If standard hours for 100 units of output are 400 @ Rs.2 per hour and actualhours take are 380 @ Rs.2.25 per, then the labour rate variance is:

a. Rs.95 (adverse)

b. Rs.100 (adverse)

c. Rs.25 (favourable)

d. Rs.120 (adverse)

8. Controllable variances are best disposed-off by transferring to:

a. Cost of goods sold

b. Cost of goods sold and inventories

c. Inventories of work–in–progress and finished goods

d. Costing profit and loss account

9. Idle time variance is obtained by multiplying:

a. The difference between standard and actual hours by the actual rate oflabour per hour

b. The difference between actual labour hours paid and actual labour hoursworked by the standard rate

c. The difference between standard and actual hours by the standard rate oflabour per hour

d. None of the above.

10. Basic standards are:

a. Those standards, which require high degree of efficiency and performance.

b. Average standards and are useful in long term planning.

c. Standards, which can be attained or achieved

d. Assuming to remain unchanged for a long time.

Answers to the MCQs

1.	**b.**	**2.**	**c.**	**3.**	**a.**	**4.**	**c.**	**5.**	**a.**	**6.**	**d.**
7.	**a.**	**8.**	**d.**	**9.**	**b.**	**10.**	**d.**				

Budget and Budgetary control

1. **If a company wishes to establish a factory overhead budget system in which estimated costs can be derived directly from estimates of activity levels, it should prepare a:**
   - **a.** Master budget
   - **b.** Cash budget
   - **c.** Flexible budget
   - **d.** Fixed budget

2. **The classification of fixed and variable cost is useful for the preparation of:**
   - **a.** Master budget
   - **b.** Flexible budget
   - **c.** Cash budget
   - **d.** Capital budget

3. **Budget manual is a document:**
   - **a.** Which contains different type of budgets to be formulated only.
   - **b.** Which contains the details about standard cost of the products to be made.
   - **c.** Setting out the budget organization and procedures for preparing a budget including fixation of responsibilities, formats and records required for the purpose of preparing a budget and for exercising budgetary control system.
   - **d.** None of the above

4. **The budget control organization is usually headed by a top executive who is known as:**
   - **a.** General manager
   - **b.** Budget director/budget controller
   - **c.** Accountant of the organization
   - **d.** None of the above

5. **"A favourable budget variance is always an indication of efficient performance". Do you agree, give reason?**
   - **a.** A favourable variance indicates, saving on the part of the organization hence it indicates efficient performance of the organization.
   - **b.** Under all situations, a favourable variance of an organization speaks about its efficient performance.
   - **c.** A favourable variance does not necessarily indicate efficient performance, because such a variance might have been arrived at by not carrying out the expenses mentioned in the budget.
   - **d.** None of the above.

6. **A budget report is prepared on the principle of exception and thus-**
   - **a.** Only unfavourable variances should be shown
   - **b.** Only favourable variance should be shown
   - **c.** Both favourable and unfavourable variances should be shown
   - **d.** None of the above

7. **Purchases budget and materials budget are same:**
   - **a.** Purchases budget is a budget which includes only the details of all materials purchased
   - **b.** Purchases budget is a wider concept and thus includes not only purchases of materials but also other item's as well
   - **c.** Purchases budget is different from materials budget; it includes purchases of other items only
   - **d.** None of the above

8. **Efficiency ratio is:**
   - **a.** The extent of actual working days avoided during the budget period
   - **b.** Activity ratio/ capacity ratio
   - **c.** Whether the actual activity is more or less than budgeted activity
   - **d.** None of the above

9. **Activity Ratio depicts:**
   - **a.** Whether actual capacity utilized exceeds or falls short of the budgeted capacity
   - **b.** Whether the actual hours used for actual production were more or less than the standard hours
   - **c.** Whether actual activity was more or less than the budgeted capacity
   - **d.** None of the above

10. **Which of the following is usually a short-term budget:**
    - **a.** Capital expenditure budget
    - **b.** Research and development budget
    - **c.** Cash budget
    - **d.** Sales budget

Answers to the MCQs

1.	**c.**	**2.**	**b.**	**3.**	**c.**	**4.**	**b.**	**5.**	**c.**	**6.**	**c.**
7.	**b.**	**8.**	**b.**	**9.**	**c.**	**10.**	**c.**				

Service costing

1. **Composite cost unit for a hospital is:**
   - **a.** Per patient
   - **b.** Per patient-day
   - **c.** Per day
   - **d.** Per bed

2. **Cost of diesel and lubricant is an example of:**
   - **a.** Operating cost
   - **b.** Fixed charges
   - **c.** Semi-variable cost
   - **d.** None of the above

3. **Cost units used in power sector is:**
   - **a.** Kilo meter (K.M)
   - **b.** Kilowatt-hour (kWh)
   - **c.** Number of electric points
   - **d.** Number of hours

4. **Absolute Tonne-km. is an example of:**
   - **a.** Composite units in power sector
   - **b.** Composite unit of transport sector
   - **c.** Composite unit for bus operation
   - **d.** Composite unit for oil and natural gas

5. **Depreciation is treated as fixed cost if it is related to:**
   - **a.** Activity level
   - **b.** Related with machine hours
   - **c.** Efflux of time
   - **d.** None of the above

6. **Jobs undertaken by IT & ITES organizations are considered as:**
   - **a.** Project
   - **b.** Batch work
   - **c.** Contract
   - **d.** All the above

7. **In Toll Road costing, the repetitive costs include:**
   - **a.** Maintenance cost
   - **b.** Annual operating costs
   - **c.** None of the above
   - **d.** Both a. and b.

8. **BOT approach means:**
   - **a.** Build, Operate and Transfer
   - **b.** Buy, Operate and Transfer
   - **c.** Build, Operate and Trash
   - **d.** Build, Own and Trash

9. **Pre-product development activities in insurance companies, include:**
   - **a.** Processing of Claim
   - **b.** Selling of policy
   - **c.** Provision of conditions
   - **d.** Policy application processing

10. **Which of the following costing method is not appropriate for costing ofeducational institutes:**
   - **a.** Batch Costing
   - **b.** Activity Based Costing
   - **c.** Absorption Costing
   - **d.** Process Costing

Answers to the MCQs

1.	**b.**	**2.**	**a.**	**3.**	**b.**	**4.**	**b.**	**5.**	**c.**	**6.**	**a.**
7.	**a.**	**8.**	**a.**	**9.**	**c.**	**10.**	**d.**				