

GOVERNMENT ARTS COLLEGE(AUTONOMOUS)

COIMBATORE-641018

STUDY MATERIAL

CLASS : II MCA
SEMESTER : III
SUBJECT : FINANCIAL AND MANAGEMENT ACCOUNTING
SUBJECT CODE : 18MCA35C
FACULTY : Dr. P.KANCHANA DEVI
UNIT : II

Cost Accounting

Cost is a basic course in accounting, finance, business and economics education. The objective of **Cost Accounting** course is to provide students with an understanding of, and ability to produce and apply cost accounting information that is used in planning and control process of **Business** organizations. Special attention is placed on mastering the topics of costing, cost systems, material, labor, FOH, budgeting, variances and performance appraisal.

The **Cost Accountant** has very important functions to perform, primarily responsible for the determination of unit, job and process costs, and for the operation of internal control within the cost accounting department. The work of cost accountant demands technical know-how, skill, judgment, initiative, and responsibility. Recording **Journal Entry**, classifying, summarizing, analyzing, reporting and interpreting of cost are few important functions of cost accountant or management accountant.

Meaning of Cost

How does one define with the cost of something? It is the amount to be paid for a good or service or the resources given in exchange for such good or service.

In commercial terms, the cost is the monetary valuation of the effort, materials, risks and opportunity costs all put together.

Cost is also defined as by the expenditure incurred to produce a given good or service. The cost will be the expenditure that is attributable to something.

Value is measured in terms of the usefulness of the product, the cost is measured strictly in monetary terms.

While cost is a very generic term, it can be classified further. All costs can be qualified as prime cost, sunk cost, factory cost, direct cost, indirect cost, etc. It is advisable to classify costs as it gives more information about it.

Meaning of Costing

Costing is essentially a technique via which we assign or costs to various elements of the business. It is a system of ascertaining costs.

We follow certain rules and principles to guide us in this ascertaining of costs. Some such methods of costing to ascertain these costs are historical costing, standard costing, etc.

Assigning variable costs according to the activity levels is direct costing

And assigning fixed costs irrespective of activity levels is known as absorption costing

Cost Accounting Definition

The term 'Cost Accounting' is defined in different ways by various authorities as follows:

Kohler – “It is that branch of accounting dealing with the classification, recording, allocation, summarisation and reporting of current and prospective costs”.

Wheldon – “It is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services, the relation of these costs to sales values and the ascertainment of profitability”.

Van Sickle – “Cost Accounting is the science of recording and presenting business transactions pertaining to the production of goods and services, whereby these records become a method of measurement and means of control”.

Shilling – “Cost Accounting as a body of concepts, methods and procedures used to measure, analyse or estimate the costs, profitability and performance of individual products, departments and other sequences of a company's operations, for either internal or external use or both and to report on these questions to the interested parties”.

I.C.M.A., London – “It is the process of accounting for cost from the point at which expenditure is incurred or committed to the establishment of its ultimate relationship with cost centres and cost units”. In its widest, usage, it embraces the preparation of statistical data; the application of cost control methods and the ascertainment of the profitability of activities carried out or planned.

An analysis of the above comprehensive definitions reveals some of the important functions of Cost Accounting. Cost Accounting refers to the formal mechanism or a systematic procedure by means of which costs of products and services are computed. This is one of the important aspects which distinguish Cost Accounting from Costing.

NATURE OF COST ACCOUNTING

The nature of cost accounting can be brought out under the following headings:

- 1. Cost accounting is a branch of knowledge:** Though considered as a branch of financial accounting, cost accounting is one of the important branch of knowledge, *i.e.*, a discipline by itself. It is an organised body of knowledge consisting of its own principles, concepts and conventions. These principles and rules vary from industry to industry.
- 2. Cost accounting is a science:** Cost accounting is a science as it is a body of systematic knowledge relating to not only cost accounting but relating to a wide variety of subjects such as law, office practice and procedure, data processing, production and material control, etc. It is necessary for a cost accountant to have intimate knowledge of all these field of study in order to carry on his day-to-day activities. But it is to be admitted that it is not a perfect science as in the case of natural science.
- 3. Cost accounting is an art:** Cost accounting is an art in the sense it requires the ability and skill on the part of cost accountant in applying the principles, methods and techniques of cost accountancy to various management problems. These problems include the ascertainment of cost, control of costs, ascertainment of profitability, etc.
- 4. Cost accounting is a profession:** In recent years cost accounting has become one of the important professions which has become more challenging. This view is evident from two facts. First, the setting up of various

professional bodies such as National Association of Accountants (NAA) in USA. The Institute of Cost and Management Accountants in UK, the Institute of Cost and Works Accountants in India and such other professional bodies both in developed and developing countries have increased the growing awareness of costing profession among the people. Secondly, a large number of students have enrolled in these institutes to obtain costing certificates and memberships for earning their livelihood.

Scope of Cost Accounting

The term scope here refers to field of activity. Cost accounting refers to the process of determining the cost of a particular product or activity. It provides useful data both for internal and external reports reporting. Internal reporting presents details of cost data in a summarized and aggregate form. For instance, in case a company manufacturing electrical goods cost of each product.

In order that cost accounting satisfies the requirements of both internal and external reporting, the following are the different activities which are undertaken under cost accounting system:

Cost Determination: This is the first step in the cost accounting system. It refers to determining the cost for a specific product or activity. This is a critical activity since the other three activities, explained below, depend on it.

Cost Recording: Its is concerned with recording of costs in the cost journal and their subsequent posting to the ledger. Cost recording may be done according to integral or non-integral system a separate set of books is maintained for costing and financial transactions.

Cost Analyzing: It is concerned with critical evaluation of cost information to assist the management in planning and controlling the business activates. Meaningful cost analysis depends largely upon the clear understanding of the cost finding methods used in cost accounting.

Cost Reporting: Its is concerned with reporting cost data both for internal and external reporting purpose. In order to use cost information intelligently it is necessary for the managers to have good understanding of different cost accounting concepts.

Importance of Cost Accounting

- Management uses cost accounting systems to estimate the cost of the products for profitability analysis, cost control and inventory valuation. In order to analyse whether the process is profitable or not, it is important to understand the accurate cost of products. Moreover, to plan the budget and understand the cash flow of the company, it is important to understand the products that are profitable and the ones that are not.
- It allows management to check the raw materials in each stage of production.
- It helps the business to lower the cost of the business operation by identifying and controlling relevant items. Thus, it leads to profit maximization.
- Costing system also helps in understanding the closing value of materials inventory, work-in-progress and finished goods inventory for preparing the financial statement.

- Since management is aware of the inventory numbers, it is able to maintain just-in-time inventory systems. In just-in-time inventory systems, the company orders the raw material as when they need it. It saves the company from storing the raw materials, and thus, saves costs related to storage, security, and obsolescence.
- The real-time part also helps the management to make decisions without waiting for reports.

ADVANTAGES OF COST ACCOUNTING

Helps in Decision Making: Cost accounting helps in decision making. It provides vital information necessary for decision making. For instance, cost accounting helps in deciding:

1. Whether to make a product buy a product?
2. Whether to accept or reject an export order?
3. How to utilize the scarce materials profitably?

Helps in fixing prices: Cost accounting helps in fixing prices. It provides detailed cost data of each product (both on the aggregate and unit basis) which enables fixation of selling price. Cost accounting provides basis information for the preparation of tenders, estimates and quotations.

Formulation of future plans: Cost accounting is not a post-mortem examination. It is a system of foresight. On the basis of past experience, it helps in the formulation of definite future plans in quantitative terms. Budgets are prepared and they give direction to the enterprise.

Avoidance of wastage: Cost accounting reveals the sources of losses or inefficiencies such as spoilage, leakage, pilferage, inadequate utilization of plant etc. By appropriate control measures, these wastages can be avoided or minimized.

Highlights causes: The exact cause of an increase or decrease in profit or loss can be found with the aid of cost accounting. For instance, it is possible for the management to know whether the profits have decreased due to an increase in labour cost or material cost or both.

Reward to efficiency: Cost accounting introduces bonus plans and incentive wage systems to suit the needs of the organization. These plans and systems reward efficient workers and improve productivity as well improve the morale of the work -force.

Prevention of frauds: Cost accounting envisages sound systems of inventory control, budgetary control and standard costing. Scope for manipulation and fraud is minimized.

Improvement in profitability: Cost accounting reveals unprofitable products and activities. Management can drop those products and eliminate unprofitable activities. The resources released from unprofitable products can be used to improve the profitability of the business.

Preparation of final accounts: Cost accounting provides for perpetual inventory system. It helps in the preparation of interim profit and loss account and balance sheet without physical stock verification.

Facilitates control: Cost accounting includes effective tools such as inventory control, budgetary control and variance analysis. By adopting them, the management can notice the deviation from the plans. Remedial action can be taken quickly.

LIMITATIONS OF COST ACCOUNTING

In spite of the various advantages claimed by cost accounting, the discipline suffers from the following limitations:

Cost Accounting is costly to operate: It involves heavy expenditure to operate. The benefits derived by operating the system are more than the cost.

Cost Accounting involves many forms and statements: It involves usage of many forms and statements which leads to increase of paper work.

Costing may not be applicable in all types of Industries: Existing methods of cost accounting may not be applicable in all types of industries. Cost accounting methods can be devised for all types of industries, and services.

It is based on Estimations: Costing system relies on predetermined data and therefore it is not reliable. Costing system estimates costs scientifically based on past and present situations and with suitable modifications for the future. This leads to accurate cost figures based on which management can initiate decisions. But for the predetermined costs, cost accounting also becomes another 'Historical Accounting'.

It is not an exact science: Like any others accounting system, it is not an exact science but an art that has developed through theories and practices.

Bias Judgments: Many judgments are biased and depend on individual discretion.

Difference in opinion: Different views are held by different cost accounts about the items to be included in cost.

RELATIONSHIP BETWEEN FINANCIAL ACCOUNTING AND COST ACCOUNTING

Cost accounting is very closely-related to financial accounting. Some authorities on the subject consider cost accounting to be the branch of financial accounting. But it may be said that cost accounting is complementary to financial accounting, *i.e.*, a subject which is necessary to make financial accounting whole or complete. Financial accounting and cost accounting are similar in certain respects. But in some other respects they differ from one another. These points of similarities and dissimilarities are enumerated below:

Points of Similarities

- (a) The fundamental principles of double entry is applicable to both the systems of accounting.
- (b) The invoices and vouchers constitute the common basis for recording transactions under both the systems of accounting.
- (c) The results of business are revealed by both the systems of accounting.
- (d) The causes for losses and wastages of a business are provided by both these systems of accounting.
- (e) The determination of future business policy is guided by both these systems of accounting.
- (f) A basis for comparison of expenses is being provided by both the accounting systems.
- (g) Accuracy of accounts is maintained under both the systems by means of exercising check over errors and commissions which might creep in either of accounting.

Points of Dissimilarities

<i>Points of Differences</i>	<i>Financial Accounting</i>	<i>Cost Accounting</i>
1. Purpose	The purpose of financial accounting is external reporting mainly to owners, creditors, tax authorities, government, and prospective investors.	The purpose of cost accounting is internal reporting, <i>i.e.</i> , to the management of every business.
2. Obligation to maintain accounts	This is to be maintained compulsorily by higher forms of business organizations. The preparation of accounts must be in accordance with the statutory provisions.	Cost accounting is maintained voluntarily. In some cases government has directed some companies to maintain cost accounts to improve efficiency.
3. Recording	<p>(a) Financial accounting records transactions in a subjective manner, <i>i.e.</i>, according to the nature of expenditure.</p> <p>(b) In financial accounting expenses are recorded in totals.</p> <p>(c) Financial accounting records all transactions which take place in the business.</p> <p>(d) Financial accounting records only historical costs.</p>	<p>(a) Cost accounting records transactions in an objective manner, <i>i.e.</i>, according to purpose for which costs are incurred.</p> <p>(b) In cost accounting costs are expressed by proper analysis and classification in order to find out cost per unit.</p> <p>(c) Cost accounting records only those costs which affect production and sales.</p> <p>(d) Cost accounting records both historical and estimated costs.</p>

4. Analysis profit of	Financial accounting discloses profit for the entire business as a whole.	Cost accounting shows the profitability or otherwise of each product, process or operation so as to reveal the areas of profitability.
5. Control	(a) It does not make use of any control techniques.	(a) It makes use of some important control techniques such as Marginal Costing, Budgetary Control, Standard Costing, etc., in order to control cost.

	(b) It does not control materials by using any technique. (c) Control over labour is not exercised.	(b) It exercises control over materials using some techniques such as ABC analysis, level setting, economic order quantity, etc. (c) Control over labour is exercised and efforts are taken to minimise idle time, overtime etc.
6. Duration of reporting	Generally, financial accounting provides financial information once a year.	Cost accounting furnishes cost data at frequent intervals. Some reports are daily. Some are weekly and some monthly.
7. Evaluation of efficiency	The information provided by financial accounting is not sufficient to evaluate the efficiency of the business.	The cost data helps in evaluating the efficiency of the businesses.
8. Pricing	It fails to guide the formulation of pricing policy.	It provides adequate data for formulating pricing policy.
9. Valuation of stock	Stock is valued at cost or market price whichever is less.	Stock is always valued at cost price.

DIFFERENCES BETWEEN COST AND MANAGEMENT ACCOUNTING

The American Accounting Association 1958, committee on management accounting defines management accounting as “the application of appropriate techniques and concepts in processing the historical and projected economic data of an entity to assist management in establishing a plan for reasonable economic objectives and in the making of rational decisions with a view towards achieving these objectives.” It includes the methods and concepts necessary for effective planning for choosing among alternative business actions, and for control through the evaluation and interpretation of performance. Its study involves consideration of ways in which accounting information may be accumulated, synthesised, analysed and presented in relation to specific problems, decisions and day-to-day tasks of business management.

The terminology published by ICMA, London, defines management accounting as “the application of professional knowledge and skill in the preparation and presentation of accounting information in such a way as to assist management in the formulation of policies and in the planning and control of the operation of the undertaking.”

If we examine the above two definitions of management accounting, it appears that both the systems of accounting serve the same purpose. However, they differ from one another in respect of the following:

<i>Points of Differences</i>	<i>Cost Accounting</i>	<i>Management Accounting</i>
1. Growth of Accounting	The history of cost accounting dates back to fourteenth century.	This system of accounting evolved in the middle of 20th century. Hence it is of recent origin when is compared to cost accounting.

2. Object	The main objects of cost accounting is to ascertain and control cost.	The main objective of management accounting is to provide useful information to management for decision-making.
3. Basis of recording	It is based on both present and future transactions for cost ascertainment.	It is concerned purely with the transactions relating to future.
4. Scope	Cost accounting has narrow scope as it covers matters	It has a wide scope in as much as it covers the areas of

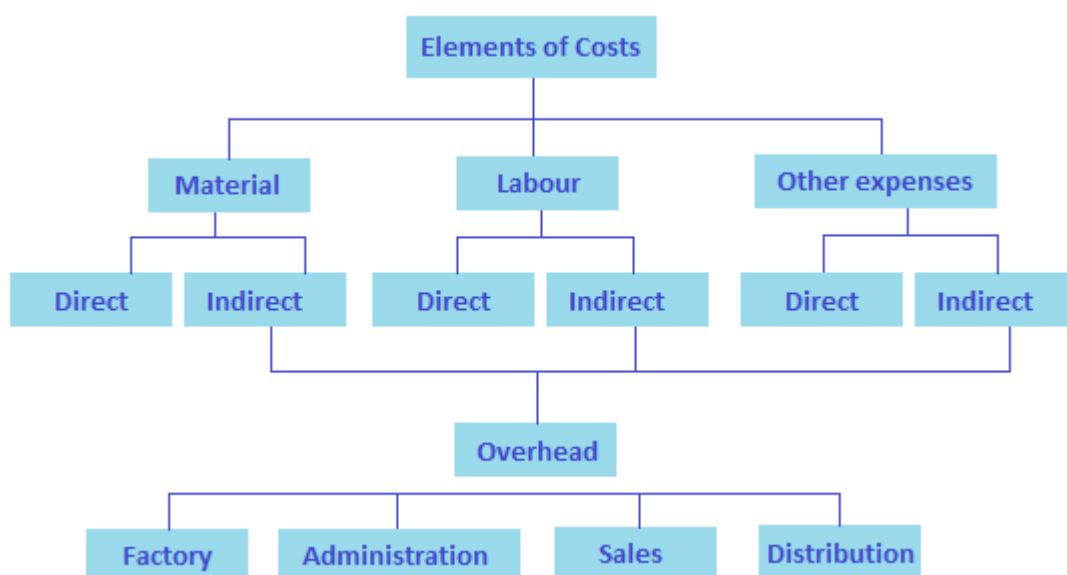
	relating to ascertainment and control of cost.	financial accounting, cost accounting, taxation, etc.
5. Utility	Cost accounting serves the needs of both internal management and external parties.	Management accounting serves the needs of only internal management.
6. Types of transactions dealt with	It deals only with monetary transactions. <i>i.e.</i> , it covers only quantitative aspect.	It deals with both monetary and non-monetary transaction, <i>i.e.</i> , both quantitative and qualitative aspects.
7. Observation of principles and format	Cost accounting follows a definite principle for ascertaining cost and a format for recording.	It does not follow a definite principle and format. Instead, the data to be presented depends upon the need of the management.

Classification of Cost

Cost classification is the process of grouping costs according to their common characteristics. Costs can be classified in the following ways:

1. Classification according to elements

According to this method, costs are divided into 3 categories, namely, materials, labor and expenses.



2. Classification according to the function

This classification is according to the purpose for which they are incurred i.e. production cost, administrative cost, selling cost and distribution cost.

3. Classification according to variability

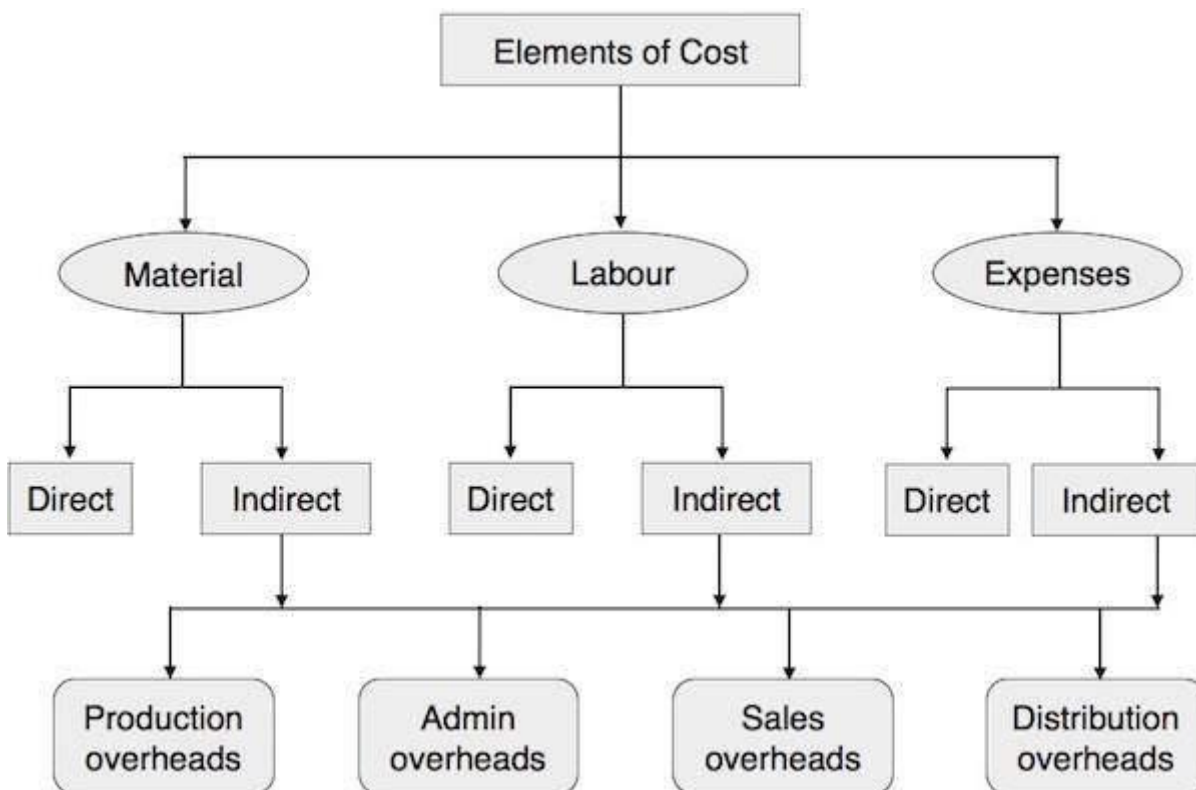
Costs are also classified into fixed, variable and semi-variable depending on the basis of variability of cost in the volume of production. Fixed cost is the cost that tends to be unaffected with the volume of output and depends upon the passage of time, Variable cost tends to vary directly with the volume of output. Whereas semi-variable costs are those which are partly fixed and partly variable. Example, repairs, telephone bill etc.

4. Classification into direct and indirect costs

Direct costs are identified with the cost centre of cost unit, whereas indirect costs cannot be identified with the cost centre or cost unit, but can be apportioned to or absorbed by cost centres of cost units.

Elements of Cost

The following chart shows the various elements of cost and how they are classified.



1. Direct Material

It represents the raw material or goods necessary to produce or manufacture a product. The cost of direct material varies according to the level of output. For example, Milk is the direct material of ghee.

2. Indirect Material

It refers to the material which we require to produce a product but is not directly identifiable. It does not form a part of a finished product. For example, the use of nails to make a table. The cost of indirect material does not vary in the direct proportion of product.

3. Direct Labour

It refers to the amount which is paid to the workers who are directly engaged in the production of goods. It varies directly with the level of output.

4. Indirect Labour

It represents the amount paid to workers who are indirectly engaged in the production of goods. It does not vary directly with the level of output.

5. Direct Expenses

It refers to the expenses that are specifically incurred by the enterprises to produce a product. The production cannot take place without incurring these expenses. It varies directly with the level of production.

6. Indirect Expenses

It represents the expenses that are incurred by the organization to produce a product. These expenses cannot be easily identified accurately. For example, Power expenses for the production of pens.

7. Overhead

It refers to all indirect materials, indirect labour, or and indirect expenses.

8. Factory Overhead

Factory overhead or Production Overhead or Works Overhead refers to the expenses which a firm incurs in the production area or within factory premises.

Indirect material, rent, rates and taxes of factory, canteen expenses etc. are example of factory overhead.

9. Administration Overhead

Administrative or Office Overhead refers to the expenses which are incurred in connection with the general administration of the organizations. Salary of administrative staff, postage, telegram and telephone, stationery etc. are examples of administration overhead.

10. Selling Overhead

All expenses that a firm incurs in connection with sales are selling overheads. Salary of sales department staff, travelers' commission, advertisement etc. are example of selling overhead.

11. Distribution Overhead

It represents all expenses incurred in connection with the delivery or distribution of finished goods and services from the manufacturer to the consumer. F Delivery van expenses. Loading and unloading, customs duty, the salary of deliverymen are examples of distribution overhead.

Cost Sheet

Definition: A cost sheet is a statement which represents the various costs incurred at different stages of business operations, in a tabular format. It determines the total cost or expenditure made by the organization, along with the cost incurred on each unit of a product or service in a particular period.

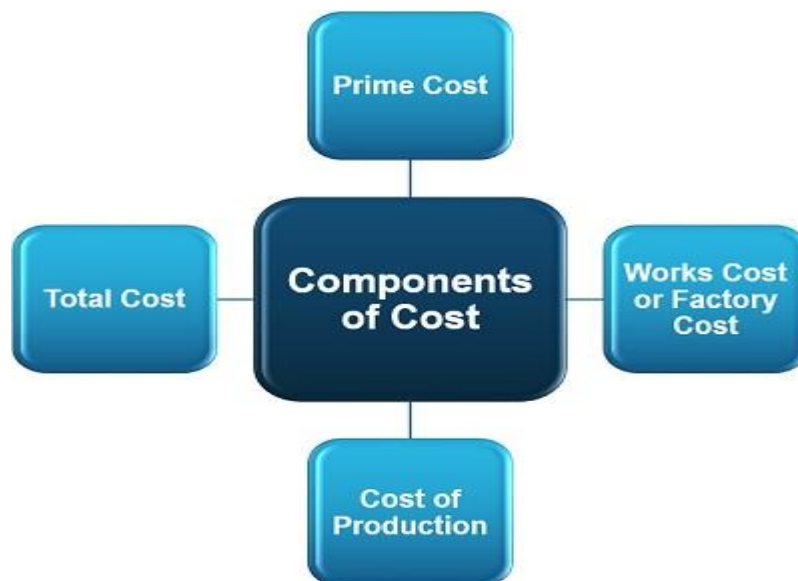
The cost sheet of a business organization provides an insight into its performance and efficiency. It helps in competitive analysis and improvement of the business operations through cost reduction.

Components

- Prime Cost
- Works Cost
- Cost of Production
- Total Cost

Components of Cost

An organization needs to bear multiple types of overheads while carrying out business operations. In a cost sheet, the following overheads or expenditure are presented systematically: Components of Cost



The total expenditure consisting of material, labour and expenses can further be analysed as under:

Prime Cost = Direct materials + Direct Labour + Direct expenses

Works Cost (Factory) = Prime Cost + Factory overhead

Cost of Production = Factory Cost + Administration overhead

Total Cost (Cost of sales) = Cost of production + Selling and distribution overhead

Objects of Cost Sheet

1. For determining the selling price

A cost sheet helps in determination of selling price of a product or of a service. Cost sheet ascertains cost at each stage of the product and also the total cost of the product, where a margin of profit is added and thus the selling price is ascertained.

2. Facilitating in managerial decision making

Preparation of cost sheet helps managers at various levels in their decision-making process such as

- to produce or buy a component,
- what price of goods to quote in the tender,
- whether to retain or replace an existing machine,
- How to reduce costs and maximize profit.
- Identify and make decisions whether they need to continue with the product or not.
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3. Preparation of budgets

Organizations can prepare a budget with the help of a cost sheet. We can prepare the budget by using the current or previous year's data.

Proforma- Cost Sheet

	Period		
	Units Produced		
	Details	Total	Cost Per Unit
	Rs.	Rs.	Rs.
Raw Materials (opening)	...		
<i>Add:</i> Purchase of Raw Materials	...		

<i>Less:</i> Returns Outward	...		

<i>Less:</i> Abnormal Loss of Materials	...		

<i>Less:</i> Raw Materials (closing)	...		

	Details	Total	Cost Per Unit
	Rs.	Rs.	Rs.
Materials Consumed	...		
Direct Wages	...		
Direct Expenses	...		
Carriage Inwards	...		
Hire of Special Plant	...		
Chargeable Expenses	...		
Prime Cost	
Indirect/Factory Expenses			
Indirect Wages	...		
Factory Expenses	...		
Factory Rent and Rates	...		
Factory Lighting and Heating	...		
Factory Fuel and Power	...		
Indirect Materials	...		
Repairs to Plant	...		
Depreciation on Plant	...		
Loose Tools	...		
	...		
<i>Less:</i> Sale of Scrap	...		
	...		
<i>Add:</i> Work-in-Progress (opening)	...		
	...		
<i>Less:</i> Work-in-Progress (closing)	...		

Factory Cost/Works Cost/Production Cost	
Office and Administrative Expenses/Overhead			
Office Rent and Taxes	...		
Office Salary, Lighting, Insurance	...		
Establishment Charges, Postage	...		
Repairs, Legal Expenses, Audit Fees,	...		
Depreciation of Furniture	...		
Management Expenses
Cost of Production	
<i>Add:</i> Finished Goods (opening)	
	

	Details	Total	Cost Per Unit
	Rs.	Rs.	Rs.
<i>Less:</i> Finished Goods (Closing)	
Cost of Production of Goods Sold	
Selling and Distribution Expenses Overhead			
Godown Rent/Storage	...		
Advertisement/Carriage Outwards	...		
Selling Expenses and Commission, Showroom Rent	...		
Salesmen's Salaries, Debt. Collection Charges etc.	...		
Total Cost/Cost of Goods Sold	
Profit (bal. fig.)	
Sales	

Problems and Solutions – Cost Sheet

Problem 1:

The accounts of Basudev Manufactures Ltd. for the year ended 31st December 1988 show the following:

	Rs.
Stock of Material on 1.1.88	6,720
Materials Purchased	1,50,000
Materials returned to suppliers	2,000
Direct Labour	50,000
Direct Expenses	20,000
Factory Expenses	15,300
Office & Administrative Expenses	8,000
Selling & Distribution Expenses	7,900
Stock of Materials on 31.12.88	7,720
Profit	10,000

Find out:

- (a) Material Consumed
- (b) Prime Cost
- (c) Works Cost
- (d) Cost of Production
- (e) Total Cost and
- (f) Sales.

Solution:

Statement of Cost for the year ended 31.12.88

<i>Particulars</i>	<i>Rs.</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Opening Stock of Materials		6,720	
Add : Purchases of Material	1,50,000		
Less : Materials returned of Suppliers	2,000	1,48,000	
		1,54,720	
Less : Closing Stock of Materials		7,720	
RAW MATERIALS CONSUMED		1,47,000	
Direct Labour		50,000	
Direct Expenses		20,000	
PRIME COST			2,17,000
Factory Overhead			
Factory Expenses			15,300
WORKS COST			2,32,300
Office & Administration Overhead			
Office & Administration Expenses			8,000
COST OF PRODUCTION			2,40,300
Selling & Distribution Overhead			
Selling & Distribution Expenses			7,900
TOTAL COST/COST OF SALES			2,48,200
PROFIT			10,000
SALES			2,58,200

Problem 2:

Prepare a Cost Sheet for the year ended 31.3.86 from the following figures extracted from the books of Best Engineering Co.

Opening Stock:

- (i) Raw Material 40,350,
- (ii) Work-in-Progress 15,000 and
- (iii) Finished Stock 35,590.

Cost incurred during the period:

Materials purchased 2,50,000, Wages paid 2,00,000, Carriage inward 2,000, Consumable Stores 10,000, Wages of Storekeeper 7,000, Depreciation of Plant & Machinery 10,000, Materials destroyed by Fire 5,000, Repairs & Renewals 5,010, Office Manager's Salary 10,000, Salary to Office Staff 20,500, Printing & Stationary 10,000, Power 10,500, Lighting for Office Building 2,000, Carriage outward 3,000, Freight 5,000, Entertainment 2,500, Warehousing charges 1,500, Legal charges 2,000, Expenses for participating in Industrial exhibition-6,000.

Closing Stock:

- (i) Raw material 35,000,
- (ii) Work-in-Progress 14,500, and
- (iii) Finished Stock 40,030. Profit 25% on cost.

Solution:

Best Engineering Co. Cost Sheet: for the year ended 31.3.86

<i>Particulars</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>
Opening Stock of Raw Materials	40,350	
Add : Purchases	2,50,000	
Add : Carriage inward	2,000	
Add : Freight	5,000	
	2,97,350	
Less : Materials destroyed by fire	5,000	
	2,92,350	
Less : Closing Stock of Raw Materials	35,000	
RAW MATERIALS CONSUMED	2,57,350	
Wages	2,00,000	
PRIME COST		4,57,350
Factory Overhead		
Consumable Stores	10,000	
Wages of Storekeeper	7,000	
Depreciation of Plant & Machinery	10,000	
Repairs & Renewals	5,010	
Power	10,500	
		42,510
		4,99,860
Add : Opening work-in-progress		15,000
		5,14,860
Less : Closing Work-in-Progress		14,500
WORKS COST		5,00,360
Office & Administrative Overhead		
Office Manager's Salary		10,000
Salary to Office Staff	20,500	
Printing & Stationery	10,000	
Light for Office Building	2,000	
Legal Charges	2,000	
		44,500
COST OF PRODUCTION		5,44,860
Add : Opening Finished Stock		35,590
		5,80,450
Less : Closing Finished Stock		40,030
COST OF GOODS SOLD		5,40,420
Selling & Distribution Overhead		
Carriage outward	3,000	
Entertainment	2,500	
Warehousing charge	1,500	
Expenses in Industrial Exhibition	6,000	
		13,000
COST OF SALES		5,53,420
PROFIT [25% ON 5,53,420]		1,38,355
SELLING PRICE		6,91,775

Problem 3:

From the following figures relating to the manufacture of a Electronic Product during the month of July 1990, prepare a statement showing Cost and Profit per unit:

		Rs.
Raw materials used		50,000
Direct wages		30,000
Labour hours worked		10,500 units
Labour hour rate	Rs. 2-00	
Office overhead		20,000
Selling overhead	Rs. 1-00	
Units produced	20,000 units	
Units sold	18,000 @ Rs. 10	

Solution:**Statement Showing Cost**

<i>Elements</i>	<i>Unit</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>	<i>Per unit Rs.</i>
Raw Materials used		50,000		
Direct wages		30,000		
PRIME COST			80,000	
Factory Overhead				
Labour hours worked [10,500 units × Rs. 2.00]			21,000	
WORKS COST			1,01,000	
Office overhead			20,000	
COST OF PRODUCTION	20,000		1,21,000	6-05
Less : Closing Stock of Finished Goods [balancing figure]	2,000		12,000	
COST OF GOODS SOLD	18,000		1,08,900	
Selling overhead [18,000 units × Re. 1]			18,000	1-00
COST OF SALES	18,000		1,26,900	7-05

Statement Showing Profit

<i>Particulars</i>	<i>Units</i>	<i>Amount Rs.</i>	<i>Amount Rs.</i>	<i>Per unit Rs.</i>
Sales [18,000 units @ Rs. 10 P.U.]			1,80,000	10-00
Less : Cost of Sales			1,26,900	7-05
PROFIT	18,000		53,100	2-95

Working Notes:**Calculation of Closing Finished Stock:**

Closing Finished Stock= Opening Finished Stock + Production – Sales
 = Nil + 20,000 – 18,000 = 2,000.

Problem 4:

The following data are available for 2006:

Production	50,000 units	Rs.
Materials Consumed		75,000
Direct Wages		50,000
Variable Production overhead		1,00,000
Variable Selling overhead		2,00,000
Fixed Expenses		75,000
Selling Price per unit		12

It is expected that in 2007:

- (a) Production will be 1,00,000 units.
- (b) Prices of materials will go up by 33 $\frac{1}{3}$ %.
- (c) Variable selling overhead and fixed expenses will rise by 25% and Rs. 25,000, respectively. What would be the cost per unit and selling price in 2007, if it is desired to maintain the same rate of profit on sales as in 2006?

Solution:

**COST SHEET
for the year ended 2006**

Particulars	Production : 50,000 units		
	Amount Rs.	Amount Rs.	Per unit Rs.
Materials Consumed	75,000		1.5
Direct Wages	50,000		1.0
PRIME COST		1,25,000	2.5
<i>Add : Factory Overhead :</i>			
Variable Production overhead		1,00,000	2.0
WORKS COST		2,25,000	4.5
<i>Add : Office and Administrative Overhead :</i>			
Fixed expenses		75,000	1.5
COST OF PRODUCTION		3,00,000	6.0
<i>Add : Selling & Distribution Overhead :</i>			
Variable selling overhead		2,00,000	4.0
COST OF SALES		5,00,000	10.0
<i>Add : PROFIT (Balancing figure)</i>		1,00,000	2.0
SALES VALUE		6,00,000	12.0

Working:

- (i) Calculation for Material Cost per unit in 2007

	Rs.
Material costs per unit in 2006	1.50
<i>Add : Increased 33$\frac{1}{3}$% in 2007</i>	0.50
	2.00

- (ii) Calculation for cost per variable selling overhead in 2007

Selling overhead increased by 25% i.e. selling overhead per unit in 2007

= Rs. 4.00 + 25% of Rs. 4 = 4.00 + 1.00 = Rs. 5.00

- (iii) Fixed expenses in 2007 = 75,000 + 25,000 = 1,00,000

(iv) Rate of profit on sales = $\frac{2}{12} \times 100 = 16\frac{2}{3}\%$

**COST SHEET
for the year 2007.**

<i>Particulars</i>	Production : 1,00,000 unit		
	<i>Units</i>	<i>Amount Rs.</i>	<i>Per unit Rs.</i>
Materials Consumed	1,00,000	2,00,000	2-00
Direct wages		1,00,000	1-00
PRIME COST		3,00,000	3-00
<i>Add : Factory Overhead :</i> Variable Production overhead		2,00,000	2-00
WORKS COST		5,00,000	5-00
<i>Add : Office & Administrative Overhead</i> Fixed Expenses		1,00,000	1-00
COST OF PRODUCTION		6,00,000	6-00
<i>Add : Selling & Distribution Overhead :</i> Variable Selling overhead		5,00,000	5-00
COST OF SALES		11,00,000	11-00
 <i>Add : PROFIT [16 $\frac{2}{3}$ % on Sales, i.e., $\frac{1}{5}$ of cost]</i>		2,20,000	2-20
SALES VALUE		13,20,000	13-20

Working Notes:

- (i) Variable overhead changed with production unit.
- (ii) Fixed expenses assumed related with office and administration.

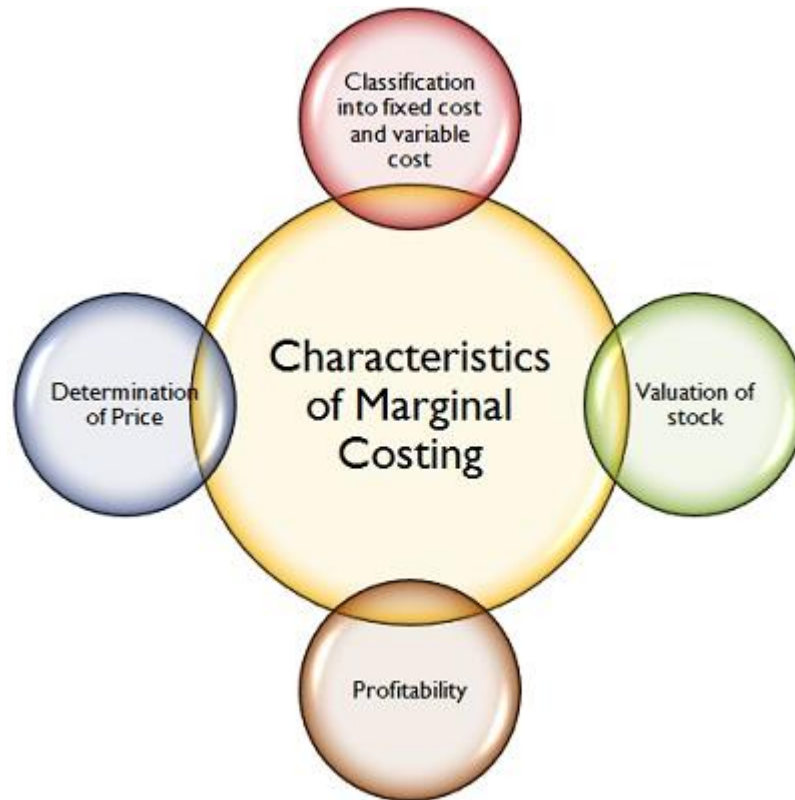
MARGINAL COSTING

Definition: Marginal Costing is a costing technique wherein the marginal cost, i.e. variable cost is charged to units of cost, while the fixed cost for the period is completely written off against the contribution.

The term **marginal cost implies the additional cost involved in producing an extra unit of output**, which can be reckoned by total variable cost assigned to one unit. It can be calculated as:

Marginal Cost = Direct Material + Direct Labor + Direct Expenses + Variable Overheads

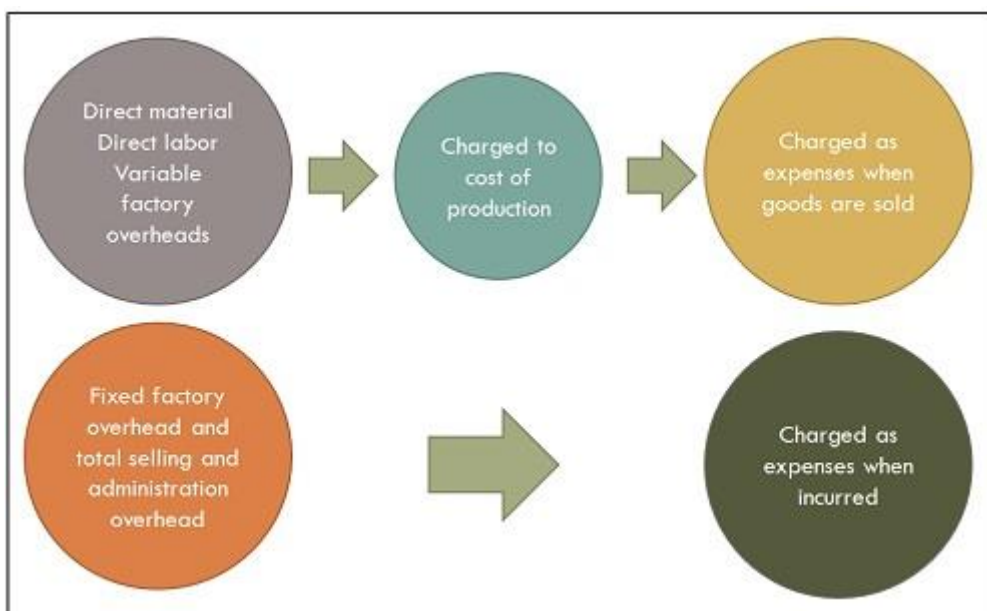
Characteristics of Marginal Costing



- **Classification into Fixed and Variable Cost:** Costs are bifurcated, on the basis of variability into fixed cost and variable costs. In the same way, semi variable cost is separated.
- **Valuation of Stock:** While valuing the finished goods and work in progress, only variable cost are taken into account. However, the variable selling and distribution overheads are not included in the valuation of inventory.
- **Determination of Price:** The prices are determined on the basis of marginal cost and marginal contribution.
- **Profitability:** The ascertainment of departmental and product's profitability is based on the contribution margin.

In addition to the above characteristics, marginal costing system brings together the techniques of cost recording and reporting.

Marginal Costing Approach



The difference between product costs and period costs forms a basis for marginal costing technique, wherein only **variable cost is considered as the product cost while the fixed cost is deemed as a period cost**, which incurs during the period, irrespective of the level of activity.

Facts Concerning Marginal Costing

- **Cost Ascertainment:** The basis for ascertaining cost in marginal costing is the nature of cost, which gives an idea of the cost behavior, that has a great impact on the profitability of the firm.
- **Special technique:** It is not a unique method of costing, like contract costing, process costing, batch costing. But, marginal costing is a different type of technique, used by the managers for the purpose of decision making. It provides a basis for understanding cost data so as to gauge the profitability of various products, processes and cost centers.
- **Decision Making:** It has a great role to play, in the field of decision making, as the changes in the level of activity pose a serious problem to the management of the undertaking.

Marginal Costing assists the managers in taking end number of business decisions, such as replacement of machines, discontinuing a product or service, etc. It also helps the management in ascertaining the appropriate level of activity, through break even analysis, that reflect the impact of increasing or decreasing production level, on the company's overall profit.

Advantages and Benefits of Marginal Costing

- **Cost control:** Marginal costing makes it easier to determine and control costs of production. By avoiding the arbitrary allocation of fixed overhead costs, management can concentrate on achieving and maintaining a uniform and consistent marginal cost.
- **Simplicity:** Marginal costing is simple to understand and operate and it can be combined with other forms of costing (e.g. budgetary costing and standard costing) without much difficulty.
- **Elimination of cost variance per unit:** Since fixed overheads are not charged to the cost of production in marginal costing, units have a standard cost.
- **Short-term profit planning:** Marginal costing can help in short-term profit planning and is easily demonstrated with break-even charts and profit graphs. Comparative profitability can be easily assessed and brought to the notice of the management for decision-making.
- **Accurate overhead recovery rate:** This method of costing eliminates large balances left in overhead control accounts, which makes it easier to ascertain an accurate overhead recovery rate.
- **Maximum return to the business:** With marginal costing, the effects of alternative sales or production policies are more readily appreciated and assessed, ensuring that the decisions taken will yield the maximum return to the business.

Applications of Marginal Costing

Application # 1. Optimum Sales Mix:

When a company is engaged in a number of products, there, may arise a problem of selecting most optimum product mix which would maximise the profit of the concern. Under such situation, profitability will improve by economizing the scarce resource known as key factor.

The product giving highest contribution per unit of key factor should be considered and then all products are put in ranks in order of priority. Selection of products will offer optimum product mix or which the profit will be maximum.

The following guide lines will be helpful in this direction:

- (i) Calculate contribution per unit of key factor.
- (ii) Assign ranks as per highest contribution per unit of key factor.
- (iii) Available key factor is to be utilised in the manufacture of first rank and so on.

Application # 2. Market Expansion:

Sales volume can be increased by taking new territories or by extending its own marketing organisation. It will require an extra expenditure. Marginal costing will be helpful in providing adequate and relevant data for taking a decision in this regard.

Application # 3. Make or Buy Decision:

The nature of decision regarding make or buy may be of the following types:

Every businessmen has to take a decision whether to manufacture the component in the factory or to buy it from the market. In such cases a comparison of marginal cost with that of buying price is to be made. Here only marginal cost is the relevant factor which is to be considered.

If the marginal cost is less than buying price, additional requirement of component is to be made by making rather than buying it from the markets. Similarly, if buying price is less than the marginal cost, it will be advantageous to purchase it from the market.

If the market price is less than the production cost, then the component should be purchased from the market.

A decision has to be taken whether a component should be purchased from the market or it should be produced in the factory.

If additional costs are less than the buying price, the component should be manufactured and vice versa.

Application # 4. Product Mix:

When any company produces a number of products, then a problem may arise of selecting most optimum product mix which would provide the maximum profits.

Before taking decision in product mix, the following principles are taken into account:

- (i) Available key factor should be utilised.
- (ii) Calculate contribution per unit of key factor.
- (iii) Assign ranks on the basis of highest contribution per unit of key factor.

Application # 5. Sales Mix:

Problem of sales mix arises when a business concern is producing more than one product. Each product might be yielding different amount of contributions. The management goal is only to get maximum profit. The ratio of quantities to be sold various products in such a manner as to earn maximum profit. It is known as optimum sales mix.

It is ascertained with the help of contribution per unit. The product which gives the highest contribution is given the highest priority. Out of the various sales mix, that sales mix is selected which provides the maximum profits.

Application # 6. Increase in Level of Activity:

If any concern is not making adequate profit, the level of activity may be increased by reducing the price and removing the shortage of materials; shortage of skilled labour or market situations etc. In all these positions, marginal costing is taken into consideration.

Application # 7. Dropping a Product:

The businessmen want to earn maximum profits out of his limited resources. It requires to fix priorities for various products. The management would like to drop the production of unprofitable product. It will be based on the comparative study of contributions made for each product.

For this purpose, marginal contribution statement is prepared. In this connection the following points are taken into consideration:

- (i) If any production is dropped, the contribution should be expressed in terms of per unit of key factor.
- (ii) The left unused capacity should be used in the production of other products.
- (iii) Production having highest contribution should be accepted top priority in production.
- (iv) If case of positive contribution, the product should not be dropped.
- (v) Least contribution product should be dropped.

Application # 8. Suspension of Activities:

Sometimes due to competition or other reasons, the business concern may not be in a position to carry out its trading activities. Thus trading activities are suspended.

These suspension may be of two types as under:

- (i) Temporary Suspension – During off season, trading activity is closed temporarily for short period. It is known as temporary suspension.
- (ii) Permanent – But when on account of depression, in case of continuous loss, the trading activity can be suspended permanently.

Application # 9. Sales Channel:

Sometimes the trader is faced with the problem of selecting the most profitable channel of distribution. With the help of marginal costing technique, the contribution may be ascertained and correct decision may be taken in

time. Under it, that channel of distribution should be selected which may provide maximum contribution. Selling and distribution expenses should be considered as a part of marginal cost for calculating contribution.

Application # 10. Sales Promotion Scheme:

The management has to evaluate the profitability of various sales schemes which may cover trade discount free gifts, extra commission and price reduction etc. In all these cases, marginal costing will help in assessing the profit through contribution analysis. If goes to increase the total contribution, the profit in that case will be maximum.

Cost Volume Profit Analysis

Cost Volume Profit Analysis (C V P) is a systematic method of examining the relationship between changes in the volume of output and changes in total sales revenue, expenses (costs) and net profit. In other words. It is the analysis of the relationship existing amongst costs, sales revenues, output and the resultant profit. It provides information about the following matters:

1. The behaviour 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

Cost-volume-profit analysis may therefore be defined as a managerial tool showing the relationship between various ingredients of profit planning, viz., cost (both fixed and variable), selling price and volume of activity, etc. Such an analysis is useful to the Finance Manager in the following respects:

- (i) It helps him in forecasting the profit fairly accurately.
- (ii) It is helpful in setting up flexible budgets, since on the basis of this relationship, it can ascertain the cost, sales and profits at different levels of activity.
- (iii) It also assists him in performance evaluation for purposes of management control.
- (iv) It helps in formulating price policy by projecting the effect which different price structures will have on cost and profits.
- (v) It helps in determining the amount of overhead cost to be charged at various levels of operations, since overhead rates are generally predetermined on the basis of a selected volume of production.

Thus, cost-volume-profit analysis is an important media through which the management can have an insight into effects on profit on account of variations in costs (both fixed and variable) and sales (both volume and value) and take appropriate decisions.

To know the cost, volume and profit relationship, a study of the following is essential:

- (1) Marginal Cost Formula
- (2) Break-Even Analysis
- (3) Profit Volume Ratio (or) PN Ratio
- (4) Profit Graph
- (5) Key Factors and
- (6) Sales Mix

Objectives of Cost Volume Profit Analysis

The following are the important objectives of cost volume profit analysis:

- (1) Cost volume is a powerful tool for decision making.
- (2) It makes use of the principles of Marginal Costing.
- (3) It enables the management to establish what will happen to the financial results if a specified level of activity or volume fluctuates.
- (4) It helps in the determination of break-even point and the level of output required to earn a desired profit.
- (5) The P/V ratio serves as a measure of efficiency of each product, factory, sales area etc. and thus helps the management to choose a most profitable line of business.
- (6) It helps us to forecast the level of sales required to maintain a given amount of profit at different levels of prices.

Basic Equation

- Profit = Sales – Total cost
- Profit = Sales – (Variable cost + Fixed cost)
- Profit = Sales – Variable cost – Fixed cost

- Profit + Fixed cost = Sales – Variable cost
- Sales – Variable cost = Fixed cost + profit
- Sales – Variable cost = Contribution
- Contribution = Fixed cost + profit
- Contribution – Fixed cost = Profit

Marginal Cost Equation

Contribution is the difference between the sales and marginal cost. Thus, contribution is calculated by the following formula:

- Contribution = Sales – Variable cost
or, $C = S - V$(i)

- Profit = Contribution – Fixed cost
or, $P = C - F$,
or, $C = F + P$(ii)

Therefore, contribution may be said to be equal to Fixed Cost plus Profit (loss). Contribution contributes towards the recovery of fixed costs and the balance is profit.

Equating equations (i) and (ii), we get,

$$S - V = F + P$$
.....(iii)

Sales – Variable cost = Fixed cost + profit

- At Break-even point, there is neither profit nor loss (i.e., Total cost = Total Sales) so that $P = 0$ (zero)
- $S - V = F + P$(iii)

$$\text{or, } S - V = F + 0$$

$$\text{or, } S = F + V$$
.....(iv)

So, Sales = Fixed Cost + Variable Cost (at B.E.P.)

or, Sales = Total Cost (at B.E.P.)

The concept of contribution is extremely helpful in the study of Break-even analysis and managerial decision making

Profit Volume Ratio (P/V)

Symbolically, P/V Ratio (or, C/S ratio) is expressed as follows:

- P/V Ratio (or, C/S ratio) = Contribution/Sales = C/S

For determining different requirements, different formulae are available:

(a) P/V Ratio = (Sales–Variable Cost)/Sales = (S–V)/S or, 1- (Variable Cost/Sales)

(b) P/V Ratio = (Fixed Cost+Profit (or loss))/Sales = (F+P (or L))/S

(c) $P/V \text{ Ratio} = \text{Change in Contribution} / \text{Change in Sales}$

(d) $P/V \text{ Ratio} = \text{Change in Profit (or Loss)} / \text{Change in Sales}$

P/V Ratio indicates the rate at which profit is being earned. A high P/V Ratio indicates high profitability and low P/V Ratio indicates low profitability.

Break-even analysis

Breakeven analysis is also known as cost-volume profit analysis. Breakeven analysis is the study of the relationship between selling prices, sales volumes, fixed costs, variable costs and profits at various levels of activity.

Break-even analysis is a widely used technique to study cost-volume-profit relationship. The narrower interpretation of the term break-even analysis refers to a system of determination of that level of activity where total cost equals total selling price. The broader interpretation refers to that system of analysis which determines probable profit at any level of activity. It portrays the relationship between cost of production, volume of production and the sales value.

It may be added here that CVP analysis is also popularly, although not very correctly, designated as 'Break-even Analysis'. The difference between the two terms is very narrow. CVP analysis includes the entire gamut of profit planning, while break-even analysis is one of the techniques used in this process. However, as stated above, the technique of break-even analysis is so popular for studying CVP Analysis that the two terms are used as synonymous terms. For the purposes of this study, we have also not made any distinction between these two terms. In order to understand the concept of break-even analysis, it will be useful to know about certain basic terms as given below:

Application

- Breakeven analysis can be used to determine a company's breakeven point (BEP)
- Breakeven point is a level of activity at which the total revenue is equal to the total costs
- At this level, the company makes no profit

1. Contribution

This refers to the excess of selling price over the variable cost. It is also known as, 'gross margin'. The amount of profit (loss) can be ascertained by deducting the fixed cost from contribution. In other words, fixed cost plus profit is equivalent to contribution. It can be expressed by the following formula:—

$\text{Contribution} = \text{Selling Price} - \text{Variable Cost}$

or

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

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

2. Profit/Volume Ratio (P/V Ratio)

This term is important for studying the profitability of operations of a business, Profit volume ratio establishes a relationship between the contribution and the sale value. The ratio can be shown in the form of a percentage also.

The formula can be expressed thus:

$$\text{P/V Ratio (or, C/S ratio)} = \text{Contribution} / \text{Sales} = C / S$$

$$\text{Or, P/V Ratio} = (\text{Sales} - \text{Variable Cost}) / \text{Sales} = (S - V) / S \text{ or, } 1 - (\text{Variable Cost} / \text{Sales})$$

This ratio can also be called 'Contribution/Sales' ratio. This ratio can also be known by comparing the change in contribution to change in sales or change in profit due to change in sales. Any increase in contribution would mean increase in profit only because fixed costs are assumed to be constant at all levels of production. Thus,

$$\text{P/V Ratio} = \text{Change in Contribution} / \text{Change in Sales}$$

$$\text{Or, P/V Ratio} = \text{Change in Profit (or Loss)} / \text{Change in Sales}$$

This ratio would remain constant at different levels of production since variable costs as a proportion to sales remain constant at various levels.

3. Break-even Point

The point which breaks the total cost and the selling price evenly to show the level of output or sales at which there shall be neither profit nor loss, is regarded as break-even point. At this point, the income of the business exactly equals its expenditure. If production is enhanced beyond this level, profit shall accrue to the business, and if it is decreased from this level, loss shall be suffered by the business.

It will be proper here to understand different concepts regarding marginal cost and break-even point before proceeding further. This has been explained below:

It is a point of neither profit nor loss. Therefore, at Break-even Point, contribution is equal to Fixed Cost.

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

$$(1) \text{ Break-even point (in units)} = \text{Fixed Cost} / \text{Contribution per unit}$$

$$(2) \text{ Break-even point (in amount)} = (\text{Fixed Cost} / \text{Contribution per unit}) \times \text{Selling Price per unit}$$

$$\text{Or,} = (\text{Fixed Cost} / \text{Total Contribution}) \times \text{Total Sales}$$

$$\text{Or,} = \text{Fixed Cost} / (1 - \text{Variable Cost per unit} / \text{Selling price per unit}) = \text{Fixed Cost} / \text{P/V Ratio}$$

$$(3) \text{ Sales revenue at break-even point} = \text{Break-even point} \times \text{selling price per unit}$$

At break-even point the desired profit is zero. In case the volume of output or sales is to be computed for a 'desired profit', or 'target profit' the amount of 'desired profit' or 'target profit' should be added to Fixed cost in the formulae given above. For example:

$$(1) \text{ No. of units at Desired Profit} = (\text{Fixed Cost} + \text{Desired Profit}) / \text{Contribution per unit}$$

$$(2) \text{ Sales for a Desired Profit} = (\text{Fixed Cost} + \text{Desired Profit}) / \text{P/V Ratio}$$

Question 1.

A company producing 500 units its variable cost \$200 per unit and sale price 250 per unit, fixed expenses are \$12,000 per month.

Required

Calculate BEP in units and sales and show profit at 90% capacity.

Answer

$$(i). \text{BEP (units)} = \text{Fixed Expenses} / C$$

$$= (\$5,42,000 + \$2,52,000) / 6$$

$$= 7,92,000 / 6 = 1,32,000 \text{ units}$$

$$\text{BEP (Sales)} = 1,32,000 \times 20 = \$26,40,000$$

(ii) Sales for examining profit \$60,000

$$\text{BEP (units)} = (\text{Fixed Exp.} + \text{Desired Profit}) / C$$

$$= (7,92,000 + 60,000) / 6$$

$$= 8,52,000 / 6$$

$$= 1,42,000 \text{ units}$$

$$\text{BEP Sales} = 1,42,000 \times 20 = \$28,40,000$$

Question 2

How would you calculate the following:

(i). PVR (ii). BEP (Sales) (iii). Margin of Safety (iv). Profit

When sales are \$80,000, variable costs \$4,000 and Fixed Costs \$ 4,000.

Answer

$$(i). \text{PVR} = (C / \$) \times 100 = (4,000 \times 100) / 8,000 = 50\%$$

$$C = 8,000 - (4,000) = \$4,000$$

$$(ii). \text{BEP (Sales)} = \text{Fixed Cost} / \text{PVR}$$

$$= (4,000 \times 100) / 50$$

$$= \$8,000$$

$$(iii). \text{MOS} = \text{Actual Sales} - \text{BEP Sales}$$

$$= 8,000 - 8,000$$

$$= \text{Nil}$$

Or

$$\text{MOS} = \text{Profit} / \text{PVR} = 0 / 8,000 = \text{Nil}$$

$$(iv). \text{Profit} = \text{Sales} - \text{Variable Cost} - \text{Fixed Cost}$$

$$= 8,000 - 4,000 - 4,000$$

$$= \text{Nil}$$

Question 3

From the following information find out sales at BEP and PVR

Variable cost per unit = \$15

Sales per unit = \$20

Fixed expenses = \$54,000

What should be the new selling price if BEP unit is brought down to 6,000 units.

$$PVR = (C \times 100) / S$$

Thus,

$$= ((20 - 15) \times 100) / 20$$

$$PVR = 25\%$$

$$BEP (\text{Sales}) = \text{Fixed expenses} / PVR$$

$$= (54,000 \times 100) / 25$$

$$= \$2,16,000$$

(iii). New selling price if BEP is brought down to 6,000 units.

$$\text{New SP} = (\text{Fixed Exp.} + \text{Variable Cost}) / \text{New BEP (units)}$$

$$= (54,000 + 15) / 6,000$$

$$= \$24$$

Question 4

Calculate (i). PV Ratio (ii) BEP (iii) Margin of Safety when:

Sales = \$1,00,000

Total Cost = \$80,000

Fixed Cost = \$20,000

Net Profit = 80,000

Answer

$$(i). PVR = (C \times 100) / S$$

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

$$1,00,000 - 60,000 = 40,000$$

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

$$(1,00,000 - 20,000 - 20,000) = 60,000$$

Thus,

$$PVR = (C / S) \times 100$$

$$= (40,000 / 1,00,000) \times 100$$

$$= 40\%$$

$$(ii). BEP = \text{Fixed Exp.} / PVR$$

$$= 20,000 / 40\%$$

$$= (20,000 \times 100) / 40$$

$$= \$50,000$$

$$\begin{aligned}
\text{(iii). Margin of Safety} &= \text{Present Sales} - \text{Break-Even Sales} \\
&= 1,00,000 - 50,000 \\
&= 50,000 \\
\text{Profitability} &= (40 \times 50,000) / 100 \\
&= \$20,000
\end{aligned}$$

Question 5

The National Company has just been formed. They have a patented process which will make them the sole suppliers of Product A. During the first year the capacity of their plant will be 9,000 units and this is the amount they will be able to sell. Their costs are:

Direct Labor = \$15 per unit

Raw material = \$5 per unit

Other variable costs = \$10 per unit

Fixed costs = \$2,40,000

(a). If the company wishes to make a profit of 2,10,000 during the first year, what should be the selling price?

What is the contribution margin at this price?

(b). If at the end of first year, they wish to increase their volume and an increase of \$1,00,000 in the annual fixed costs will increase their capacity to 50,000 units, how many units will they have to sell to realise a profit of \$7,60,000, if their selling price is \$70 per unit and no other costs change, except that invest \$5,00,000 in advertising with a view to achieve this end?

Solution

(a). Calculation of selling price

Direct labor (9,000 x 15) = \$1,35,000

Raw material (9,000 x 5) = \$45,000

Other variable costs (9,000 x 10) = \$90,000

Total variable costs (PU 30) = 2,70,000

Add: Fixed Cost = 2,40,000

Profit = 2,10,000

Total sale value of 9,000 units @ \$80 per unit = 7,20,000

(b). Sales in Units

(Fixed expenses + Desired profit) / (Sales – Variable cost)

Thus,

Fixed Expenses = 2,40,000 (given) + 1,00,000 (extra) + 50,000 (advertisement cost)

= 8,40,000 + Desired Profit (7,60,000) = \$16,00,000

= 16,00,000 / (70 – 30) = 40,000 units

1. Pepsi Company produces a single article. Following cost data is given about its product:-

Selling price per unit	Rs.40
Marginal cost per unit	Rs.24
Fixed cost per annum	Rs.16000

Calculate:

- (a) P/V ratio (b) break even sales (c) sales to earn a profit of Rs.2,000 (d) Profit at sales of Rs.60,000 (e) New break even sales, if price is reduced by 10%.

Solution:

We know that $(S - v)/S = F + P$ **OR** $S \times P/V \text{ Ratio} = \text{Contribution}$ So,

(A) $P/V \text{ Ratio} = \text{Contribution} / \text{sales} \times 100$
 $= (40 - 24) / 40 \times 100 = 16 / 40 \times 100$ **OR** 40%

(B) Break even sales

$S \times P/V \text{ Ratio} = \text{Fixed Cost}$

(At break even sales, contribution is equal to fixed cost)

Putting this values: $S \times 40 / 100 = 16,000$

$S = 16,000 \times 100 / 40 = 40,000$ **OR** 1000 units

(C) The sales to earn a profit of Rs.2,000

$S \times P/V \text{ Ratio} = F + P$

Putting this values: $S \times 40 / 100 = 16000 + 2000$

$S = 18,000 \times 100 / 40$

$S = \text{Rs.}45,000$ **OR** 1125 units

(D) Profit at sales of 60,000

$S \times P/V \text{ Ratio} = F + P$

Putting this values: $\text{Rs.}60,000 \times 40 / 100 = 16000 + P$ $24,000 = 16000 + P$

$24,000 - 16,000 = P$

8,000

(E) New break even sales, if sale price is reduced by 10%

New sales price = $40 - 10\% = 40 - 4 = 36$

Marginal cost = Rs. 24

Contribution = Rs.12

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

$= 12 / 36 \times 100$ **OR** 33.33%

Now, $S \times P/VRatio = F$

$$= Rs. 16000$$

$$S = 16000 \times 300 / 100 \quad S =$$

Rs. 48,000.

(at B.E.P. contribution is equal to fixed cost) $S \times 100 / 300$

2. From the following information find out:

a. P/VRatio

b. Sales &

c. Margin of Safety

Fixed Cost = Rs. 40,000 Profit

$$= Rs. 20,000$$

B.E.P. = Rs. 80,000

Solution:

a. P/VRatio.

We know that $S - V = F + P$

$$\text{OR} \quad S(S - V) / S = F + P$$

B.E.S. $\times P/VRatio = F$ (Value of P is zero at B.E.Sales)

$$\text{OR} \quad P/VRatio = F / BES$$

Putting the value,

$$P/VRatio = 40,000 / 80,000$$

$$= 50 / 100$$

$$\text{OR} \quad 50\%$$

b. Sales.

We know that $Sales \times P/VRatio = F + P$

$$\text{OR} \quad Sales \times P/VRatio = Contribution$$

OR $Sales = Contribution / P/VRatio$

$$\text{So,} \quad = (40,000 + 20,000) / 50 / 100$$

$$= (60,000 \times 100) / 50$$

$$= Rs. 1,20,000$$

c. Margin of Safety.

Margin of Safety = Sales - B.E.P. Sales So,

$$MOS = 1,20,000 - 80,000$$

$$MOS = Rs. 40,000$$

3. Basic company manufactures a single product having a marginal cost of Rs. 1.50 per unit.

Fixed cost is Rs. 30,000 per annum. The market is such that up to 40,000 units can

be sold at a price of Rs. 3.00 per unit, but any additional sale must be made at Rs.

2.00 per unit. Company has planned profit of Rs. 50,000. How many units must be made and sold?

Solution:

a. Contribution desired = Fixed cost + Desired Profit

$$= 30,000 + 50,000 = 80,000$$

b. Calculation of contribution by producing 40,000 units.

Contribution per unit = Selling price – Marginal cost

$$= 3.00 - 1.50$$

$$= 1.50$$

c. Contribution for producing 40,000 units.

$$= 1.50 \times 40,000 \text{ units}$$

$$= \text{Rs. } 60,000$$

d. Additional units to be produced and sold at Rs. 2.00 per unit after 40,000 units.

$$= \text{Rs. } 80,000 - \text{Rs. } 60,000$$

$$= \text{Rs. } 20,000$$

e. Units to be produced for contribution of Rs. 20,000 after change in price.

$$\text{Contribution per unit} = \text{Rs. } 2.00 - \text{Rs. } 1.50 = \text{Rs. } 0.50$$

f. Additional units to be produced for contribution of Rs. 20,000.

$$= (20,000 \times 100) / 50 = 40,000 \text{ units.}$$

Total units to be produced to earn planned profit = 40,000 + 40,000 = 80,000 units.

4. Mitanshi & company manufacture three products. The following is the cost data relating to products A, B, and C.

Products	A	B	C	Total
	Rs.	Rs.	Rs.	Rs.
Sales	1,50,000	90,000	60,000	3,00,000
Variable Cost	1,20,000	63,000	36,000	2,19,000
Contribution	30,000	27,000	24,000	81,000
Fixed Cost				40,500
Profit				40,500

Prove that how knowledge of marginal costing can help management in changing the sales mix in order to increase profit of the company.

Solution: Let's find out relative profitability so that we can compare it later on.

Products	A	B	C	Total
	Rs.	Rs.	Rs.	Rs.
Sales	1, 50, 000	90, 000	60, 000	3, 00, 000
Variable Cost	1, 20, 000	63, 000	36, 000	2, 19, 000
Contribution	30, 000	27, 000	24, 000	81, 000
Fixed Cost				40, 500
Profit				40, 500
P/V Ratio	20%	30%	40%	27%

From the above table it is clear that with the comparison of product B and C, A is less profitable. Keeping total production same, company should change the sales mix in a way that emphasis should be on producing product C and B.

Now assume that the company decides to use its production capacity more for product B and C than A. Let's see the effect on profit if sale of product B and C is increased by Rs. 30,000 each and product A by reducing Rs. 60,000.

Products	A	B	C	Total
	Rs.	Rs.	Rs.	Rs.
Sales	90, 000	1, 20, 000	90, 000	3, 00, 000
Variable Cost	72, 000	84, 000	54, 000	2, 10, 000
Contribution	18, 000	36, 000	36, 000	90, 000
Fixed Cost				40, 500
Profit				49, 500

From the above table, we can observe that proposed change in product mix leads to an increase in profit from Rs. 40, 500 to Rs. 49, 500.

5. A company has a machine No. 9 which can produce either product A or B. The cost data relating to machine A and B are as follows:

Particulars	Product A	Product B
Selling price	Rs. 20.00	Rs. 30.00
Variable expenses	Rs. 14.00	Rs. 18.00
Contribution	Rs. 6.00	Rs. 12.00

Additional Information:

- Capacity of machine No. 9 is 1,000 hrs.
- In one hr machine No. 9 can produce 3 units of A and 1 unit of B.

Which product should machine No. 9 produce?

Solution:

Statement showing contribution per hour for machine No. 9

Particulars	Product A	Product B
Sales	20.00	30.00
Variable expenses	14.00	18.00
Contribution per unit	6	12
Contribution per hour	18.00	12.00
Contribution per 1, 000 units	18, 000	12, 000

From the above table we can see that **company should produce product A** with the help of machine No.9.

6. Meet & company Ltd. has three divisions each of which makes a different product.

The budgeted data for the next year is as follows:

Divisions	A	B	C
	Rs.	Rs.	Rs.
Sales	1, 12,000	56, 000	84, 000
Direct material	14, 000	7, 000	14, 000
Direct labor	5, 600	7, 000	22, 400
Variable overhead	14, 000	7, 000	28, 000
Fixed cost	28, 000	14, 000	28, 000
Total cost	61, 600	35, 000	92, 400

The management is considering closing down division C. There is no possibility of reducing variable costs. Advise whether or not division C should be closed down.

Solution:**Marginal Cost Statement**

Division	A	B	C
	Rs.	Rs,	Rs.
Sales	1, 12, 000	56, 000	84, 000
Marginal cost (Direct material + Direct cost + Variable overheads)	33, 600	21, 000	64, 400
Contribution	78, 400	35, 000	19, 600
Fixed cost	28, 000	14, 000	28, 000
Profit	50, 400	21, 000	(8,400)

7. Cost data for last year:

Sales	-	60,00,000 (Operating at 75% capacity)
Marginal cost (50% of sale)	-	30, 00, 000
Contribution	-	30, 00, 000
Fixed cost	-	20, 00, 000
Profit	-	10, 00, 000
Percentage of profit over sales	-	16.7%

A report on the performance for the year states:

Sales	-	80, 00, 000
Profit	-	16, 00, 000
Percentage on profit on sale	-	20%

Should the performance of current year be commended? What options should be conveyed to the managing director on the basis of the Cost - Volume - Profit analysis?

Solution:

Statements showing profit for last year and profit at a sale of Rs.80,00,000

Particulars	Last year performance 75% capacity	Performance in present activity level, i.e., 100%
	Rs.	Rs.
Sales	60, 00, 000	80, 00,000
Marginal cost (50% of sales)	30, 00, 000	40, 00,000
Contribution	30, 00, 000	40, 00,000
Fixed cost	20, 00, 000	20, 00,000
Profit	10, 00, 000	20, 00, 000

From the above table we can say that result of current year's performance is not commendable because profit should have been 25% of sales after operating at 100% capacity, whereas it is only 20% of sales.

8. The following budget has been prepared at 70% level of home market:

Units	-	4, 200
Wages	-	12, 600
Materials	-	21, 000
Fixed cost	-	7, 000
Variables cost	-	2, 100
Total	-	42, 700

The selling price in India is Rs. 15. In Sri Lanka about 800 units may be sold only at Rs. 10 and in addition 25 paise per unit will be expenses as freight etc, Do you advise trying for the market in the Sri Lanka?

Solution:

Particulars	India (4200 units)	Sri Lanka (800 units)	Total (5000 units)
	Rs.	Rs.	Rs.
Sales (units x price) (A)	63, 000	8, 000	71, 000
Materials (Rs. 5 per unit)	21, 000	4, 000	25, 000
Wages (Rs. 3 per unit)	12, 600	2, 400	15, 000

Variables(Rs. 0.50 per unit)	2, 100	400	2, 500
Freight(OnlyforSriLankaRs.0.25perunit)	200	200
Marginal cost (B)	35, 700	7, 000	42, 700
Contribution (A – B)	27, 300	1, 000	28, 300
Less: Fixed cost	7, 000	7, 000
	20, 300	1, 000	21, 300

Suggestion: It is advisable to try for the Sri Lankan market at Rs. 10 per unit as by doing so there is an increase of Rs. 1000.

9. Asian paints manufacture 1,000 tins of paints when working at normal capacity. It incurs the cost of Rs. 16 in manufacturing one unit. The details of this cost are given below:

Particulars	Rs.
Direct material	7.50
Direct labor	2.00
Variable overheads	2.50
Fixed overheads	4.00
Production cost (per unit)	16.00

Each unit of product is sold for Rs. 20 with variable selling and administrative expenses of Rs. 0.50 per unit of production.

During the next 3 months, only 500 units can be produced and sold. Management plan to close down the factory estimating that the fixed manufacturing cost can be reduced to Rs. 2,000 for the quarter.

When the plant is operating, the fixed overhead costs are incurred at a uniform rate throughout the year. Additional cost of plant shutdown for the three months is estimated at Rs. 2,800.

Express your view whether the plant should be shut down for three months, and calculate the shutdown point for three months in units of products.

Solution:

(A) Statements showing Contribution per unit:

Particulars	Per unit Rs.
Direct material	7.50
Direct labor	2.00
Variable overheads	2.50
Variable selling and administrative expenses	0.50

Marginal cost (Total) (A)	12.50
Sales (B)	20.00
Contribution (A – B)	7.50

(B) Computation of Loss, if the plant is operated:

500 units to be produced:

Contribution on 500 units:

$$500 \times \text{Rs. } 7.50 = \text{Rs. } 3,750$$

Fixed cost for three months

$$10,000 \times 4 \times 3 / 12 = \text{Rs. } 10,000$$

Expected cost on Operation

$$(\text{Contribution} - \text{Fixed cost}) = \text{Rs. } 6,250$$

(C) Computation of loss, if the plant is shutdown:

Unfavorable Fixed cost = Rs. 2,000

Additional cost of Shutdown = Rs. 2,800 Total loss

on shut down = Rs. 4,800

(D) Advise: From the above calculation, it is clear that it is in the interest of company to shutdown.

(E) Calculation of shutdown point:

Avoidable fixed cost for the period

$$= \text{Total fixed costs for the period} - \text{unavoidable fixed cost} - \text{additional cost for shut down}$$

$$= \text{Rs. } 10,000 - \text{Rs. } 2,000 - \text{Rs. } 2,800$$

$$= \text{Rs. } 5,200$$

$$\text{Shut down point} = \text{Avoidable fixed cost} / \text{Contribution per unit}$$

$$= 5,200 / 7.50 = \text{693 units.}$$

10. A company is providing its product to the consumer through the wholesalers. The managing director of the company thinks that if the company starts selling through retailers or to the consumers directly, it can increase its sales, charge higher prices and make more profit. On the basis of the following information, advise the managing director whether the company should change its channel of distribution or not:

Particulars	Wholesaler	Retailer	Consumer
	Rs.	Rs.	Rs.
Sales per unit	3.60	5.25	6.00
Estimated Sales per year (units)	1,00,000	1,20,000	1,80,000
Selling and distribution overheads (per unit)	0.40	1.00	1.50

Cost of production: Variable cost Rs. 2.50 per unit, Fixed cost Rs. 50, 000.

Solution:

Statement of profit

Particulars	Wholesaler	Retailers	Consumers
	Rs.	Rs.	Rs.
No. of unit sold	1, 00,000	1, 20,000	1, 80,000
Sales revenue (unit x price) (A)	3, 60,000	6, 30,000	10, 80,000
Variable cost	2, 50,000	3, 00,000	4, 50,000
Selling and distribution overheads	40, 000	1, 20,000	2, 70,000
Marginal cost(B)	2, 90,000	4, 20,000	7, 20,000
Contribution (A – B)	70, 000	2, 10,000	3, 60,000
Less: Fixedcost	50, 000	50, 000	50, 000
Profit (Contribution – Fixed cost)	20, 000	1, 60,000	3, 10,000

Advise: Sales should be made directly to the consumers as this channel contributes higher profit.

11. The cost analysis of two products A and B is given below:

Particulars	Product A	Product B
	Rs.	Rs.
Material Rs. 2.50 per unit	25	45
Labor @ Rs. 1 per hour	12	-
Labor @ Rs. 1.50 per hour	-	15
Variable overheads	2	5
Selling price	70	80

On the basis of above information, which product would you recommend to be manufactured if labor is key factor and if material is key factor?

Solution:

Here first of all we have to find out contribution on the basis of both, material as a key factor and labor as a key factor.

Statement showing marginal cost and contribution

Particulars	Product A	Product B
	Rs.	Rs.
Selling price(A)	70	80
Material	25	45
Labor	12	15
Overheads	2	5
Marginal cost(B)	39	65
Contribution (A – B)	31	15
Contribution per unit of Material	$31/10 \text{ units} = 3.10$ $(25 \text{ units}/2.50 = 10 \text{ units})$	$15/18 = 0.83$ $(45 \text{ units}/2.50 = 18 \text{ units})$
Contribution per labor Hour	0.258 $(31/12 \text{ hrs})$	1.50 $(15/10 \text{ hrs})$

Advise: If labor is key factor then product B and if material is key factor then product A should be produced.

12. A manufacturer produces 1500 units of products annually. The marginal cost of each product is Rs. 960 and the product is sold for Rs. 1200. Fixed cost incurred by the company is Rs. 48,000 annually. Calculate P/V Ratio and what would be the break-even point in terms of output and in terms of sales value?

Solution:

A. Contribution per unit = Sales – Variable cost = Rs. 1200 – Rs. 960 = Rs. 240

B. P/V Ratio = Contribution / Sales x 100 = $240/1200 \times 100 = 20\%$

C. Break- even point (in units) = Fixed cost / Contribution per unit = $48,000 / 240 = 200 \text{ units}$

D. Break- even point (in Rs.) = Break- even point x selling price per unit

$$= 200 \times 1200 = 2,40,000$$

OR

D.Break- evenpoint(inRs.)

$$= \text{Fixed cost} / \text{P/V Ratio}$$

$$= 48,000 / 20\% = 2,40,000$$

13. From the following data calculate Margin of Safety.

Particulars	Rs.
Sales	15,00,000
Fixed expenses	4,50,000
Profit	3,00,000

Solution:

$$\text{P/V Ratio} = \frac{\text{Fixed expenses} + \text{Profit}}{\text{Sales}} \times 100$$

$$= \frac{\text{Rs. } 4,50,000 + 3,00,000}{15,00,000} \times 100$$

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

$$= 50\%$$

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

$$= \frac{3,00,000}{50\%}$$

$$= 6,00,000$$

14. Following data is of Dev manufacturing company.

Costs	Variable cost (% of Sales)	Fixed cost Rs.
Direct materials	23.8	
Direct labor	18.4	
Factory overheads	21.6	37,980
Distribution expenses	4.1	11,680
General & administrative expenses	11.1	13,340

Budgeted sales for the next year are Rs. 3,70,000.

Calculate the following:

The sales required to be

made even.

Profit at the budgeted sale

volume

The profit, if actual sales – A. Increases by 5% from the budgeted sales and B. Drop by 10% from the budgeted sales.

Solution:

A. Variable cost = 23.8 + 18.4 + 21.6 + 4.1 + 11.1 = 79% (of sales)

So, it will be 79% of sales = 3,70,000 x 79/100 = 2,92,300

B. Fixed cost = Rs. 37,980 + Rs. 11,680 + Rs. 13,340 = 63,000

C. Contribution = 100 – 79 = 21%

D. P/V Ratio = Contribution / Sales x 100

= 21 / 100 x 100 = 21%

Break- even point = Fixed cost / P/V Ratio

= 63,000 / 21%

= Rs. 3,00,000

Profit at budgeted sales of Rs. 3

,70,000 Contribution =

Sales x P/V Ratio

= 3,70,000 x 21%

= Rs. 77,700

Contribution = Fixed expenses + Profit

So, Profit = Contribution – Fixed expenses

= Rs. 77,700 – 63,000

= Rs. 14,700

Profit if actual sales increased by 5% from the budgeted sales.

Particulars	Rs.
Sales	3,70,000
Add: 5% increase on Rs. 3,70,000	18,500
Revised sales	3,88,500
Less: Variable cost 79% of Rs. 3,88,500	3,06,915
Contribution	81,585
Less: Fixed cost	63,000
Profit	18,585

Profit if actual sales dropped by 10%

Particulars	Rs.
Sales	3, 70, 000
Less: 10% decrease on Rs. 3,70,000	37, 000
Revised sales	3, 33, 000
Less: Variable cost 79% of 3,33,000	2, 63, 070
Contribution	69, 930
Fixed cost	63, 000
Profit	6, 930

15. Gyanlimited manufactures and sells four types of products under the brand names A, B, C, and D. The sales mix in value comprises 30%, 40%, 20%, and 10% of A, B, C, and D respectively. The total budgeted sales are Rs. 60, 000 per month. The operating costs are:

Product A - 60% of selling price

Product B - 70% of selling price

Product C - 80% of selling price

Product D - 70% of selling price

Fixed cost Rs. 12,000 per month. Calculate the break-even point and percentage of margin of safety for the product on overall basis.

Solution:

Calculation of Sales Mix

Particulars	Products				
	A	B	C	D	Total
	30%	40%	20%	10%	100%
	Rs.	Rs.	Rs.	Rs.	Rs.
Sales	18, 000	24, 000	12, 000	6, 000	60, 000
Less: Variable cost	10, 800	16, 800	9, 600	4, 200	41, 400
Contribution	7, 200	7, 200	2, 400	1, 800	18, 600
Less: Fixed cost					12, 000
Profit					6, 600

P/V Ratio = Contribution/Sales x 100

$$= 18,600 / 60,000 \times 100$$

$$= 31\%$$

Break- even point = Fixed cost / P/V Ratio

$$= 12,000 / 31\%$$

$$= 38,709$$

Margin of safety = Actual sales – Break- even point / Actual sales x 100

$$= 60,000 - 38,709 / 60,000 \times 100$$

$$= 35.48\%$$

16. From the following information, calculate Break- even point and Sales to earn profit of Rs.2,40,000.

Particulars	Rs.
Sales	8,00,000
Fixed cost	3,60,000
Variable cost	5,60,000

Solution:

Contribution = Sales – Variable cost

$$= 8,00,000 - 5,60,000$$

$$= 2,40,000$$

P/V Ratio = Contribution / Sales x 100

$$= 2,40,000 / 8,00,000 \times 100$$

$$= 30\%$$

Sales to earn a profit of Rs. 2, 40, 000

= Fixed cost + Desired Profit / P/V Ratio

$$= 3,60,000 + 2,40,000 / 30\%$$

$$= 6,00,00 / 30\%$$

$$= 20,00,000$$

17. From the information given below, calculate P/V Ratio, Fixed expenses, Expected profit if sales is budgeted at Rs.90,000.

Year	sales	Profit
2004	1, 80, 000	30,000
2005	2, 60, 000	50,000

Solution:

$$\text{P/V Ratio} = (\text{Change in profit Rs.} / \text{Change in sales Rs.}) \times 100$$

$$= 50,000 - 30,000 / 2,60,000 - 1,80,000 \times 100$$

$$= 20,000 / 80,000 \times 100$$

$$= 25\%$$

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

$$= 1,80,000 \times 25\%$$

$$= 45,000$$

$$\text{Fixed cost} = \text{Contribution} - \text{F} + \text{Profit}$$

$$= 45,000 - \text{F} + 30,000$$

$$= \text{F} = 45,000 - 30,000$$

$$= \text{F} = 15,000$$

When sales is budgeted as Rs. 90,000

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

$$= 90,000 \times 25 / 100$$

$$= 22,500$$

$$\text{Profit} = \text{Contribution} - \text{Fixed cost}$$

$$= 22,500 - 15,000 = 7,500$$

18. The budgeted results of Dev limited company include the following:

Products	Sales volume Rs.	P/V Ratio
A	2,00,000	40%
B	1,20,000	50%
C	80,000	25%
Total	4,00,000	30%

Fixed overheads for the period are Rs. 80,000. The management is very much concerned at the result forecasts for the company. They have requested you to prepare a statement showing the amount of loss expected and recommenda

change in sales mix which will eliminate the expected loss.

Solution:

A. Contribution = 4,00,000 x 30/100 = 1,20,000

Loss = Contribution – Fixed cost

= 1,20,000 – 80,000

= 40,000

B. Recommended change in sales mix:

Under recovery of fixed cost or Loss/P/V Ratio of the product

Product A = 40,000 / 40%

= 1,00,000

Product B = 40,000 / 50%

= 80,000

Product C = 40,000 / 25%

= 1,60,000

C. Increase in total sale to eliminate loss of Rs. 40,000:

= Expected Loss / Composite P/V Ratio

= 40,000 / 30%

= 1,33,334

19. Use the following information and explain that how the reduction in selling price would affect the margin of safety?

Particulars	Rs.	Rs.
Selling price per unit	40
	
Variable cost		
Material	12
Labor	8
Overheads	4	24

Fixed cost is Rs. 8,000.

Full capacity of the plant is 5,000 units.

00 units.

Reduced selling price is Rs.32
per unit.

Solution:

1. When selling price is Rs.40, then Margin of Sa

fety: $MOS = \text{Total sales} - \text{Sales at B.E.P.}$

So, first of all we have to calculate Total sales and Sales at B.E.P.

A. Total Sales = Total units x Sales price per unit

$$= 5,000 \times 40$$

$$= 2,00,000$$

B. Sales at B.E.P. = Fixed cost x Price / Price - Variable cost

$$= 8,000 \times 40 / 40 - 24$$

$$= 3,20,000 / 16$$

$$= 20,000$$

From the above information now we can calculate Margin of Safety by the following way:

Margin of Safety = Total sales - Sales at B.E.P.

$$= 2,00,000 - 20,000$$

$$= 1,80,000$$

2. Margin of Safety when reduced selling price is Rs.32:

B.E.P. = Fixed cost x Price / Price - Variable cost

$$= 8,000 \times 32 / 32 - 24$$

$$= 8,000 \times 32 / 8$$

$$= 32,000$$

Margin of Safety = 1,80,000 - 32,000

Margin of Safety = 1,48,000

3. **Impact:** From the above calculation we can see that the reduced price will decrease margin of safety and B.E.P. will increase.