COST AND MANAGEMENT ACCOUNTING

Second Year : B.Com.

SEMESTER – IV

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2ⁿᵈ Year B.Com. Semester – IV

COST AND MANAGEMENT ACCOUNTING

This book is exclusively prepared for the use of students of Three – Year, UG Programme, Centre for Distance Education, Acharya Nagarjuna University and this book is meant for limited circulation only.

Printed at :

FOREWORD

Since its establishment in 1976, Acharya Nagarjuna University has been forging ahead in the path of progress and dynamism, offering a variety of courses and research contributions. I am extremely happy that by gaining a 'A' Grade from the NAAC in the year 2014, the Acharya Nagarjuna University is offering educational opportunities at the UG, PG levels apart from research degrees to students from over 285 affiliated colleges spread over the two districts of Guntur and Prakasam.

The University has also started the Centre for Distance Education with the aim to bring higher education within reach of all. The centre will be a great help to those who cannot join in colleges, those who cannot afford the exorbitant fees as regular students, and even housewives desirous of pursuing higher studies. With the goal of bringing education in the door step of all such people. Acharya Nagarjuna University has started offering B.A, and B, Com courses at the Degree level and M.A, M.Com., L.L.M., courses at the PG level from the academic year 2021-22 on the basis of Semester system.

To facilitate easier understanding by students studying through the distance mode, these self-instruction materials have been prepared by eminent and experienced teachers. The lessons have been drafted with great care and expertise in the stipulated time by these teachers. Constructive ideas and scholarly suggestions are welcome from students and teachers invited respectively. Such ideas will be incorporated for the greater efficacy of this distance mode of education. For clarification of doubts and feedback, weekly classes and contact classes will be arranged at the UG and PG levels respectively.

It is aim that students getting higher education through the Centre for Distance Education should improve their qualification, have better employment opportunities and in turn facilitate the country's progress. It is my fond desire that in the years to come, the Centre for Distance Education will go from strength to strength in the form of new courses and by catering to larger number of people. My congratulations to all the Directors, Coordinators, Editors and Lesson -writers of the Centre who have helped in these endeavours.

Prof. P.Rajasekhar
Vice –Chancellor,
Acharya Nagarjuna University

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen & CA)– Semester – IV

402BCO21- **Course 4B:Cost and Management Accounting**

Learning Outcomes:

At the end of the course, the student will able to;

- ➢ Understand various costing methods and management techniques.
- ➢ Apply Cost and Management accounting methods for both manufacturing and service industry.
- ➢ Prepare cost sheet, quotations, and tenders to organization for different works.
- ➢ Analyze cost-volume-profit techniques to determine optimal managerial decisions.
- ➢ Compare and contrast the financial statements of firms and interpret the results.
- ➢ Prepare analysis of various special decisions, using relevant management techniques.

SYLLABUS:

UNIT-I: Introduction:

Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Management Accounting: Features – Objectives – Functions –
Elements of Cost - Preparation of Cost Sheet (including problems)

UNIT-II: Material and Labour Cost:

Techniques of Inventory Control – Valuation of Material Issues: FIFO - LIFO - Simple and Weighted Average Methods
Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages- Incentive Schemes -Time Rate Method, Piece Rate Method, Halsey, Rowan Methods and Taylor Methodsonly(including problems)

UNIT-III: Job Costing and Batch Costing:

Definition and Features of Job Costing – Economic Batch Quantity (EBQ) – Preparation of Job Cost Sheet – Problems on Job Cost Sheet and Batch Costing(including problems)

UNIT-IV: Financial Statement Analysis and Interpretation:

Financial Statements - Features, Limitations. Need, Meaning, Objectives, and Process of Financial Statement Analysis- Comparative Analysis – Common Size Analysis and Trend Analysis (including problems)

UNIT-V: Marginal Costing:

Meaning and Features of Marginal Costing – Contribution –Profit Volume Ratio- Break Even Point – Margin of Safety – Estimation of Profit and Estimation of Sales(including problems)

References:

1. S.P. Jain and K.L. Narang – Advanced Cost Accounting, Kalyani Publishers.
2. M.N. Arora – A test book of Cost Accounting, Vikas Publishing House Pvt. Ltd.
3. S.P. Iyengar – Cost Accounting, Sultan Chand & Sons.
4. Nigam & Sharma – Cost Accounting Principles and Applications, S.Chand& Sons.
5. S.N. Maheswari– Principles of Management Accounting, Sultan Chand & Sons.
6. I.M.Pandey – Management Accounting, Vikas Publishing House Pvt. Ltd.
7. Sharma & Shashi Gupta – Management Accounting, Kalyani Publishers.
8. Murthy & Guruswamy – Management Accounting, Tata McGraw Hill, New Delhi.
9. S.P. Gupta – Management Accounting, S. Chand Publishing, New Delhi.
10. Umamaheswara Rao and Ranganath, Cost Accounting, Kalyani Publishers.
11. Dr V Murali Krishna – Cost Accounting, Seven Hills International Publishers.

Suggested Co-Curricular Activities:

♦ Debate on methods of payments of wages

♦ Seminars

♦ Problem Solving Exercises

♦ Seminar on need and importance of financial statement analysis

♦ Graphs showing the breakeven point analysis

♦ Identification of elements of cost in services sector by Visiting any service firm

♦ Cost estimation for the making of a proposed product

♦ Listing of industries located in your area and methods of costing adopted by them

♦ Collection of financial statements of any two organization for two years and prepare a common Size Statements

♦ Collection of cost sheet and pro-forma of quotation

♦ Examinations (Scheduled and surprise tests)

B. Com.(General / Comp. Appl.s) Degree Examination

Second Year – Fourth Semester

Part – II : Commerce

Paper – IV : COST AND MANAGEMENT ACCOUNTING

Time : Three hours   **Maximum Marks : 70**

Section – A

Answer any FIVE of the following questions.   (5 × 4 = 20 Marks)

1)   Elements of cost.

వ్యయం అంశాలు.

2)   Time and rate method.

సమయం మరియు రేటు పద్ధతి.

3)   EBQ.

EBQ.

4)   Trend analysis.

ట్రెండ్ విశ్లేషణ.

5)   Profit volume Ratio.

లాభం వాల్యూమ్ నిష్పత్తి.

6)   Job costing.

జాబ్ కాస్టింగ్.

7)   Cost sheet.

కాస్ట్ షీట్.

8)   Inventory control.

సరుకు నియంత్రణ.

Section – B

Answer the following questions.   (5 x 10 = 50 Marks)

9) (a) Define Cost Accounting. Briefly explain the objectives and functioning of cost accounting.

కాస్ట్ అక్కౌంటింగ్ ను నిర్వచించి, కాస్ట్ అక్కౌంటింగ్ యొక్క లక్ష్యాలు మరియు విధులను వివరించండి.

Or

(b) Distinguish between Cost Accounting and Management Accounting.

కాస్ట్ అక్కౌంటింగ్ మరియు నిర్వహణ అక్కౌంటింగ్ మధ్య వ్యత్యాసాలను వ్రాయండి.

10) (a) From the following details write stores ledger under simple average method.

2006 Dec			
	1	Opening Balance	100 kg @ Rs. 5.00
	4	Received	50 kg @ Rs. 5.20
	8	Issued	120 kg
	10	Issued	100 kg
	15	Received	80 kg @ Rs. 5.00
	20	Issued	50 kg
	22	Received	100 kg @ Rs. 5.00
	25	Issued	40 kg
	30	Issued	60 kg

క్రింది వివరములు నుండి సాధారణ సగటు పద్ధతిలో స్టోర్స్ ఆవర్జా వ్రాయండి.

2006 డిసెంబర్			
	1	ప్రారంభ బాలన్స్	100 కిలోలు @ Rs. 5.00
	4	స్వీకరించబడినది	50 కిలోలు @ Rs. 5.20
	8	జారీ చేయబడినది	120 కిలోలు
	10	జారీ చేయబడినది	100 కిలోలు
	15	స్వీకరించబడినది	80 కిలోలు @ Rs. 5.00
	20	జారీ చేయబడినది	50 కిలోలు
	22	స్వీకరించబడినది	100 కిలోలు @ Rs. 5.00
	25	జారీ చేయబడినది	40 కిలోలు
	30	జారీ చేయబడినది	60 కిలోలు

Or

(b) Define Labour Turnover. How is it measured? Explain it.

లేబర్ టర్నోవర్ ను నిర్వచించి దానిని ఎలా కొలుస్తారో వివరించండి.

11) (a) Define job cost and batch costing. Explain difference between Job costing and batch costing.

జాబ్ కాస్టింగ్ మరియు బ్యాచ్ కాస్టింగ్ లను నిర్వచించి, వాటి మధ్య ఉన్న వ్యత్యాసాలను వివరించండి.

Or

(b) Annual demand for a component is 30,000 units. Cost of set – up per batch is 600. Inventory carrying cost per unit per annum is Rs. 1.

(i) Calculate the total cost assuming batch size of 4,000 units, 5,000 units, 6,000 units, 7,000 units, 8,000 units, 9,000 units, and 10,000 units. Also find the economic batch quantity.

(ii) Using mathematical formula calculate economic batch quantity.

ఒక భాగం కోసం వార్షిక డిమాండ్ 30,000 యూనిట్లు ఒక్కో బ్యాచ్ ను సెటప్ ఖర్చు రూ. 600. సంవత్సరానికి ఒక యూనిట్ కు ఇన్వెంటరీ క్యారియింగ్ ఖర్చు రూ. 1.

(i) 4,000 యూనిట్లు, 5,000 యూనిట్లు, 6,000 యూనిట్లు, 7,000 యూనిట్లు, 8,000 యూనిట్లు, 9,000 యూనిట్లు మరియు 4,000 యూనిట్లు. యూనిట్లు బ్యాచ్ పరిమాణాన్ని ఊహించి మొత్తం ఖర్చును లెక్కించండి. ఆర్థిక బ్యాచ్ పరిమాణాన్ని కూడా కనుగొనండి.

(ii) గణిత సూత్రాన్ని ఉపయోగించి ఆర్థిక బ్యాచ్ పరిమాణాన్ని లెక్కించండి.

12) (a) Define financial statement analysis. Explain the objectives and process of financial statement analysis.

ఆర్థిక ప్రకటన విశ్లేషణను నిర్వచించండి. ఆర్థిక నివేదిక విశ్లేషణ యొక్క లక్ష్యాలు మరియు ప్రక్రియను వివరించండి.

Or

(b) Briefly explain comparative analysis and common size analysis.

తులనాత్మక విశ్లేషణ మరియు సాధారణ పరిమాణం విశ్లేషణను క్లుప్తంగా వివరించండి.

13) (a) Define marginal costing. Explain the features and importance of marginal costing.

ఉపాంత వ్యయాన్ని నిర్వచించండి. మార్జినల్ కాస్టింగ్ యొక్క లక్షణాలు మరియు ప్రాముఖ్యతను వివరించండి.

Or

(b) From the following data, you are required to calculate

(i) P/V ratio

(ii)   Break – even sales with the help of P/V ratio.

(iii)   Sales required to earn a profit of Rs. 4,50,000

       Fixed expenses = Rs. 90,000

       Variable cost per unit

       Direct material = Rs. 5

       Direct labour = Rs. 2

       Direct overheads = 100% of direct labour

       Selling price per unit = Rs. 12

క్రింది డేటా నుండి మీరు లెక్కించవల్సి ఉంటుంది

(i)   P/V నిష్పత్తి

(ii)   P/V నిష్పత్తి సహాయంతో బ్రేక్ – ఈవెన్ అమ్మకాలు

(iii) లాభం పొందటానికి అమ్మకాలు అవసరం రూ. 4,50,000

       స్థిర ఖర్చులు = రూ. 90,000

       యూనిట్ కి వేరియబుల్ ధర

       డైరెక్ట్ మెటీరియల్ = రూ. 5

       ప్రత్యక్ష లేబర్ = రూ. 2

       డైరెక్ట్ ఓవర్ హెడ్స్ = 100% డైరెక్ట్ లేబర్

       యూనిట్ విక్రయం ధర = రూ. 12

CONTENTS

LESSON - 1

NATURE AND SCOPE OF FINANCIAL ACCOUNTING AND COST ACCOUNTING

1.0 Objective :

The objective of this lesson is to explain Definitions of Financial Accounting and Cost Accounting, Nature and Scope of Cost Accounting, Difference between Financial Accounting and Cost Accounting.

Structure

1.1 Introduction :
1.2 Meaning and Definition of Accounting
1.3 Meaning of Financial Accounting
1.4 Limitations of Financial Accounting
1.5 Cost Accounting - Costing - Cost Accountancy
1.6 Cost
1.7 Costing
1.8 Cost Accounting
1.9 Cost Accountancy
1.10 Scope of Cost Accountancy
1.11 Objectives of Cost Accounting
1.12 Cost Accounting Vs Financial Accounting
1.13 Differences between Financial Accounting And Cost Accounting
1.14 Self Assessment Questions
1.15 Suggested Reading

1.1 INTRODUCTION :

The accounting systems which we find today have developed with the development of institutions of trade, commerce and industry. In earlier days the business was simple and the transactions were few. The business men used to remember the transactions by memorising them. The advent of industrial revolution resulted in large scale production in widening of markets. With the increase in business activity the businessmen were expected to keep a track of their relationship with out siders and to make a record of their assets and liabilities. The Technological changes have also brought a change in the field of accounting. Accounting is now considered as a managerial tool for planning and control.

1.2 MEANING AND DEFINITION OF ACCOUNTING :

Accounting involves the collection, recording, classification and presentation of financial data for the benefit of management and outside agencies such as shareholders, creditors, bankers and government. According to the committee on Terminology of American Institute of Certified Public Accountants, accounting is "the art of recording, classifying and summarising in a significant manner and interms of money, transactions and events, which are in part at least, of a financial character and interpreting the results there of ". The transactions which are measurable in monetary terms only form a part of accounting. The recording of transactions is done in such away that analysis and interpretation of business activities is possible.

Smith and Ashburne describe it as "Accounting is the science of recording and classifying business transactions and events, primarily of financial character, and the art of making significant summarises, analysis and interpretation of those transactions and events and communicating the results to persons who must make decisions or form judgements". This definition emphasises financial reporting and decision - making aspect of accounting.

The word ' Accounting can be classified in to three categories.

a) Financial Accounting

b) Cost Accounting; and

c) Management Accounting.

1.3 MEANING OF FINANCIAL ACCOUNTING :

Financial Accounting may be defined as the science and art of recording and classifying business transactions and preparing summaries of the same for determing year end profit or loss and the financial position of the concern. It is the part of accounting which is employed to communicate the financial information of a business unit.

Financial Accounting is primarily concerned with record keeping directed towards the preparation of Profit and Loss Account and Balance Sheet. It provides information regarding the profit and loss that the business enterprise is making and also its financial position on a particular date. The information concerning the business enterprise is helpful to management to control in a general way the major functions of a business i.e. finance, administration production and distribution but details regarding operating efficiency of these divisions are lacking.

1.4 LIMITATIONS OF FINANCIAL ACCOUNTING :

The following limitations of financial accounting have lead to the development of cost accounting.

1. Historical Nature : Financial accounting is historical in nature in the sense that it is a record of all those transactions which have taken place in the business during a particular period of time. The impact of future uncertainities has no place in financial accounting. As management needs information for future planning, financial accounting can only give information about what has happened and not about what will happen. It does not suggest it what should be done to increase the efficiency of the concern.

2. Provides the Information About the Concern as a Whole : Financial accounting discloses only the net result of the collective activities of a business as a whole. It does not indicate the profit or loss of each department, job, process or contract. It does not disclose the exact cause of inefficiency.

3. Not Helpful in Price Fixation : Financial accounting is not helpful in fixing prices of products. Price fixation requires information about variable and fixed costs, indirect costs. Indirect expenses are estimated on the basis of past records for price determination. The concern may be required to quote price for the supply of goods in the near future. Financial accounting can not supply all these information. So it is not helpful in price determination.

4) Cost Control Not Possible : Cost control is not possible in financial accounting. The cost figures are known only at the end of a financial period. When the cost has already been incurred then nothing can be done to control it. There is no technique in financial accounting which can help to ascertain whether the cost is more or less while the expenses are being incurred. There is no procedure to assign responsibility for higher costs.

5) Appraisal of Policies Not Possible : It is not possible to evaluate various policies and programmes in financial accounting. There is no technique for comparing actual performance with budgeted targets. Whether the work is going on as per schedule or not cannot be determined. The only criterion for determing efficiency is to see the profits at the end of financial period. The profitability is the only yardstick for evaluating managerial performance. Profits of an enterprise are influenced by a number of outside factors also. So it is not a reliable test for ascertaining efficiency of the management.

6) Only Actual Costs Recorded : Financial accounting records only actual cost figures. The amount paid for purchasing of materials, property or other assets is recorded in account books. The price of goods and assets go on varying from time to time. The present prices of assets may be absolutely different from the recorded costs. Financial accounts do not record price level changes. The recorded costs cannot provide correct information or exact values of assets.

7) Not Helpful in Strategic Decisions : It does not supply useful data to management for comparison with previous period and for taking various financial decisions as introduction of new products, replacement of labour by machines, price in normal or special circumstances, producing a part in the factory or buying it from outside products, investment to be made in new products or not etc.

8) Technical Subject : Financial Accounting is a technical subject. The recording of transactions and making their use requires knowledge of accounting principles and conventions. A person who is not conversant with accounting subject has little utility of financial accounts.

9) Quantitative Information : Financial accounting records only that information which can be quantitatively measured. Anything which cannot be quantitatively measured will not form a part of financial accounting even though it is important for business.

10) Lack of Unanimity About Accounting Principles : Accountants differ on the use of accounting principles and procedures. The use of different accounting methods reduces the usefulness and reliability of accounts.

11) Chances of Manipulation : There are chances of using financial accounts to suit the whims of management. The over valuation or under valuation of inventory may change the figures of profits. More profits may be shown to get more remuneration, issue more dividend or to raise the prices of company's shares. Less profits may be shown to save taxes or for not paying bonus to workers etc. The possibility of manipulating financial accounts reduces their reliability.

12) Inadequate Information for Reports : It does not provide adequate information for reports to outside agencies such as banks, government, insurance companies and trade associations.

13) No Analysis of Lossess : It does not provide complete analysis of losses due to defective material, idle time, idle plant and equipment. No distinction is made between avoidable and unavoidable wastage.

1.5 COST ACCOUNTING :

Costing is a specialised branch of accounting. It has been developed because of limitations of financial accounts.

Concepts of Cost, Costing, Cost Accounting and Cost Accountancy.

1.6 COST :

The term 'Cost' has a wide variety of meanings. Different people use this term in different senses for different purposes. For example while buying a book we generally ask "What is the cost of book?" Here it means the price of the book. But in management terminology, the term cost refers to expenditure and not the price. For our purposes cost is not the same as price. The costing terminology of the Institute of cost and works Accountants, London defines cost as " the amount of expenditure (actual or notional) incurred on or attributable to a given thing". Thus, cost refers to something that must be sacrificed to obtain a particular thing.

1.7 COSTING :

Costing is the technique and process of ascertaining costs. It consists of the principles and rules which are used for ascertaining the costs of products and services. Costing is a systematic procedure of determining the unit cost of product / service.

1.8 COST ACCOUNTING :

Cost Accounting is the classifying recording and appropriate allocation of expenditure for the determination of the costs of products or services and for the presentation of suitably arranged data for purposes of control and guidance of management. It includes the ascertainment of the cost of every order, job, contract process, service or unit as may be appropriate. It deals with the cost of production, selling and distribution. It is thus the provision of such analysis and classification of expenditure as will enable the total cost of any particular unit of production or service to be ascertained with reasonable degree of accuracy and at the same time to disclose exactly how such total cost is constituted so as to control and reduce its cost.

1.9 COST ACCOUNTANCY :

Cost Accountancy is the application of costing and Cost Accountancy principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived there from for purposes of managerial decision making. Thus, Cost Accountancy is the science, art and practice of a cost accountant. It is a science because it is a body of systematic knowledge having certain principles which a cost accountant should possess for proper discharge of his responsibilities. It is an art as it requires the ability and skill with which a cost accountant is able to apply the principles of cost accountancy to various managerial problems. Practice includes the continuous efforts of a cost accountant in the field of cost accountancy. Such efforts also includes the presentation of information for the purpose of managerial decision making and keeping statistical records.

1.10 SCOPE OF COST ACCOUNTANCY :

The scope of Cost Accountancy is very wide and includes the following :

Cost Ascertainment : It deals with the collection and analysis of expenses, the measurement of production of the different products at the different stages of manufacture and the linking up of production with the expenses. The varying procedures for the collection of expenses give rise to different systems Costing such as Historical or Actual Costs, Estimated Costs, Standard Costs etc. Again the varying procedures for the measurement of production have resulted in different methods of costing such as specific order costing, operation costing etc. For linking up of production with the expenses the different techniques of costing such as Marginal Cost Technique, the Total Cost Technique, Direct Cost Technique etc. All the three i.e. systems, methods and techniques can be used in one concern simultaneously.

Cost Accounting : It is the process of accounting for cost which begins with recording of expenditure and ends with the preparation of statistical data. It is the mechanism by means of which costs of products or services are ascertained and controlled cost accounting is helpful to the management in decision making.

Cost Control : Cost control is the guidance and regulation by an executive action of the costs of operating an undertaking. The cost can be controlled by standard costing, budgetary control, proper presentation and reporting of cost data and cost audit.

1.11 Objectives of Cost Accounting :

The Objectives of cost accounting are ascertainment of Cost, fixation of selling price, proper recording and presentation of cost data to management for measuring efficiency and for cost control. The following are the main objectives of cost accounting :

a) To ascertain the cost per unit of the different products manufactured by a business concern.

b) To provide correct analysis of cost both by process or operations and by different elements of cost.

c) To disclose the sources of wastage whether of material, time or expenses or in the use of machinery, equipment and tools and to prepare reports to control such wastage.

d) To provide requisite data and serve as a guide to price fixing of products manufactured or services rendered.

e) To ascertain the profitability of each of the products and advise management as how these profits can be maximised.

f) To exercise effective control of stocks of raw materials, work in progress, consumable stores and finished goods in order to minimise the capital locked up in these stocks.

g) To supply useful data to management for taking various financial decisions such as introduction of new products, replacement of labour by machine etc.

h) To present and interpret data for management planning, decision making and control.

i) To provide specialised services of cost audit to prevent the errors and frauds and to facili - tate prompt and reliable information to management.

1.12 Cost Accounting *Vs* Financial Accounting :

Both financial and cost accounting are the branches of accounting whose main objective is to provide information by recording the business transactions systematically and scientifically so that it may serve the purpose of the management for policy formulation and controlling to provide necessary protection to outsiders. Both are based on double entry system and their role are supplementary. The ordinary trading account provides valuable information. Financial accounting treats costs very broadly, while cost accounting does this in much greater detail. In order to illustrate this, fact, let us examine the following two statements under Financial Accounting

Trading and Profit and Loss Account
(for the year ending 31st December..)

Dr   Cr

Particulars	Rs.	Particulars	Rs.
To Material Consumed	20,000	By Sales	75,000
To Wages	16,000		
To Direct Expenses	2,000		
To Manufacturing Expenses	12,000		
To Gross Profit C/d	25,000		
	75,000		75,000
To Office and Administration Expenses	3,000	By Gross Profit B/d	25,000
To Selling and Distribution Expenses	7,000		
To Net Profit 20% on Sales	15,000		
	25,000		25,000

The contents of the above accounts are reproduced by the cost accountant in the following statement, that three products viz., A,B and C are manufactured.

Statement of Cost and Profit

Particulars	Products			
	Total Rs	A Rs	B Rs	C Rs
Direct Materials	20,000	8,000	8,000	4,000
Direct Labour	16,000	6,000	8,000	2,000
Direct Expenses	2,000	1,000	1,000	-
Prime Cost	38,000	15,000	17,000	6,000
Factory Overheads	12,000	4,000	7,000	1,000
	50,000	19,000	24,000	7,000
Office & Admn Overheads	3,000	1,000	1,500	500
	53,000	20,000	25,500	7,500
Selling & Distribution Overheads	7,000	3,000	2,500	1,500
Total Cost	60,000	23,000	28,000	9,000
Sales	75,000	38,000	23,500	13,500
Profit / Loss	15,000	15,000	- 4,500	4,500
Percentage of Profit on Sales	20 %	39.47 %	-19.15 %	33.33 %

The profit as shown by the financial books is Rs. 15,000 being 20 % profit on sales but the cost accountant shows how this profit has been arrived at. The product 'A' is giving a profit of 39.47 % and product 'C' a profit of 33.33 % on sales while product B is actually giving a loss. This analysis as shown by cost accounting is quite useful and necessary but the financial accounting does not take to this point.

1.13 Differences between Financial Accounting & Cost Accounting :

Basis	Financial Accounting	Cost Accounting
Purpose	It provides information business in general way. It tells about the profit and loss and financial position of the business to owners and other out side parties.	It provides information to the management for proper planning, operation, control and decision making.
Form of accounts	These accounts are kept in such a way to meet the requirements of companies Act and Income Tax Act.	These accounts are kept voluntarily to meet the requirements of the management.
Recording	It records the expenditure in a subjective manner i.e. according to the nature of expenses.	It records the expenditure in an objective manner i.e. according to the purpose for which it is incurred.
Control	It lays emphasis on the recording aspect without giving any importance to control.	It provides a detailed system of control for materials, labour and overheads with the help of standard costing and budgetary control.
Period	It reports operating results and financial position usually at the end of the year.	It gives information through cost reports to management as and when desired.
Analysis of Profit	Financial accounts are the accounts of the whole business. It disclose the net profit or loss of the business as a whole.	Cost accounts are only a part of the financial accounts and disclose the profit or loss of each product, job, or service.
Reporting of Costs	The Costs are reported in aggregate in financial accounts.	The costs are broken down on a unit basis in cost accounts.

Basis	Financial Accounting	Cost Accounting
Nature of trans-actions	Financial accounts relate to commercial transactions of the business and include all expenses i.e. manufacturing, office, selling and distribution etc. Financial accounts are concerned with external transactions.	Cost accounts relate to transactions connected with the manufacture of goods and services cost accounts are concerned with internal transactions.
Information	It deals with the monetary transactions.	It deals with the monetary and non-monetary transactions.
Figures	Financial accounts deal mainly with actual facts and figures.	Cost accounts deal partly with facts and figures and partly with estimates.
Stock Valuation	Stocks are valued at cost or market price whichever is less.	Stocks are valued at cost.

1.14 Self Assessment Questions

1. Give five limitations of financial accounting.

2. State the differences between financial accounting and cost accounting.

3. Define - i) Cost accounting
          ii) Costing
          iii) Cost accountancy.

4. State five objectives of Cost Accounting.

1.15 Suggested Reading

Cost & Management Accounting - S.P.Jain & K.L.Narang.

Advanced Management Accounting - Shashi k. Gupta, R.K.Sharma.

Cost Accounting   -   N.K.Prasad.

P.USHA RANI

LESSON - 2

NATURE AND SCOPE OF MANAGEMENT ACCOUNTING

2.0 Objective :

The objective of this lesson is to explain the concepts of Management Accounting, characteristics, Scope, objectives, Functions, Advantages, Differences and limitations of Management Accounting.

Structure

2.1 Introduction

2.2 Meaning of Management Accounting

2.3 Definitions of Management Accounting

2.4 Characteristics of Management Accounting

2.5 Scope of Management Accounting

2.6 Objectives of Management Accounting

2.7 Functions of Management Accounting

2.8 Advantages of Management Accounting

2.9 Financial Accounting Vs Management Accounting

2.10 Cost Accounting Vs Management Accounting

2.11 Limitations of Management Accounting

2.12 Self Assessment Questions

2.13 Suggested Readings / Reference books.

2.1 INTRODUCTION :

Cost accounting no doubt serves the internal management by directing their attention on inefficient operations and assisting in a day to day control of activities of the enterprise. But even costing information fails to meet informational needs for managerial functions. In actual practice cost accountants are doing the jobs of management accountants. Further, most of the techniques of management accounting are also being used by the cost accountants. That is why, management accounting is treated as extension of cost accounting. Management accounting includes many more aspects of the study besides the cost accounting. Management Accounting has been developed with the limitations of financial and cost accounting.

2.2 Meaning of Management Accounting :

The term Management Accounting is of a recent origin. Management Accounting is comprised of two words 'Management' and 'Accounting'. It is the study of managerial aspect of accounting. Management Accounting is the presentation of accounting information in such a way so as to assist management in the creation of policy and day to day operation of an undertaking. That it relates to the use of accounting data collected with the help of financial accounting and cost accounting for the purpose of policy formulation, planning, control and decision making by the management.

2.3 Definitions of Management Accounting :

"Management Accounting is concerned with accounting information that is useful to management".

- R.N. Anthony.

"Management Accounting is the term used to describe accounting methods, systems, techniques which coupled with special knowledge and ability, assists management in its task of maximising profits or minimising losses".

- J.Balty.

From the above it is clear that management accounting uses all techniques of financial accounting, cost accounting and statistics to collect and process data for making it available to management so that it can take decisions in a scientific manner.

2.4 Nature or Characteristics of Management Accounting :
The following are the main characteristics of Management Accounting.

1) Providing Accounting Information : Management accounting involves the presentation of information in a way it suits managerial needs. Management accounting provides necessary information to different levels of management to take various policy decisions.

2) Cause and Effect Analysis : The study of cause and Effect relationship is possible in management accounting. If there is profit or loss, the factors directly influence the profit or loss are studied.

3) Use of Special Techniques and Concepts : Management accounting uses special techniques and concepts to make accounting data are more useful. The techniques usually used include financial planning and analysis, standard costing, budgetary control, marginal costing, project appraisal, control accounting etc.

4) Taking Important Decisions : Management Accounting helps in taking various important decisions. It supplies necessary information to management to take important decisions.

5) Achieving of Objectives : In management accounting, the accounting information is used in such a way that it helps in achieving organisational objectives. In case there are deviations between the standards set and actual performance of various departments corrective measures can be take at once. This is possible with the help of budgetary control and standard costing.

6) No Fixed Norms Followed : No specific rules are followed in management accounting. Though the tools of management accounting are the same but their use differs from concern to concern. Every concern uses the figures in its own way. The presentation of figures will be in the way which suits the concern most. So every concern has its own rules and by-rules for analysing the data.

7) Increase in Efficiency : The purpose of using accounting information is to increase efficiency of the concern. The efficiency can be achieved by setting up of goals for each department. If there is any deviation, an effort is made to take corrective measures so that efficiency is improved.

8) Supplies Information and not Decision : The management accountant supplies information to the management. The decisions are taken by the Top Management. Management Accounting is only to guide and not to supply decisions.

9) Concerned with Fore Casting : The management accounting is concerned with the future. It helps the management in planning and forecasting.

2.5 Scope of Management Accounting :

The scope of management accounting is very wide and broad based. It includes all information which is provided to the management for financial analysis and interpretation of the business operations. The following field of activities are included in the scope of management Accounting :

i) Financial Accounting : Financial Accounting though provides historical data but is very useful for future planning and forecasting. Designing of a proper financial accounting system is a must for obtaining full control and coordination of operations of the business. So management accounting is closely related to financial accounting.

ii) Cost Accounting : It provides various techniques of costing like marginal costing, standard costing, differential and opportunity cost analysis etc., which play a useful role in the operation and control of the business undertakings.

iii) Budgeting and Forecasting : Budgeting means expressing the plans, policies and goals of the enterprise for a definite period in future. Forecasting on the otherhand is a prediction of what will happen as a result of a given set of circumstances. Forecasting is judgement where as budgeting is an organisational object . Both budgeting and forecasting are for management accountant in planning various activities.

iv) Cost Control Procedures : These procedures are integral part of the management accounting process and includes inventory control, cost control, labour control, budgetary control and variance analysis etc.

v) Reporting : The management accountant is required to submit reports to the management on the various aspects of the undertaking. While reporting he may use statistical tools for presentation of information as graphs, charts, pictorial presentation, index numbers and other devices in order to make the information more impressive and intelligent.

vi) Methods and Procedures : It includes in this study all those methods and procedures which help the concern to use its resources in the most efficient and economical manner. It undertakes special cost studies and estimation reports on cost volume profit relationship under changing circumstances.

vii) Tax Accounting : It is an integral part of management accounting and includes preparation of income statement determination of taxable income and filing up the return of income etc.

viii) Internal Audit : Internal Audit helps the management in fixing responsibility of different individuals.

ix) Interpretation of Data : The management accountant interprets various financial statements to the management. These statements give an idea about the financial and earning position of the concern. These statements may be studied in comparison to statements of earlier periods or comparison with statements of similar other concern.

x) Office Services : The management accountant may be required to maintain and control office services in some organisation. This function includes data processing, reporting on best use of mechanical and electronic devices, communications etc.

2.6 OBJECTIVES OF MANAGEMENT ACCOUNTING :

The Primary objective of management accounting is to enable management to maximise profits or minimise losses. This is done through the presentation of statements in such a way that management is able to take correct policy decisions. The following are the important objectives of management accounting.

1) Planning and Policy Formulation : The object of management accounting is to supply necessary data to management for formulating plans.

Helpful in controlling performance: management accounting devices like standard costing and budgetary control are helpful in controlling performance. The management is able to control performance of each and every individual with the help of management accounting devices.

2) Helpful in Organising : Management accounting is connected with the establishment of cost centres, preparation of budgets, preparation of cost control accounts and fixing of responsibility for different functions. All these aspects are helpful in setting up an effective and efficient organisational frame work.

3) Helpful in Interpreting Financial Information : The main object of management accounting is to present financial information to the management in such a way that it is easily understood.

4) Motivating Employees : The objective of management accounting is to help the management in selecting best alternatives of doing the things. Targets are laid down for the employees. They feel motivated in achieving their targets and further incentives may be given for improving their performance.

5) Helpful in Making Decisions : The information provided by the accountant helps the management in selecting a suitable alternative and taking correct decisions.

6) Reporting to Management : One of the primary objectives of management accounting is to keep the management fully informed about the latest position of the concern. This helps management in taking proper and timely decisions.

7) Helpful in coordination : Management accounting provides tools which are helpful in co-ordinating the activities of different sections or departments Management accountant act as a co-ordinator and reconciles the activities of different sections.

8) Helpful in Tax Administration : Management accounting helps in assessing various tax liabilities and depositing correct amount of taxes with the concerned authorities Tax administration is carried on with the advice and guidance of the management accountant.

2.7 FUNCTIONS OF MANAGEMENT ACCOUNTING :

Management accounting is a part of accounting. It has developed out of the need for making more and more use of accounting for taking managerial decisions. Some of the functions of management accounting are given as follows :

i) Planning and Forecasting : One of the important functions of the management accounting is to help management in planning for short-term and long term periods and also in making forecasts for the future.

ii) Modification of Data : Management accounting helps in modifying accounting data. The information is modified in such a way that it becomes useful for the management. Management accountant classifies and modifies information according to the requirements of the management.

iii) Financial Analysis and Interpretation : The management accountant analyses the data and presents it before the management in Non technical language along with his comments and suggestions so that top management can understand it and take decisions with out any difficulty.

iv) Facilitates Managerial Control : Management accounting is very useful in controlling performance. Performance evaluation is possible through standard costing and budgetary control which are an integral part of management accounting.

v) Communication : Management accounting establishes communication with in the organisation and with the outside world. The management accountant prepares reports for the benefit of different levels of management and employees. The activities of the concern, are communicated to outsiders such as bankers, investors, creditors, government agencies etc.

vi) Co-ordinating : Management accountant acts as a co-ordinator among different financial departments through budgeting and financial reports.

vii) Helpful in Taking Strategic Decisions : Management accounting helps in taking strategic decisions. It supplies analytical information regarding various alternatives and the choice of management is made easy. These decisions may be regarding seasonal or temporary stoppage of production, replacement decisions, expansion and diversification of works and a correct decision is taken.

2.8 ADVANTAGES OF MANAGEMENT ACCOUNTING :

The following are the advantages of Management Accounting :

1) Increase Efficiency : Management accounting increases efficiency of business operations. The targets of different departments are fixed in advance and achievements of those goals is a tool for measuring their efficiency.

2) Proper Planning : Management is able to plan various operations with the help of accounting information. The activities of the concerned are planned in a systematic manner.

3) Measurement of Performance : The systems of budgetary control and standard costing enable the measurement of performance. In standard costing, standards are determined and then actual cost is compared with standard cost. It enables the management to find out deviations between standard cost and actual cost. The performance will be good if actual cost does not exceed the standard cost. Budgetary control system too helps in measuring efficiency of all employees.

4) Maximising Profitability : The Thrust of various management techniques is to control cost of production and increase efficiency of each and every individual in the organisation. The profits of enterprise are maximised with the help of management accounting system.

5) Improves Service to Customers : The cost control devices employed in management accounting enable the reduction of prices. The quality of products becomes good because quality standards are predetermined. The customers are supplied good quality goods at reasonable prices.

6) Effective Management Control : The tools and techniques of management accounting are helpful to the management in planning, coordinating and controlling activities of the concern.

2.9 Financial Accounting Vs Management Accounting :

The following are the main distinctions between the financial accounting and management accounting.

Basis	Financial Accounting	Management Accounting
1. Objects	The objective of Financial accounting to measure the business income and provide information to outsiders i.e. creditors, bankers, investors etc.	The objective is to help the internal management.
2. Subject Matter	It deals with all the activites of the business as a whole and reveals over all performance.	It deals with vital and significant activities of the business.
3. Nature	It is objective in nature lays emphasis on the past activities and represents historical records just to show the results of the business.	It is subjective in nature, stresses the future and uses historical costs and data for estimating the future.
4. Compulsion	It is obligatory for Joint stock companies	It is optional.
5. External Parties	Accounts are prepared to meet the requirements of outsiders.	Accountants are maintained to provide information for internal use of management only.
6. Methodology	Financial Accounting records the transactions relating to income, expense, revenue personal accounts and property accounts.	Management accounting reports, costs and revenue by profit centre or responsibility centre.
7. Publication and audit	Statements are to be audited and published for the general use of public.	Statements are not to be published and audited as there are for internal use.
8. Description	In Financial Accounting all the transactions are recorded and can be measured in monetary terms.	Monetary and Non monetary transactions are recorded.
9. Period of reporting	In Financial accounting final accounts are prepared on year to year basis.	It lays emphasis on weekly, fortnightly and monthly reporting.

2.10 Cost Accounting Vs Management Accounting :

Cost Accounting and Management Accounting both have the same objectives of helping the management in planning, control and decision making. Both are internal to the organisation and use common tools and techniques like standard costing, variable costing, budgetary control etc. Inspite of these similarities there are certain differences between these two. The main distinctions between cost accounting and management accounting are :

Basis	Cost Accounting	Management Accounting
1. Deals with	It deals with ascertainment, allocation, apportionment and accounting aspect of costs.	It deals with the effect and impact of cost on the business.
2. Base	It provides a base for management accounting.	It is derived from both cost accounting and financial accounting.
3. Role	It is helpful in collecting costing data for management.	It is greater degree of relevance and objectivity as the management accountant has a clear idea of the types of costs and items requiring analysis and state the specific problems of business.
4. Scope	It does not include financial accounting, tax planning and tax accounting.	It includes financial accounting, cost accounting tax planning and tax accounting.
5. Period of Planning	It is concerned with short term planning.	It is concerned with short range and long range planning.
6. Tools and Techniques.	It has standard costing variable costing, break even analysis etc as the basic tools and techniques.	Along with these the management accounting has funds and cash flow statements, ratio analysis etc as his accounting tools and techniques.
7. Assistance	It merely assist the management in its functions.	It assists and evaluates the management performance.
8. Installation	It can be installed with out management accounting.	It needs financial and cost accounting as its base for its installation.

2.11 Limitations of Management Accounting :

i)   The management accountant takes into consideration the past records provided by the financial and cost accounting while making decisions for future.

ii) Management must have the knowledge of various fields for taking sound decisions but the person who is taxing decisions may not have comprehensive knowledge of all the subjects.

iii) The Techniques and tools suggested by the management accountant are not alternate or substitute of good administration.

iv) There is possibility of personal bias from the collection of data to interpretation stage in financial accounting.

v)   The installation of management accounting system is costly.

vi) Management accounting has not reached the final stage and is in the process of development.

2.12 Self Assessment Questions :

1. Define Management Accounting.

2. What are the characteristics of Management Accounting ?

3. What is the scope of Management Accounting ?

4. State any five objectives of Management Accounting.

5. State five functions of Management Accounting.

6. What are the Advantages of Management Accounting ?

7. State any five differences between Financial Accounting and Management Accounting.

8. State the differences between Cost Accounting and Management Accounting.

9. What are the limitations of Management Accounting?

2.13 Suggested Readings :

Cost & Management Accounting   -   S.P.Jain & K.L.Narang.

Advanced Management Accounting   -   Shashi k.Gupta,
                                         R.K.Sharma.

Cost Accounting   -   N.K.Prasad.

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LESSON - 3

COST ACCOUNTING - ADVANTAGES - LIMITATIONS

3.0 Objective:

The objective of this lesson is to explain the advantages and limitations of Cost Accounting System.

Structure

3.1 Advantages of Cost Accounting

3.2 Limitations of Cost Accounting

3.3 Objections against cost Accounting

3.4 Principles of cost Accounting

3.5 Characteristics of an Ideal Costing System

3.6 Installation of Costing System

3.7 Practical difficulties in installing a Costing System

3.8 Steps to overcome Practical Difficulties

3.9 Self Assessment Questions

3.10 Suggested Readings

3.1 Advantages of Cost Accounting:

The main advantages of cost accounting are given below :

(1) Profitable and Unprofitable activities are disclosed and steps can be taken to eliminate or reduce those activities from which little or no benefit is obtained or change the method of production in order to make such activities more profitable.

(2) It enables a concern to measure the efficiency and then to maintain and improve it. This is done with the help of valuable data made available for the purpose of comparison

(3) It provides information upon which estimates and tenders are based.

(4) It guides future production policies.

(5) It helps in increasing profits by disclosing the sources of loss or waste and by controlling that loss or wastage.

(6) It enables a periodical determination of profits or losses with out resort to stock taking.

(7) It furnishes reliable data for comparing costs in different periods.

(8)　The exact cause of a decrease or an increase in profit or loss can be detected.

(9)　Cost Accounting discloses the relative efficiencies of different workers and there by facilitates the introduction of suitable plans of wage to reward efficiency and to provide adequate incentive to less efficient workers.

(10)　It enables the creditors and investors to judge the financial strength and credit worthiness of the business.

(11)　It is helpful to the Government. It facilitates the assessment of Excise duty and Income Tax and the formulation of policies regarding industry, export, import, taxation etc.

(12)　It is helpful to consumers by supplying goods at lower price.

(13)　Costing has a more important role to play in public enterprises than in private enterprises. In public enterprises the primary objective is not to raise profit but it is to serve the society by providing quality goods at cheaper rates. A good system of costing ensures efficient and effective control through a proper analysis of their working.

3.1.1 Costing – An Aid to Management:

Cost accounting helps the management in carrying out efficiently its functions by developing practical cost procedures that provide information useful in controlling the operations of the business enterprise. Cost accounting does this by analysing, recording, standardizing, forecasting, comparing, reporting and recommending. In fact, cost accounting is so closely allied to management that it is difficult to indicate where work of cost accountant ends and managerial control begins.

A good system cost accounting serves management in the following ways.

a)　**Classification and sub division of cost:** Costs are collected and classified by various ways in order to provide information to the management for control purposes and to ascertain the profitability of each area of activity.

b)　**Control of Materials, Labour and Over head Costs:** An efficient check is provided on stores and materials. Stores Ledger and Material Abstracts are maintained which provide an effective check on the stores and material used in the business. Maximum, Minimum, Reordering levels are maintained so that stocks can be arranged in time. An efficient check on labour and machines is provided by giving detailed information about the availability of machine and labour capacity. The work is so planned that no section is over worked and no section remains idle. By having proper classification of overheads into controllable and uncontrollable or fixed and variable, it helps to control the overhead costs.

c)　**Business Policies:** Business policy may require the consideration of alternative methods and procedures and this is facilitated by cost information correctly presented. It helps the management to take vital decisions such as introduction of a new product, selection of a most profitable product mix, utilisation of spare capacity, exploration of additional market, whether to make or buy, problem of limiting factor, replacement of existing assets, appraisal of proposed investment to meet expansion programme etc, with the help of marginal costing techniques and differential cost analysis.

d) Budgeting: It provides the use of budgets and performance reports and enables management to correct inefficiencies before they enter into business. Two important cost accounting tools for helping managers are budgets and performance reports.

e) Standards for Measuring Efficiency: It provides the use of standards to assist management in making estimates and plans for future and to provide the basis of management of efficiency. Actuals are compared with predetermined standards to determine the operating efficiency.

f) Best use of limited Resources: Cost Accounting provides the reliable data of costs with regard to materials, wages and other expenses. These help the management to get maximum output at the minimum cost by indicating where economies may be affected, waste eliminated and inefficiency increased.

g) Instrument of Management control: It provides management with valuable data for planning, budgeting and control of costs. An efficient system of cost accounting is, thus, regarded as an important part in the efforts of any management to secure business stability.

h) Cost Audit: The operation of a system of cost audit in the organisation will assist in prevention of errors and frauds.

i) Price Determination: It helps the management to fix the remunerative selling prices of various items of goods in different circumstances. If prices are fixed with out costing information, it is possible, that prices quoted may be too high or too low. In periods of depression, it may become necessary to reduce the prices even below total cost. It is only costing which will guide the business man in this matter.

Expansion:

Management is able to formulate expansion policy on the basis of estimates of cost of production at various levels provided by cost accountant.

3.2 Limitations of Cost Accounting:

The Cost system has the following limitations.

1. The system is based on estimates the results differ from activities.

2. The methods and techniques adopted with in the system are several and their applications varying on different plans makes the results unworthy of cost comparison and cost control, e.g;
   a) Pricing of issue of materials by different methods
   b) Remunerating labour on different bases
   c) Apportionment and Absorption of overhead at different bases and by the application of different methods,
   d) Classification of costs in to direct and indirect.
   e) Classification of overheads in to fixed and variable;
   f) Determination of standard in standard costing
   g) Charging of depreciation and valuation of stocks at different bases.

3. For getting the benefits of cost accounting many formalities are to be observed. Due to which the establishment and running costs are so much.
4. It has not involved so far any tool for handling inflationary situation.

3.3 Objections against Cost Accounting:

A number of objections are generally raised against the introduction of costing on various grounds. The following are some of the important objections usually raised:

1. Cost system is unnecessary: It has been argued that costing is of recent origin and that industries prospered in the past and are still prospering with out the aid of costing and therefore it is unnecessary expenditure. But the modern industries are running under highly competitive conditions and every manufacturer should know the actual cost of production to decide how far he can reduce the selling price.

2. Inapplicability: It is argued that modern methods of costing are inapplicable to many type of industries. But in many cases some methods of costing can always be devised to suit the requirements of the business.

3. The system has failed in many cases: It is argued that the adoption of costing system failed to produce the desired results in many cases and therefore, the system is defective. But the failure of a system may be due to several causes. So it is hasty to find the fault with the system.

4. Cost system is a matter of forms and rulings: It is argued that after some time, a costing system degenerates in to a matter of forms and rulings. This is not the fault of the system. It is fault of the way in which the system is maintained.

5. Cost system is highly expensive: It is argued that the expenditure incurred on the installation of cost system is quite heavy and the operational part is also expensive. But the cost system is so designed to suit the economy of the business – whether small or big.

3.4 General Principles of Cost Accounting

The following are the main principles of Cost Accounting:

1. Cause – effect relationship: Cause effect relationship should be established for each item of cost. This cost should be shared only by those units which pass through the departments for which such cost has been incurred.

2. Charge of cost only after its incurrance: Unit cost should include only those costs which have been actually incurred.

3. Past cost should not form part of future cost: Past cost should not be recovered from future cost as it will not only affect the true results of future period but will also distort other statements.

4. Exclusion of abnormal costs from cost accounts: All costs incurred because of abnormal reasons (like theft, negligence) should not be taken in to consideration while computing the unit cost. If done, so it will distort the cost figures and mislead the management resulting in wrong decisions.

5. Principle of double entry should be followed preferably: To Lessen the chances of any mistake or error, cost ledgers and cost control accounts, as far as possible should be maintained on double entry principles.

3.5 Characteristics of an Ideal costing system:

The following are the main characteristics which an ideal system of costing system should possess or the points which should be taken into consideration before installing a costing system.

i) Suitability to the business: A costing system must be devised according to the nature, conditions, requirements, and size of the business.

ii) Simplicity : The system of costing should be simple and plain so that it may be easily understood even by a person of average intelligence.

iii) Flexibility: The system of costing must be flexible so that it may be changed according to changed conditions and circumstances.

iv) Economical: A costing system should not be expensive and must be adopted according to the financial capacity of the business.

v) Comparability : The costing system must be such so that it may provide facts and figures necessary to the management for evaluating the performance by comparing it with the past figures, figures of other concerns or against the industry as a whole or other departments of the same concern.

vi) Capability of presenting information at the desired time : The system must provide accurate and timely information so that it may be helpful to the management for taking decisions and suitable action for the purpose of cost control.

vii) Minimum changes in the existing set up: The existing system of delegation and division of authority and responsibility must not be disturbed with the costing system.

viii) Uniformity of forms: All forms and proformas be necessary to the system should be uniform in size and quality of paper.

ix) Efficient system of Material control: There should be an efficient system of stores and stock control as materials usually account for a greater portion of the total cost.

x) Adequate wage Procedure: There should be a well defined wage procedure for recording the time spent by workers on different jobs, for preparing the wage sheet and for the payment of wages. Thus the introduction of well defined wage system will help to control the cost of labour.

xi) Departmentalisation of expenses: A sound plan should be devised for the collection, allocation, apportionment and absorption of overheads in order to ascertain the cost accurately

xii) Reconciliation of cost and financial accounts: The costing system should be so devised that the two sets of accounts are capable of easy reconciliation.

xiii) Duties and Responsibilities of the cost accountant: Under a good system of cost accounting the duties and responsibilities of the cost accountant should have access to all works and departments.

3.6 Installation of Costing System

The fundamental factors that a cost accountant should consider while introducing a system of costing are:

      i) The existing organisation should be distributed as little possible.
      ii) There should be a gradual and smooth introduction of the system.
      iii) While over – elaboration of records should be avoided.

3.6.1 Steps for Installation:

The steps to be taken in installing a costing system are:

1. Objectives to be achieved: The costing system will be simple if the objective is only to determine cost but it will have to be elaborate if the objective is to have information which will help the management in exercising controlling and taking decisions.

2. Studying the Organisation: In this connection the points to be noted are – the nature of the business and of operations, extent of responsibility and authority attached to the various functionaries, the lay out of the factory, the methods of dealing with wastage of materials, the system of time recording and the methods of computing and paying wages, the system of issuing orders and the amount of fixed, semi variable and variable overheads.

3. Deciding the structure of cost accounts: What system of cost accounting is suitable and the extent of details required can be decided after a thorough study of the manufacturing process and their ancillary services. The designing of the system should be such that there is a gradual build up of the cost at each significance stage of production.

4. Determining the cost rates: This entails a thorough study of factory conditions and decisions are to be made about classification of cost in to direct and indirect, grouping of indirect cost in to production, selling and administration etc, treatment of waste of all kinds, methods of pricing issues, methods of recovering overheads and calculation of overhead rates.

5) Introducing the system: Before the system is put in to effect, the implications of the system should be explained to all indicating to them the benefits that will accrue to each and to the business as a whole.

6) Organising the Cost Office: It is always better that the cost office is situated adjacent to the factory so that delay in routing out documents or in clearing up discrepancies and doubts is avoided. The costing staff must be allowed to have access to the works if they are to perform their duties properly.

7) Relationship of cost office to other departments: The cost department should function independently, the cost accountant being made directly responsible to the General Manager, of Managing Director. The costing system should be designed to serve management at all levels.

3.7 Practical difficulties in installing a costing system:

Practical difficulties apart from technical costing problems which a cost accountant has to face in installing a costing system are:

1) Lack of support from Top Management: In most of the cases the cost accounting system is introduced without the support of the top management in all the functional areas.

2) Resistance from the existing accounting staff: When ever a new system is introduced resistence is natural, as the existing staff may feel that they would lose their importance and may be unsure of their position in the organisation.

3) Non cooperation at other levels of organisation: The foremen, supervisors and other staff may not cooperate with other departments in providing information which is absolutely necessary for the smooth and efficient working of any accounting system.

4) Shortage of trained staff: The work of costing department cannot be handled with out the availability of trained staff.

5) Heavy cost of operating system: The cost of operating system may be heavy unless the costing system is properly designed according to the requirements of each case.

3.8 Steps to overcome Practical Difficulties:

To over come the above difficulties the following steps are suggested.

1. Support from top management: Before the installation or operation of a costing system there must be firm commitment to the system on the part of the top management.

2. Utility of system to the existing staff: The existing accounting staff should be impressed about the need to supplement the existing financial accounting system.

3. Workers confidence for cooperation: The various employees must be properly educated regarding the benefits which can be obtained from such a system.

4. Training of existing accounting staff: The existing staff working in the accounts department must be properly trained in costing methods and techniques with the help of the Institute of cost and works Accountants of India, Calcutta.

5. Proper supervision: There should be proper supervision after installation and continuous efforts on the part of the cost accountant to make the system successful and to achieve the desired goal of cost ascertainment, cost presentation and cost control.

3.9 Self Assessment Questions:

1. State two advantages of cost accounting to:

       i) Management
       ii) Workers
       iii) Creditors
       iv) Government
       v) General Public

2. What are the limitations of Cost Accounting

3. What are the objections against cost Accounting

4. Give five characteristics of an Ideal costing system

5. State the factors which a cost accountant should consider introducing a costing system

6. What are the practical difficulties in installing a costing system.

3.10 Suggested Readings

      Cost & Management Accounting   -   S.P. Jain & K.L. Narang

      Cost Accounting   -   N.K. Prasad.

P. USHA RANI

LESSON - 4

COST CONCEPTS - CLASSIFICATION - ANALYSIS

4.0 Objective :

The objective of this lesson is to explain the concepts of Cost, classification of Cost, elements of Cost and preparation of Cost Sheet.

Structure

4.1 Cost Concepts
4.2 Classification of Cost
4.3 Elements of Cost
4.4 Cost Sheet / Statement of Cost
4.5 Proforma of Cost Sheet
4.6 Self Assessment Questions
4.7 Suggested Readings

4.1 COST CONCEPTS :

Some Cost Concepts which are used in cost accounting are discussed below :

a) COST : It is the amount of resources given up in exchange for some goods and services. The resources given up are expressed in monetary terms. Cost is defined as "the amount of expenditure (actual or notional) incurred on or attributable to a given thing or to ascertain the cost of given thing" (ICMA).

In the ICMA definition cost is the amount of

a) actual expenditure incurred on a given thing and
b) notional expenditure attributable to a given thing.

Regarding notional expenditure is one which is conceptual and which is deemed to have been incurred or attributed for instance i) rent of owned factory where rent is charged as cost for purpose of comparison with the cost of undertaking running factory in rented factories although this rent is not actually paid. ii) Interest on owned capital where interest is charged in cost a matter of policy although it is not paid.

The objective for which costs are computed is also important. For example, if the purpose is to fix selling price, the total cost is considered. For valuation of stock cost means cost of production only. If the objective is to measure efficiency, Cost will have to be compiled differently than if the purpose is to quote or value the stock. So the term cost has different interpretations.

A cost must always be studied with reference to its purpose and conditions. For the valuation of work in progress, factory cost is used but for valuation of finished goods cost of production is used. If the purpose of the study of cost is the same, different conditions may lead in variation in cost. The cost per unit of product changes with increase or decrease in volume of output as the amount of fixed expenses to be borne by each unit of output decreases or increases with increase or decrease in units of production. Cost is also different from value as cost is measured in terms of money where as value is measured interms of usefulness or utility of an article.

b) EXPENSE : Expenses are costs which have been applied against revenue of particular accounting period in accordance with the principle of matching cost to revenue e.g., cost of goods sold, office salaries of the period in which they are incurred.

c) COST CENTRE : A cost centre is the smallest segment of activity or area or responsibility for which costs are accumulated. Typically cost centres are departments but in some instances, a department may contain several cost centres. These cost centres are the departments or sub departments of an organisation with reference to which cost is collected for cost ascertainment and cost control. A cost centre can be a location i.e an area such as department store yard or sales area or an item of equipment, e.g., lathe machine, delivery vehicle or a person, e.g., sales man, foreman.

The determination of a suitable cost centre is very important for ascertainment and control of cost. The manager incharge of a cost centre is held responsible for control of cost of his cost centre. It enables the accumulation of all such costs at one place for which a common base of recovery may be used.

d) PROFIT CENTRE : A profit centre is the segment of activity of a business which is responsible for both revenue and expenses and discloses the profit of a particular segment of activity. Profit centres are created to delegate responsibility to individuals and measure their performance.

The selection of suitable cost centres or cost units for which costs are to be ascertained in an undertaking depends upon the organisation of the factory; condition of incidence of cost; requirements of costing i.e suitability of the unit or cost centre for cost purpose; availability of information; management policy regarding making a particular choice from several alternatives.

4.2 COST CLASSIFICATIONS :

Cost classification is the process of grouping costs according to their common characteristics. It is the placement of like items together according to their common characteristics. A suitable classification of costs is of vital importance in order to identify the cost with cost centres or cost units. The cost may be classified according to their nature i.e material, labour and expenses and a number of other characteristics. The same cost figures are classified according to different ways of costing depending upon the purpose to be achieved and requirements of a particular concern. The important ways of classification are :

1) By Nature or Elements, 2) By Functions, 3) By Direct and Indirect, 4) By Change in activity or volume, 5) By Controllability, 6) By Normality, 7) By Capital and Revenue, 8) By Time, 9) According to planning and control, 10) By Association with product and 11) For Managerial decisions.

1) By Nature or Elements or Analytical Classification : According to this classification, the costs are divided into three categories i.e Material, Labour and Expenses. There can be further sub-classification of each element; for example material into raw material components, spare parts, consumable stores, packing material etc. This classification is important as it helps to find out the total cost, now such total cost is constituted and valuation of work in progress.

2) By Functions (i.e. Functional Classification) : According to this classification costs are divided in the light of the different aspects of basic managerial activities involved in the operation of a business undertaking. It leads to grouping of costs according to the broad division or functions in a business undertaking i.e. production, administration, selling and distribution.

3) By Direct and Indirect : According to this classification, total cost is divided in to Direct costs and Indirect costs.

Direct Costs : Direct costs are those which are incurred for and may be conviniently identified with a particular cost centre or cost unit. Materials used and labour employed in manufacturing an article or in a particular process of production are common examples of direct costs.

Indirect Costs : Indirect costs are those costs which are incurred for the benefit of a number of cost centres or cost units and cannot be conveniently identified with a particular cost centre or cost unit. Examples of indirect costs include rent of building, management salaries, machinery depreciation etc. The nature of the business and the cost unit chosen will determine which costs are direct and which are indirect. The importance of the distinction of costs into direct and indirect lies in the fact that direct costs of a product or activity can be accurately determined while indirect costs have to be apportioned on certain assumptions as regards their incidence.

4) By Changes in Activity or Volume : According to this classification, costs are classified according to their behaviour in relation to changes in the level of activity or volume of production. On this basis, costs are classified in to three groups i.e fixed, variable and semi variable.

i) Fixed Costs : Fixed costs are commonly described as those which remain fixed in total amount with increase or decrease in the volume of output or productive activity for a given period of time. Fixed cost per unit decreases as production increases and increases as production declines. Examples of fixed costs are rent, insurance of factory building, factory manager's salary etc. These fixed cost are constant in total amount but fluctuate per unit as production changes. These costs are known as period costs because these are dependent on time rather than on output.

ii) Variable Costs : Variable costs are those which vary in total indirect proportion to the volume of output. These costs per unit remain relatively constant with changes in production. Thus, variable costs fluctuate in total amount but tend to remain constant per unit as production activity changes. Examples are direct material costs, direct labour costs, power, repairs etc. Such costs are known as product costs because they depend on the quantum of output rather than on time.

iii) Semi Variable Costs : Semi variable costs are those which are partly fixed and partly variable. For example telephone expenses include a fixed portion of monthly charge plus variable according to calls; thus total telephone expenses are semi variable. Other examples of such costs are depreciation, repairs and maintenance of building and plant etc.

5) By Controllability : Under this, costs are classified according to whether or not they are influenced by the action of a given member of the undertaking. On this basis costs are classified in to two categories;

i) Controllable Costs: Controllable Costs are those which can be influenced by the action of a specified member of an undertaking, this to say costs which are at least partly with in the control of management. An organisation is divided in to a number of responsibility centres and controllable costs incurred in a particular cost centre can be influenced by the action of the manager responsible for the centre. Generally speaking all direct costs including direct materials, direct labour and some of the overhead expenses are controllable by lower level of management.

ii) Un controllable costs: Uncontrollable costs are those which can not be influenced by the action of a specified member of an undertaking, that is to say, which are not with in the control of management. Most of the fixed costs are uncontrollable. For example rent of the building is not controllable and so is managerial salaries. Overhead cost, which is incurred by one service action and is apportioned to another which receives the service is also not controllable by latter.

6. By Normality : Under this costs are classified according to whether these are costs which are normally incurred at a given level of output in the conditions in which that level of activity is normally attained. On this basis, it is classified into two categories:

a) Normal Cost: It is the cost which is normally incurred at a given level of output in the conditions in which that level of output is normally attained. It is a part of cost of production.

b) Abnormal Cost: It is the cost which is not normally incurred at a given level of output in the conditions in which that level of output is normally attained. It is not a part of cost of production and charged to costing Profit and Loss Account.

7. By capital and Revenue : The cost which is incurred in purchasing an assets either to earn income or increasing the earning capacity of the business is called capital cost. For example, the cost of machine. Such cost is incurred at one point of time but the benefits accruing from it are spread over a number of accounting years. If any expenditure is incurred in order to maintain the earning capacity of the concern such as cost of maintaining an asset or running a business it is revenue expenditure e.g., cost of materials used in production, labour charges paid to convert the materials in to production, salaries, depreciation, repairs and maintenance charges, selling and distribution charges. The distinction between capital and revenue items is important in costing as all items of revenue expenditure are taken in to consideration while calculating cost where as capital items are completely ignored.

8. By Time: Cost can be classified in to
 i) Historical cost and ii) predetermined cost

i) Historical Costs: The costs which are ascertained after being incurred are called historical costs. Such costs are available only when the production of a particular thing has already been done.

Basic Characteristics of such Costs are:

a) They are based on recorded facts

b) They can be verified because they are always supported by the evidence of their occurance.

c) They are mostly objective because they relate to happenings which have already taken place.

ii) predetermined Costs: Such costs are estimated costs i.e., computed in advance of production taking in to consideration the previous period's costs and the factors affecting such costs. Predetermined cost determined on scientific basis becomes standard cost. Such cost which compared with actual costs will give the reasons of variance and will help the management to fix the responsibility and to take remedial action to avoid recurrence in future.

9. According to planning and control: Planning and control are two functions of management. According to this, costs can be classified as budgeted costs and standard costs.

Budgeted Costs: Budgeted costs represent an estimate of expenditure for different phases of business operations such as manufacturing, administration, Sales, research and development etc. Continuous comparison of actual performance (i.e actual cost) with that of budgeted cost is made so as to report the variations from the budgeted cost to the management for corrective action.

Standard Costs: Budgeted Costs are translated in to actual operation through the instrument of standard costs. The Charted Institute of Management Accountants, London defines Standard Costs as "the predetermined cost based on technical estimate for materials labour and overhead for a selected period of time for a prescribed set of working conditions". Thus standard cost is determination, in advance of production, of what should be the cost.

10. By Association with the Product : Under this classification costs can be product costs and period costs.

Product Costs : Product costs are those cost which are traceable to the product and are included in inventory valuation. They comprise direct materials, direct labour and manufacturing overheads in case of manufacturing concerns. These are used for valuation of inventory and are shown in Balance sheet till they are sold because such costs provide income or benefit only after sale.

Period Costs: Period costs are incurred on the basis of time such as rent, salaries etc. These may relate to administration and selling costs essential to keep the business running. Though these are not associated with production and are necessary to generate revenue but cannot be assigned to a product. These are charged to the period in which these are incurred and treated as expense.

II For Managerial Decisions: On this basis, costs may be classified in to the following costs.

i) Marginal Cost: Marginal cost is the total of variable cost i.e. prime cost plus variable overheads. It is based on the distinction between fixed and variable costs. Fixed costs are ignored and only variable costs are taken in to consideration for determining the cost of products and value of work in progress and finished goods.

ii) Out of Pocket Costs: This is the portion of costs which involves payment to outsiders i.e gives rise to cash expenditure as opposed to such costs as depreciation which do not involve any cash expenditure. Such costs are relevant for price fixation during recession or when make or buy decision is to be made.

iii) Differential Costs : The change in costs due to change in the level of activity or pattern or method of production is known as differential cost. If the change increases the cost it will be called incremental cost. If there is decrease in cost resulting from decrease in output, the difference is known as decremental cost.

iv) Sunk Cost : A sunk cost is an irrecoverable cost and is caused by complete abandonment of a plant. It is written down value of abandoned plant less its salvage value. Such costs are not relevant for decision making and are not affected by increase or decrease in volume. Thus, which has taken place and is irrecoverable in a situation is treated as sunk cost.

v) Imputed or Notional Costs : These costs are notional in nature and do not involve any cash outlay. The charted Institute notional cost as "the value of a benefit where no actual cost is incurred". Even though such costs do not involve any cash outlay but are taken into consideration while making managerial decisions. Examples of such costs are: Notional rent charged on business premises owned by the proprietor interest on capital for which no interest has been paid.

vi) Opportunity Cost : It is the maximum possible alternative earning that might have been earned if the productive capacity or services had been put to some alternative use. For example, if an owned building is proposed to be used for a project the likely rent of the building is the opportunity cost which should be taken into consideration while evaluating the profitability of the project.

vii) Replacement Cost : It is the cost at which there could be purchase of an asset, or material identical to that which is being replaced or revalued. It is the cost of replacement at current market price.

viii) Avoidable and Unavoidable Cost : Avoidable costs are those which can be eliminated if a particular product or department with which they are directly related in discontinued. For example, salary of the clerks employed in a particular department can be eliminated if the department is discontinued. Unavoidable cost is that cost which will not be eliminated with the discontinuation of a product or department. For example salary of factory manager or factory rent can not be eliminated even if product is eliminated.

4.3 ELEMENTS OF COST :

Mere knowledge of total cost cannot satisfy the needs of management. For proper control and managerial decisions, management is to be provided with necessary data to analyse and classify the costs. For this purpose the total cost analysed by elements of cost i.e by the nature of expenses. The elements of costs are three i.e materials, labour and other expenses. The elements of cost further analysed in to different elements as follows :

Elements of Cost

```
                        Elements of Cost
                              |
         -------------------------------------------------
         |                    |                          |
      Material             Labour                  Other Expenses
         |                    |                          |
    -----------          -----------               -----------
    |         |          |         |               |         |
  Direct   Indirect    Direct   Indirect         Direct   Indirect
              |                     |                          |
              -----------------------------------------------
                              |
                          Overheads
                              |
         ----------------------------------------------------
         |              |                  |                 |
    Production      Administration      Selling          Distribution
       or            overheads         overheads          overheads
      works
    overheads
```
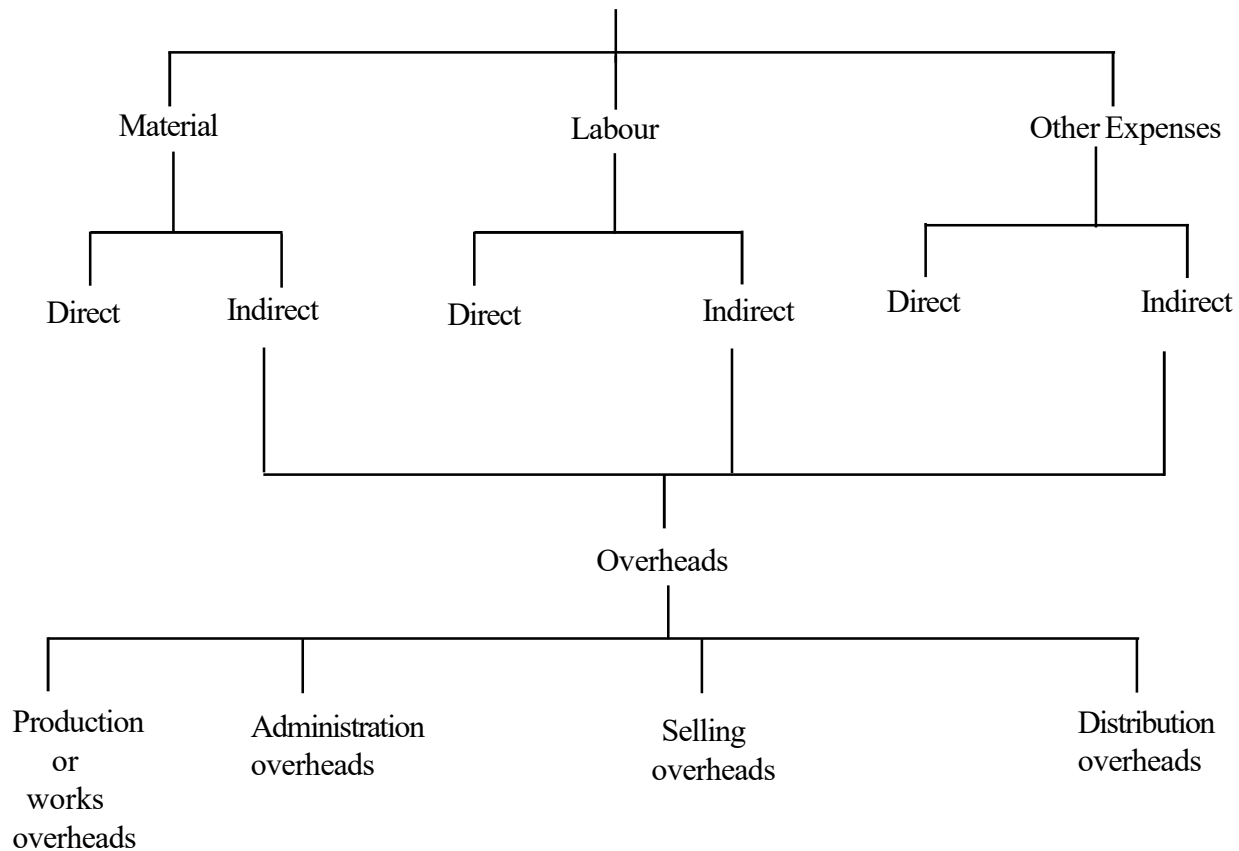
1. Direct Materials : Direct materials are those materials which can be identified in the product and can be conveniently measured and directly charged to the product. Thus, these materials directly enter the production and form a part of the finished product. For example, timber in furniture making cloth in dress making and bricks in building a house. The following are the Direct Materials.

  i) All raw materials like jute in the manufacture of gunny bags, pig iron in foundry and fruits in canning industry.

  ii) Material specifically purchased for a specific job, process or order like glue for book, binding, startch powder for dressing yarn.

  iii) Parts or components purchased or produced like batteries for transistor radios and tyres for cycles.

  iv) Primary packing materials like cartons, wrappings, card board boxes etc used to protect finished product from climatic conditions or for easy handling inside the factory.

2. Indirect Materials : Indirect materials are those materials which can not be identified in the product and cannot be conveniently measured and not directly charged to the product. Example of indirect materials are : Consumable like cotton waste, lubricants, cleaning materials, materials for repairs and maintenance of fixed assets, diesel used in power generators etc.

Classification of materials into direct and indirect facilitates material control. Direct materials are usually high value items as compared to indirect material and need strict control and critical analysis for reducing their cost.

However in some cases, though the materials is a part of the finished product yet it is not treated as direct material; for example sewing thread in dress making and nails in furniture making.

3. Direct Labour : Direct labour is that labour which can be conveniently identified or attributed wholly to a particular job, product or process or expanded in converting raw materials in to finished goods. Wages of such labour are known as direct wages.

The wages paid to supervisors, inspectors etc though not direct labour can be treated as direct labour if they are directly engaged specific product or process and the hours they spend on it can be directly measured with out much of an effort. Similarly where the cost is not significant like the wages of trainees or apprentices, their labour though directly spent on product is not treated as direct labour.

4. Indirect Labour : Indirect labour is the labour which are not directly engaged in the production of goods and services but which indirectly helps the direct labour engaged in production. The example of indirect labour are supervisors, sweapers, foremen, watchmen, time keeper, cleaners, repairers etc. The cost of indirect labour cannot be conveniently allocated to a particular job, order, process or article.

5. Direct Expenses : Direct expenses are those expenses which are directly incurred in process of production other than direct material and direct labour. For example excise duty, Royalty on production, Architect fees, travelling expenses to site, expenditure on pilot projects, experimental expenditure, planning expenditure.

6. Overheads : Overheads may be defined as the aggregate of the cost of indirect materials, indirect labour and such other expenses including services as cannot conveniently be charged direct to specific cost units. Thus overheads are all expenses other than direct expenses. In general terms, overheads comprise all expenses incurred for or in connection with the general organisation of the whole or part of the undertaking i.e the cost of operating supplies and services used by the undertaking and including the maintenance of capital assets. The main groups in to which overheads may be sub-divided are i) Manufacturing overhead ii) Administration overhead iii) Selling overheads iv) Distribution overheads v) Research and Development overheads.

Expenses Excluded from Costs :

The total cost of a product should include only those items of expenses which are a charge against profit. Items of expenses which are relating to capital assets, capital losses, payments by way of distribution of profits and matters of pure finance should not form a part of the costs

Examples of such expenses are - income tax, dividends, abnormal wastage of material, abnormal idle time, interest on capital given or received, expenses of raising capital, discount on shares and debentures, profit or loss from the sale of asset or investments, excessive depreciation, appropriation of profits, writing off goodwill, preliminary expenses and underwriting commission, cash discount, debentures interest, incomes which are connected with business i.e transfer fees, rent, interest, dividend received and capital expenditure.

4.4 Cost Sheet or Statement of Cost :

Cost sheet is a statement designed to show the output of a particular accounting period along with break-up of costs. There is no fixed form for preparation of a cost sheet but in order to make the cost sheet more useful it is generally presented in columnar form. The main advantages of cost sheet are :

1. It discloses the total cost and the cost per unit of the units produced during the given period.

2. It enables a manufacturer to keep a close watch and control over the cost of production.

3. By providing a comparative study of the various elements of current cost with the past results and standard costs, it is possible to find out the causes of variations in costs and to eliminate the adverse factors and conditions which go to increase the total cost.

4. It acts as a guide to the manufacturer and helps him in formulating a definite useful production policy.

5. It helps in fixing up the selling price more accurately

6. It helps the business man to minimise the cost of production when there is a cut throat competition.

7. It helps the business man to submit quotations with reasonable degree of accuracy against tenders for the supply of goods.

4.5 Proforma of Cost Sheet :

Cost Sheet

Particulars	Rs.	Total Cost Rs.	Cost Per Unit Rs.
Opening stock of Raw Materials	x x x x		
Add : Purchases	x x x x		-
Add : Carriage on Purchases	x x x x		
	x x x x		
Less : Closing stock of Raw Materials	x x x x		

Cost Sheet

Particulars	Rs.	Total Cost Rs.	Cost Per Unit Rs.
Cost of Raw Materials Used		x x x x	x x x x
Direct Wages		x x x x	x x x x
Direct Expenses		x x x x	x x x x
Prime Cost		x x x x	x x x x
Add : Factory / Works Overheads	x x x		
Factory Rent Rates & Taxes	x x x		
Fuel & Water	x x x		
Indirect materials	x x x		
Indirect wages	x x x		
Works manager salary	x x x		
Drawing office salaries	x x x		
Works expenses	x x x		
Depreciation on Plant & Machinery	x x x		
Repairs of plant & machinery	x x x		
Insurance on plant & machinery	x x x		
Depreciation on land & Buildings	x x x		
	x x x x		
Less : Scrap value	x x x		
	x x x x		
Add : Opening work in progress	x x x		
	x x x x		
Less : Closing work in progress	x x x		

Cost Sheet

Particulars	Rs.	Total Cost Rs.	Cost Per Unit Rs.
Factory Cost / Works Cost / Cost of Out put		x x x x	x x x x
Add : Administrative or office overheads :	x x x		
Counting office salaries	x x x		
Office manager salary	x x x		
Staff salaries	x x x		
Office rent, taxes, insurance	x x x		
Office lighting & cleaning	x x x		
Directors fees	x x x		
Managing Director Salary	x x x		
Printing & Stationary	x x x		
Postage	x x x		
Telephone expenses	x x x		
Audit Fees	x x x		
Depreciation on office furniture and buildings	x x x		
Other expenses	x x x		
Office cost or Cost of Production	x x x x		
Add : Opening stock of finished goods	x x x	x x x x	x x x x
	x x x x		
Less : Closing stock of finished goods	x x x		
Cost of goods sold :		x x x x	x x x

Cost Sheet

Particulars	Rs.	Total Cost Rs.	Cost Per Unit Rs.
Add : Selling and Distribution overheads			
Sales men salaries & commission	x x x		
Sales manager Salary	x x x		
Advertisement Expenses	x x x		
Show room expenses	x x x		
Samples & free gifts	x x x		
Market research expenses	x x x		
Bad debts	x x x		
Ware house rent & insurance	x x x		
Travelling expenses	x x x		
Carriage outwards	x x x		
Packing expenses	x x x		
Delivery van expenses	x x x		
Depreciation on delivery van	x x x		
Cost of Sales / Total Cost		x x x x	x x x x
Profit / Loss		x x x	x x x x
Sales / Selling Price.		x x x x	x x x x

4.6 Self Assessment Questions :

1. Prepare a chart showing the different elements of cost.

2. Define i) Cost ii) Cost centre.

3. Define cost classification.

4. Distinguish between Direct and Indirect Cost.

5. Define : i) fixed cost ii) variable cost iii) Semi variable cost.

6. Distinguish between product cost and period cost.

7. Explain the controllable and uncontrollable costs.

8. How the cost is classified for Management decision.

4.7 Suggested Readings

Cost & Management Accounting   -   S.P.Jain & K.L.Narang.

Cost Accounting   -   N.K.Prasad.

P. USHA RANI

Lesson - 5

COST SHEET

5.0 OBJECTIVES:

After studying this lesson you should be able to Prepare cost sheet

STRUCTURE:

5.1 Introduction

5.2 Features of incentive schemes

5.3 Method of payment of incentives

5.4 Solved Problems

5.5 Self Assessment Questions

5.6 Books Recommended

5.1 INTRODUCTION:

Cost sheet is also known as statement of cost. It is designed to show the out put of a particular accounting period along with breakup of costs. The data incorporated in cost sheet are coollected from various statements of accounts. The main advantages of a cost sheet are :

1. It discloses the total cost and the cost per unit of the units produced during the given period.

2. It enables a manufacturer to keep a close watch and control over the cost of production.

3. Cost sheet provides a comparative study of the various elements, current costs with the past results to find out the causes of variations in costs.

4. It helps the manufacturer in formulating a definite useful production policy.

5. It helps in fixing up the selling price more accurately.

6. It helps the businessmen to minimise the cost of production.

   There is no fixed form for preparation of a cost sheet but in order to make the cost sheet more useful it is generally presented in columnar form as given in the following format.

5.2. SPECIMEN OF COST SHEET :

Specimen of cost sheet or statement of cost units......

Particulars	Inner coloumn	Total cost	Unit cost
	Rs.	Rs.	Rs.
Opening stock of Raw material	xxx		
Add Purchases	xxx		
Add carriage inwards	xxx		
	xxxx		
Less : Closing stock	xxx		
Materials consumed		xxxx	xx
Add : Direct wages		xxx	xx
Direct Expenses		xxx	xx
Prime cost		xxxxx	xxx
Add : Factory or works over heads	xxx		
Factory Rent & Taxes			
Power, fuel, water	xxx		
Indirect material	xxx		
Indirect wages	xxx		
Works manager slaries	xxx		
Drawing office salaries	xxx		
Factory expenses	xxx		
Depreciation of plant and Machinery	xxx		
Repairs of plant and Machinery	xxx		
Insurance on plant and Machinery	xxx		

Depreciation on buildings and land of factory	XXX		
	XXXX		
Less : Scrap value	XXX		
	XXXX		
Add : Opening balance of work in progress	XXX		
		XXXX	XXX
Factory cost or works cost		XXXX	XXX
Add : Office or Administration over heads			
Office salaries	XXX		
Office manager salary	XXX		
Office Rent, Insurance and Taxes	XXX		
Directors fees	XXX		
Managering director salary	XXX		
Statinery and printing	XXX		
Postage	XXX		
Telephone & Audit fess	XXX		
Depreciation on office furniture and buildings	XXX		
other office expenses	XXX		
Cost of production		XXXX	XXXX
Add : opening balance of finished goods		XXX	XXX
		XXXX	XXXX
Less : Colsing balance of finished goods		XXX	XX
		XXXX	XXXX
Add : Selling & Distribution expenses			
solaries and commission of salesmen	XXX		

Salary of sales manager	xx		
Publicity and Advertisment	xx		
Showroom expenses	xx		
Samples, gifts	xx		
Market research expenses	xx		
Bad debts	xx		
godown rent, insurance	xx		
sales transportation	xx		
packing expenses	xx		
Delivery van expenses	xx		
Depreciation of delivery van	xx	xxx	xxx
Total cost / cost of sales		xxxx	xxx
Profit / loss		xxx	xx
Sales		xxxx	xxx

5.3. EXPENSES EXCLUDED FROM COSTS :

Items of expenses which are relating to capital assets, capital losses, payments by way of distibution of profits and matters of pure finance should not form a part of the costs. Examples of such expenses are -

1. Income Tax

2. dividends

3. Good will

4. Reserves

5. Interest on Debentures

6. Donations

7. Preliminary expenses

8. abnormal wastage of material

9. Wages paid for abnormal idle time

10. Interest on capital

11. Expenses of raising capital

12. Discount on shares and debentures

13. Profit or loss from the sale of asset

14. excessive deprecintion

15. Underwriting commission

16. Preliminary expenses

17. Cash discounts and

18. incomes which are not connected with business etc.

5.4 SOLVED PROBLEMS :

1. Following information is collected from the books of left centre corporation. prepare

    a) Materials consumed

    b) Prime cost

    c) factory cost

    d) cost of sales

    e) Net profit

	June 2006	June 2007
	Rs.	Rs.
Raw Material	30,000	25,000
Work in progress	12,000	15,000
finished goods	60,000	55,000
purchase of raw material	4,50,000	
Wages	2,30,000	
Factory over heads	92,000	
Office over heads	30,000	
Selling and distribution overheads	20,000	
Sales	9,00,000	

solution :

COST SHEET

Particulars	June 2006	June 2007
	Rs.	Rs.
Opening balance of Raw material	30,000	
Add : Purchases	4,50,000	
	4,80,000	
Less : Closing balance of Raw material	25,000	
Materials consumed		4,55,000
Add : wages		2,30,000
Prime cost		6,85,000
Add : factory over heads		92,000
		7,77,000
Add : opening balance of work in process		12,000
		7,89,000
Less : Closing balance of work in process		15,000
Factory cost		7,74,000
Add : office expenses		30,000
Total cost of production		8,04,000
Add : opening balance of finished goods		60,000
		8,64,000
Less: closing balance of finished goods		55,000
Cost of goods sold		8,09,000
Add : selling & distribution expenses		20,000
Total cost		8,29,000
Net profit		71,000
Sales		9,00,000

2. From the following data of Sai Enterprises find out :

a) Materials consumed

b) Prime cost

c) factory cost

d) Total cost

in total and per unit.

	Rs.
Balance of Raw Material on 1st jan 2007	35,000
Purchases	85,000
Direct wages	1,20,000
Factory expenses	90,000
Office expenses	1,24,000

company produced 10,000 units. Closing balance of Raw material Rs. 20,000 on 31.12.2007

Solution:

COST SHEET

Particulars	Rs.	Per unit Rs.	Per 10,000 units Rs.
Opening balance of Raw material	35,000		
Add Purchase	85,000		
	1,20,000		
Less closing balance of Raw material	20,000		
Materials consumed		10.00	1,00,000
Add : Direct wages		12.00	1,20,000
Prime cost		22.00	2,20,000
Add : work expenses		9.00	90,000
work cost		31.00	3,10,000
Add : Office expenses		12.40	1,24,000
Total cost		43.40	4,34,000

3. Following is the information of a standard production company for the month April 2008

	Rs.
Raw Material	80,000
Direct wages	48,000
Machine hours (working)	8,000
Machine hour rate	400

Administration overheads on factory cost - 10%

Selling and distribution expenses perunit Rs 1-50.

  Units produced 4,000

  Units sold 3,600 at Rs 50.

    From the above information find out the following :

a) Unit cost

b) Profit per month

Statement of Cost and Profit

Particulars	Rs.	Total cost (4,000 Units) Rs.	Cost per unit Rs.
Raw material		80,000	20.00
Add : Purchase		48,000	12.00
prime cost		1,28,000	32.00
Add : factory expenses			
Machine hours x machine hour rate	8,000x4	32,000	8.00
Works Cost		1,60,000	40.00
Add : office over heads 10% of			
Works cost	$\dfrac{1,60,000}{100} \times 10$	16,000	4.00
Cost of production		1,76,000	44.00

Cost of goods sold	3,600x44	1,58,400
Add : Selling and distribution		
expenses	3,600x1.50	5,400
Cost of sales		1,63,800
Profit		16,200
Sales	3,600x50	1,80,000

4. Calculate prime cost, factory cost, cost of production, cost of sales and profit from the following particulars :

	Rs.		Rs.
Direct wages	30,000	Depreciation :	
Direct Materials	1,00,000	Factory	500
Wages of foreman	2,500	Office	1250
Electric power	500	Consunable stores	2,500
Lighting : Factory	1,500	Manager's salary	5,000
Office	500	Director's fees	1,250
Store keeper's wages	1,000	Office stationary	500
Oil and water	500	Telephone charges	125
Rent : Factory	5,000	Postage and Telegrams	250
Office	2,500	Salesmen's Salaries	1,250
Repairs : Factory	3,500	Travelling expenses	500
Office	500	Advertising	1,250
Transfer to reserves	1,000	warehouse charges	500
Discount on shares	500	Sales	1,89,500
Dividend	2,000	carriare outand	375
		Income tax	10,000

solution :

STATMENT OF COST AND PROFIT

Particulars	Rs.	Rs.
Direct Material		1,00,000
Direct wages		30,000
Prime cost		1,30,000
Add : Factory over heads :		
Wages of foreman	2,500	
Electric power	500	
Store keeper's wages	1,000	
Oil and water	500	
factory rent	5,000	
factory repairs	3,500	
factory lighting	1,500	
factory depreciation	500	
consumable stores	2,500	
factory cost		17,500
		1,47,500
Add : Administration expenses :		
Office rent	2500	
office repairs	500	
office lighting	500	
office depreciation	1,250	
manager's salareis	5,000	
Director's fees	1,250	
office stationary	500	
Telephone charges	125	
postage and telegrams	250	11,875

Cost of production		1,59,375
Add : Selling & Distribution overheads:		
Carriage outward	375	
Salesmen's salaries	1,250	
Travelling expenses	500	
Advertising	1,250	
warehouse charges	500	3,875
Cost of sales		1,63,250
profit		26,250
sales		1,89,500

5. From the following particulars of Rum & Co. Ltd. for three months ending 31st March 2007

Prepare

a) Cost sheet for the period giving various costs and

b) profit and loss account for the quarter showing profit per barrel.

Wages Rs. 12,000 coal and oil 11,200, cooperage, corks and shives Rs. 4,000, Malt Rs.40,000, Hops Rs. 10,800, Beer duty Rs. 2,80,000, water Rs. 1,000, Rent & Taxes Rs. 6,000, By product Rs. 3,600, Sugar Rs. 14,000, Preservatives Rs. 1,600, Other Materials Rs. 1,200, Repairs Rs. 1,800, Depreciation Rs. 1,200, Administration expenses Rs. 24,000 , Selling and distribution expenses Rs. 30,000.

Opening stock of beer Rs. 40,500 (300 barrels) closing stock of beer Rs. 67,500 (500 barrels) Beer sales Rs. 4,98,000 (2,800 barrels), Beer brewed during the period 3,000 barrels.

solution :

COST SHEET FOR THE QUARTER ENDING 31st MARCH, 2007

(Output : Beer Brewed 3,000 Barrels)

Particulars	Total Cost	Cost per unit
	Rs.	Rs.
Material Consumed:		
Malts	40,000	13.33
Hops	10,800	3.60
Sugar	14,000	4.67

Preservatives	1,600	0.53
Other Materials	1,200	0.40
Water	1,000	0.33
	68,600	22.86
Beer duty	2,80,000	93.33
Less : proceeds from	3,48,600	116.19
Sale of by product	3,600	1.19
	3,45,000	115.00
wages	12,000	4.00
Prime cost	3,57,000	119.00
Add : Factory over heads :		
Coal and oil	11,200	3.73
Co operane, corks and shives	4,000	1.33
Rent and Taxes	6,000	2.00
Repairs	1,800	0.60
Depreciation	1,200	0.40
Factory cost	3,81,200	122.06
Add : Administration expenses.	24,000	8.00
Cost of production	4,05.200	135.06

Profit & Loss Account

[for the quarter ending 31st March 2007]

	Barrel Rs.	Total Rs.	Per Barrel Rs.		Barrel Rs.	Total Rs.	Per Barrel Rs.
To opening stock	300	40,500		By sales	2,800	4,98,000	177.85
To cost of production	3,000	4,05,200	135.06				
To Selling & Distribution expenses		30,000	10.72	By stock at cost	500	67,500	
To Net profit		89,800	32.07				
	3,300	5,65,500	177.85		3,300	5,65,500	177.85

6. A company makes two distinct types of vehicles A and B. The total expenses during a period as shown by the books of assembly of 600 of A and 800 of B are as under :

	Rs.
Material	1,98,000
Direct wages	12,000
Stores overhead	19,800
Running expenses of Machine	4,400
Depreciation	2,200
Labour amenities	1,500
Works general	30,000
Administration & selling expenses	26,790

Additional information

	A : B
Material cost ratio per unit	1 : 2
Direct labour ratio per unit	2 : 3
Machine utilisation ratio per unit	1 : 2

Calculate the cost of each vehicle per unit giving reason for the basis of apportionment adopted by you

Solution :

Statement of Cost

Particulars	Vehicle A Rs.	Vehicle B Rs.	Total Rs.
Material (3:8)	54,000	1,44,000	1,98,000
Direct wages (1:2)	4,000	8,000	12,000
Prime cost	58,000	1,52,000	2,10,000
Storage over heads			
(10% of material cost)	5,400	14,400	19,800
Running expenses of machines (3:8)	1,200	3,200	4,400
Depreciation (3:8)	600	1600	2200

Labour amenities (2:3)	600	900	1500
works general (2:3)	10,000	20,000	30,000
Works cost	75,800	1,92,100	2,67,900
Administration and Selling			
(10% of works cost)	7,580	19,210	26,790
Total cost	83,380	2,11,310	2,94,690

Cost per unit of each vehicle 138.97, 264.14

Notes :

1. Material cost has been apportioned on the basis of cost ratio per unit multiplied by the units produced

   i.e A:B = 1x 600 ; 2 x 800 = 600 ; 1,600 = 3:8

2. Direct wages have similarly been apportioned

   i.e A:B = 2 x 600 ; 3 x 800 = 1200 ; 2400 = 1:2

3. Stores overheads have been apportioned as a percentage of material cost

   i.e $\dfrac{19800}{1,98000} \times 100 = 10\%$

4. Running expenses of machines have been apportioned on the basis of machine utilization ration per unit multiplied by the units produced

   i.e A:B = 1x 600 ; 2 x 800 = 600 ; 1,600 = 3:8

5. Depreciation charges have been apportioned on the same basis as running expenses of machines.

6. Labour amenities are apportioned on the basis of direct labour ratio i.e. A : B = 2:3

7. Works general expenses have been apportioned on the basis of direct labour ratio

   i.e A : B = 2 : 3

8. Administration and selling overheads have been apportioned on the basis of works cost

   i.e ; 758 : 1,921.

7. From the following particulars prepare a cost sheet showing the total cost per tonne for the period ended 31st December 2007

	Rs.		Rs.
Raw material	66,000	estimations	1600
Productive wages	70,000	factory stationery	1500
Direct expenses	6,000	office stationery	1800
Un productive wages	21,000	Loose tools written off	1200
Factory rent	15,000	Rent & Taxes (office)	1000
Factory lighting	4,400	Water supply	2400
Factory heating	3,000	Factory insurance	2200
Motive power	8,800	Office insurance	1000
Haulare	6,000	legal expenses	800
Directors fees (works)	2,000	Depreciation of:	
Directors fees (office)	4,000	Plant & Machinery	4000
Factory cleaning	1,000	office building	2000
sundry office expenses	400	Delivery Van	400
Sales department salaries	3000	Bad debts	200
Up keep of delivery Vans	1400	Advertising	600
Bank Charges	100		
Commission on sales	1,500		

The total output for the period has been 29,550 tonnes.

solution :

STATMENT OF COST AND PROFIT

Particulars	Rs.	Rs.
Raw Material	66,000	
Productive wages	70,000	
Direct wages	6,000	
Prime cost		1,42,000
Add : Works expenses:		

Un productive wages	21,000	
factory rent	15,000	
factory lighting	4,400	
factory heating	3,000	
Motive power	8,800	
hacelege	6,000	
Director's fees (factory)	2,000	
Factory cleaning	1,000	
Estimation expenses	1,600	
loose tools	1,200	
Factory estimtion	1,500	
water supply	2,400	
factory insurance	2,200	
Depreciation	4,000	74,100
Factory Cost		2,16,100
Add : Office expenses :		
Directors fees (office)	4,000	
Sundry office expenses	400	
Office stationary	1,800	
Office rent	1,000	
Office Insurance	1,000	
legal expenses	800	
Depreciation	2,000	
Bank changes	100	11,100
Cost of production		2,27,200
Add : Selling & Distribution expenses :		
Rent of ware house	600	
Depreciation	400	
Bad debts	200	

Advertising	600
Sales Dept, salaries	3,000
Commission on sales	3,000
Up keep of delivery vans	1,400

9,200

Total Cost — 2,36,400

$$\text{Cost per tonne} = \text{Rs.} \frac{2,36,400}{29,550} = 8$$

8. From the following particulars of a manufacturing firm, prepare a statement showing

    a) Cost of materials used.

    b) works cost

    c) Cost of production

    d) Percentage of works overhead to productive wages

    e) Percentage of general overheads to works cost.

	Rs.		Rs.
Stock of material on 1-1-2007	40,000	Finished goods sold	24,00,000
Purchase of raw material in		Works over head charges	1,50,000
January, 2007	11,00,000	Office and general expenses	1,00,000
Stock of finished goods		Stock of materials	
on 1st January 2007	50,000	on 31st Jan 2007	1,40,000
Wages	5,00,000	stock of finished goods	
		on 31st Jan 2007	60,000

solution :

STATMENT OF COST AND PROFIT

Particulars	Rs.	Rs.
Stock of Raw material 1.1.2007	40,000	
Add purchases	11,00,000	
	11,40,000	

Less stock of Raw material 31.1.2007	1,40,000	
Cost of material consumed		10,00,000
Add wages		5,00,000
Prime cost		15,00,000
Add works over heads		1,50,000
Works cost		16,50,000
Add office expenses		1,00,000
Cost of production		17,50,000
Add : Stock of finished goods (opening)		50,000
		18,00,000
Less : Stock of finished goods (closing)		60,000
Cost of goods sold		17,40,000
profit		6,60,000
sales		24,00,000

Percentage of works overheads charges to production

Wages $\dfrac{1,50,000}{5,00,000} \times 100 = 30\%$

Percentage of general over headss to works cost

Wages $\dfrac{1,00,000}{16,50,000} \times 100 = 6.06\%$

9. The following extract of costing information relates to commodity 'A' for the half year ending 31st December 2007

	Rs.
Purchase of Raw materials	1,20,000
Works overheads	48,000
Direct wages	1,00,000

carriage on purchases	1,440
stock (1st July, 2003)	
Raw material	20,000
Finished product (1,000 tons)	16,000
Stock (31 st Dec, 2007)	
Raw material	22,240
Finished product (2,000 tons)	32,000
Work in progress 1st july 2007	4,800
Work in progress 1st Dec 2007	16,000
Sales finished products	3,00,000

Selling and distribution overheads are Re.1 per ton sold. 16000 tons of commodity were produced during the period.

You are to ascertain.

a) Cost of raw material used

b) Cost of output for the period

c) Cost of sales

d) Net profit for the period

e) Net profit per ton of the commodity.

Solution :

STATMENT OF COST AND PROFIT

(For the half year ending 31st december 2007)

Particulars	Units (Tonner)	Amount Rs.
Opening Stock of Raw material		20,000
Add: purchases of Raw material		1,20,000
Add: carriage on purchases		1,440
		1,41,440
Less: closing stock of Raw material		22,240

Value of Raw materials used		1,19,200
Add Direct wages		1,00,000
Prime cost		2,19,200
Add : Works over heads		48,000
		2,67,200
Add: opening stock of work in progress		4,800
		2,72,000
Less: closing stock of work in progress		16,000
Cost of output for the period	16,000	2,56,000
Add : opening stock of finished goods	1,000	16,000
	17,000	2,72,000
Less: closing stock of finished goods	2,000	32,000
Cost of goods sold	15,000	2,40,000
Add : Selling & distribution over heads		
on 15,000 tons at Re 1 per ton		15,000
Cost of sales		2,55,000
Net profit of the period		45,000
Sales		3,00,000

$$\text{Net profit per ton} = \frac{45,000}{15,000} = 3$$

Note :

$$\text{Profit} = \frac{\text{Rate percentage on sale x Total cost}}{100 - \text{Rate percentage on sales}}$$

10. Following information has been obtained from the cost records of aditya chemicals Ltd. for 2007

	Rs.
Finished good on 1.1.2007	50,000
Raw materials on 1.1.2007	10,000
work in progrees 1.1.2007	14,000
Direct labour	1,60,000
Purchase of Raw Material	98,000
Indirect labour	40,000
Heat, light	20,000
Factory insurance	5,000
Repairs to plants	3,000
Factory supplies	5,000
Depreciation - factory building	6,000
Depreciation - plant	10,000

Other information

Factory cost of goods produced in 2007	Rs. 2,80,000
Raw Material consumed in 2007	Rs. 95,000
Cost of goods sold in 2007	Rs. 1,60,000

prepare a statement of cost.

Solution :

STATMENT OF COST AND PROFIT

Particulars	Rs.	Rs.
Opening Stock of Raw material	10,000	
Add purchases	98,000	
	1,08,000	
Less closing stock (1,08,000 - 95,000)	13,000	

Cost of Raw material consumed		95,000
Add direct labour		1,60,000
prime cost		2,55,000
Add : factory overheads :		
Indirect labour	40,000	
Heat, light	20,000	
Insurance	5,000	
Repairs	3,000	
Factory supplies	5,000	
Depreciation plant	10,000	
Building	6,000	89,000
		3,44,000
Add opening balance of work in progress		14,000
		3,58,000
Less closing balance of work in progress		
(3,58,000 - 2,80,000)		78,000
Factory cost (given)		2,80,000
Add opening stock of finished goods		50,000
		3,30,000
Less closing stock (3,30,000 - 1,60,000)		1,70,000
Cost of goods sold		1,60,000

11. Prepare cost sheet from the following information -

	No.1	No.2
Material (Rs)	60,000	1,00,000
Labour (Rs)	1,20,000	1,40,000
Sales (units)	360	400
Selling price (Rs) per unit	2,400	3,000

Work on cost is charged at 40% on works cost and

Office on cost is charged at 20% on total cost.

Solution :

COST SHEET

Particulars	No.1	No.2
Out put and sales : No. 1 = 360		
No.2 = 400		
Materials	60,000	1,00,000
Labour	1,20,000	1,40,000
Prime cost	1,80,000	2,40,000
Works on cost (40% on works cost equivalent to $\frac{40}{60}$ of prime cost)	1,20,000	1,60,000
works cost	3,00,000	4,00,000
Office on cost 20% on total cost or $\frac{20}{80}$ of works cost)	75,000	1,00,000
Total cost	3,75,000	5,00,000
Profit	4,89,000	7,00,000
Sales (units sold x selling price)		
(360 x2400) (400 x 3000)	8,64,000	12,00,000

12. A computer manufacturing company producing two types of computers A and B from the following information prepare cost sheet

	A	B
Material	90,000	1,50,000
Wages	2,15,000	4,75,000
Computers sold (units)	500	750

Works over heads 80% on wages, Administration expenses 10% on factory cost, selling price of computer A at Rs 1,200 and computer B at Rs. 1500

Solution :

	Cost Sheet			
	Computer A (500)		Computer B (750)	
Particulars	Total cost	Per unit	Total cost	Per unit
	Rs.	Rs.	Rs.	Rs.
Materials	90,000	180.00	1,50,000	200.00
wages	2,15,000	430.00	4,75,000	633.33
Prime cost	3.05.000	610.00	6,25,000	833.33
Add factory expenses				
(80% on labour)	1,72,000	344.00	3,80,000	506.67
Works cost	4,77,000	954.00	10,50,000	1340.00
Add Administration expenses				
(10% of works cost)	47,700	95.40	1,00,500	134.00
Total cost	5,24,700	1049.40	11,05,500	1474.00
Profit	75,300	150.60	19,500	26.00
Sales	6,00,000	1200.00	11,25,000	1500.00

13. From the following information prepare a monthly cost sheet of sand lime brick works, show ing cost and profit per 1,000 bricks -

Material used	Labour

Lime 895 tons of Rs 50 per ton

Sand Rs 2 per 1,000 bricks mad   Sand digging and

Coal 820 tons at Rs 40 per ton   Running Rs 10,000

Stores Rs 1250   Bricking Rs. 40,000

Factory on cost is 25% of direct charges. office on cost is 10% of factory cost. Bricks sold 35 lakhs, @ Rs. 70 per thousand . Stock of bricks at the end of month was 6 lakh bricks in the beginning the stock was 1 lakh bricks.

Solution :

COST SHEET

Particulars	Total Cost Rs.	Cost per 1000 units Rs.
Materials :		
Lime 895 tons of Rs 50 per ton	44,750	
Coal 820 tons at Rs 40 per ton	32,800	
Sand Rs 2 per 1,000 (40 lakhs)	8,000	
Stores	1,250	
	86,800	21.70
Labour		
Sand digging & running	10,000	12.50
Brick making	40,000	
Prime cost	1,36,800	34.20
Factory over heads at 25% of prime cost	34,200	8.55
Work cost	1,71,000	42.75
Office on cost at 10 % of works cost	17,100	4.28
Cost of production (40 lakhs)	1,88,100	47.03
Add opening stock 1 lakh bricks	4,702.50	
	1,92,802.50	
Less closing stock 6 lakh bricks	28,215.00	
Cost of bricks sold (35 lakhs)	1,64,587.50	47.03
Profit	80,412.50	22.97
Sales	2,45,000.00	70.00

Cost per thousand Rs 47.03.

Note : Caculations are made approximately.

5.6. SELF ASSESSMENT QUESTIONS :

Five Marks Questions :

1. What is cost sheet, What are its advantages ?

2. List out expenses which are not included in cost sheet

Ten Marks Questions :

3. In a factory 20,000 units of product A were manufactured in the month of July, 2007. Form the following information prepare cost sheet showing cost per unit.

	Rs.
Opening stock of Raw materials	10,000
Purchases	1,10,000
Closing stock	20,000
Direct wages	50,000
Factory over heads	80,000
Office and administration over head	40,000

Ans - 1,35,000 - 6.75

4. From the following particulars of ABC ltd. prepare cost sheet

	Rs.
Opening stock of Raw materials	20,000
Purchases	1,50,000
Closing stock	10,000
Direct wages	60,000
Factory over heads	22,500
Office and administration over head	27,500

Opening stock of finished goods 500 units at Rs. 11.20 per unit

Closing stock of finished goods 1,500 units worth Rs. 16,200

Profit on sales 20%

Selling and distribution expenses Rs. 20,000 units produced 25,000.

Ans - Units -24,000 ; Total cost - 3,49,250 Cost per unit - 14.55

5. The accounts of Sai international enterprise for the year ended 31st December 2007 shows the following prepare cost sheet.

	Rs.		Rs.
Factory office salary	13,000	Travelling expenses	4,200
General office salary	25,200	Travelling salaries	15,400
Carriage outward	9,200	Productive wages	2,52,000
Carriage on purchases	14,300	Depreciation - plant	13,000
Bad debts written off	13,000	furniture	600
Plant repairs	8,900	Directors fees	12,000
Insurance - factory office	17,000	Gas and water factory	2400
office	4,000	office	800
Sales	9,22,200	Managers salary	
Stock of material -		(3/4 factory 1/4 office	20,000
31st Dec 2006	1,25,600	General expenses	6,800
31st Dec 2007	96,000	Income Tax	1,000
Materials purchased	3,70,000	Dividend	2,000

Ans - Total cost - 8,30,800

6. In a factory two types of T.V sets are manufactured Viz optonica, Thomson model. From the following particulars prepare a statment showing cost and profit per T.V. sold. There is no opening or closing stock.

	Optonica	Thomson
Material	27,300	1,08,680
Labour	15,600	62,920

works overheads are charged at 80% on labour and office overhead is taken at 15% on works cost. the selling price of both T.V sets is Rs. 1,000 78 optonica and 286 thomson T.V.s were sold.

Ans - Cost per unit : Optonica - 816.50

Thomson - 892.40

7. From the following information prepare cost sheet -

	Rs.		Rs.
Opening Materials	25,000	Advertisement	2000
Purchases	85,000	Depreciation on Machinery	1500
Closing Materials	40,000	Dep. on furniture	100
Carriage inwards	5,000	Office staff salaries	2500
Direct wages	75,000	factory expenses	5700
Indirect wages	10,000	other office expenses	900
Direct expenses	15,000	Managerial director salary	12000
Rent and Rates - Factory	5000	selling expenses	1000
Office	500		
indirect material	500		
Travelling allowance of salesmen	1100		
Carriage outward	1000		
sales	2,50,000		
Income Tax	1500		

Ans - Total cost - 2,08,800

Profit - 41,200

8. From the following information calculate the following -

    a) prime cost

    b) factory cost

    c) production cost

    d) cost of sales

	Rs.
Direct materials	40,000
Direct wages	10,000
Direct expenses	2,000
Scrap	100

foreman salary		1000
store keeper salary		500
electric power		200
Lighting - factory -	500	
office -	200	700
Rent - factory -	2000	
office -	1000	3000
Repair - factory plant -	500	
Machinery -	1000	
Office buildings -	200	1700
Depreciation - Office -	500	
factory -	200	700
Consumable store		1000
Manager salary		2000
Director's fees		500
Stationary		200
Telephone expenses		50
Postage expenses		100
salesmen commission		500
Travelling expenses		200
Advertisement expenses		500
Godown expenses		200
carriage outwards		150

Ans - Total cost - 65,300

9. From the following trading Account, prepare cost sheet showing

    a) Materials consumed

    b) Cost of production

    c) percentage of profit on sales

Trading Account

	Rs.		Rs.
To Balances			
Finished goods	80,000	By sales	8,40,000
Raw material	24,000	By balances finished goods	70,000
To purchase	2,40,000	By Raw materials	28,000
To wages	4,00,000		
To Transportation	20,000		
To Gross profit	1,74,000		
	9,38,000		9,38,000

Ans - Cost of production - 6,66,000

Percentage of profit - 20.7

10. XYZ ltd. is producing Refregerators. From the following expenses of production prepare cost sheet showing cost of production for the month of april 2007.

	Rs.	Rs.
work in progress on 1.4.2007		
At prime cost	51,000	
Productive expenses	15,000	
		66,000
work in progress on 30.4.2007		
At prime cost	45,000	
Productive expenses	9,000	
		54,000

Raw material on 1.4.2007	2,25,000
Purchases	4,77,000
Direct wages	1,71,000
Productive expenses	84,000
Raw material on 30.4.2007	2,04,000

Ans - Cost of production - 7,65,000

5.6. BOOKS RECOMMENDED :

1. Practical costing - Khanna ; Pandey ; Ahuja.

2. Cost & Management Accounting - S.P. Jain & K.L. Narang

3. Cost Accounting - S.P. Jain & K.L. Narang

4. Practical problems in Cost Accounting - S.P. Jain & K.L. Narang

Dr. K. Kanaka Durga

Lesson - 6

MATERIALS-I

6.0 OBJECTIVES:

After studying this lesson you should be able to understand the following

> What is material control

> How to control material

> Procedure for purchasing of material

> Role of different levels of stock in controlling material (or stores)

STRUCTURE:

6.1 Introduction

6.2 Types of material

6.3 Material Control

   6.3.1 Objectives of material control

   6.3.2 Essentials of material control

   6.3.3. Advantages of material control

6.4 Purchasing and its organisation

   6.4.1 Objectives of purchasing department

   6.4.2. Centralised purchasing

   6.4.3. Decentralised purchasing

6.5 Layout of stores

   6.5.1 Centralised stores

   6.5.2 Decentralised stores

   6.5.3 Sub - stores

6.6 The store keeper

6.7 Levels of materials

6.8 Illustrations

6.9 Conclusion

6.10 Self Assessment Questions

6.11 Books Recommended

6.1 INTRODUCTION:

Material is a very important factor of production. It includes physical commodities used to manufacture the final end product. Material is that it can be purchased in varying quantities according to the requirements of the firm where as other elements of cost like labour and other services cannot be easily varied once they are established. From this it can be concluded that material is most flexible and controllable input. It is the first and most significant element of cost. Purchase of material will include both direct and indirect materials. Material control is necessary from the time orders for purchase of materials are placed with suppliers until they have been consumed. The object of material control is to reduce material cost on all fronts so that cost of material may be reduced.

6.2. TYPES OF MATERIAL :

Purchase of material will include both direct and indirect materials. Direct and indirect material are treated as stores items Whereas stock of finished goods is not treated as a stores item. Finished goods are treated as stock.

a. Direct material :

Direct material is a stores item. It can be conveniently and accurately allocated to a particular unit of cost. For example, leather used in the making of a pair of shoes is direct material.

b. Indirect material :

Indirect material is also a stores Item. It can be conveniently and accurately allocated to a particular unit of product. For example nails and gum used in the makeing of shoes.

6.3. MATERIAL CONTROL :

Material control can be defined as a comprehensive framework for the accounting and control of material cost designed with the object of maintaining material supplies at a level so as to ensure uninterrupted. Production but at the same time minimising investment of funds. In other words material control is a systematic control over the purchasing storing and using of materials so as to have the minimum possible cost of materials. Material control involves recording on printed forms all steps and movements which occur in the acquisition and utilisation of materials. Effective control also requires the systematic preparation of periodic summaries and reports.

6.3.1. Objectives or need of material control :

The following are the various objectives of material control.

1. **Availability of material :** There should be a continuous availability of all types of materials in the factory so that the production may not be held up for want of any material.

2. **Investment in material :** There should be no excessive investment in stock. Over stocking should be avoided keeping in view the disadvantages it carries. For this maximum quantity should be assigned.

3. **Reasonable price :** While purchasing materials, it is seen that it is purchased good quality material at reasonably low price.

4. **Minimum wastage :** Wastage should not exeed the normal level of wastage. Store keeper and worker should be trained to handle the material in a scientific way to avoid the wastage.

5. **Risks of spoilage and obsolescence :** Risk of spoilage and obsolescence must be avoided. For this purpose, a maximum quantity of each material is determined and proper method of issue of material is followed.

6. **Information about availability of materials :** Information should be made continuously available to the management so that planning of production may be done.

7. **Misappropriation by employees :** Material can be easily misappropriated by employees, this requires an internal check on materials which is a part of material control.

6.3.2. Essentials of material control :

The important requirements of material control are -

i. Proper co - ordination among the departments involved in the buying, receiving, inspection, storage and accouting.

ii. Centralisation of purchasing under the control of competent buyer.

iii. Proper scheduling of material requirements.

iv. Proper classification of materials.

v. The operation of a system of internal check to ensure that all tranction involving materials and equipment are checked by properly authorised and independent persons.

vi. The storage of materials is well - planned and kept in properly designated location.

vii. The operation of a perpetual inventory system.

viii. Fixing maximum, minimum and reordering levels of stock.

ix. Adequate records to control materials.

x. Regular reports to management about material control.

6.3.3. Advantages of material control :

A good system of material control enjoys the following advantages.

a. eliminates waste in the use of material.

b. reduces the risk of loss of material from fraud and theft.

c. helps in keeping perpetual inventory and other records to facilitate the preparation of accurated reports to management.

d. reduces the capital tied up in inventories.

e. reduces the cost of storage.

f. furnishes quickly and accurately the value of materials used in various departments.

g. Prevents production delays due to lack of materials by supplying adequate quantity at right time.

6.4. PURCHASING AND ITS ORGANISATION :

Purchasing is a specialised activity carried on by purchasing department under the control of a purchasing manager. Purchasing is a significant activity because it influences many factors such as quantity, quality, cost, efficiency, economy, prompt delivery, volume of production etc, In manufacturing organisation, purchasing includes the procuring of materials, supplies, machines tools and services required for the equipment, maintenance and operation of the business. The purchasing department obtains the required materials, supplies, machines, tools and serivces at the most favourable terms, consistent with maintaining the desired standard of quality and continuity of service. Following are the basic objectives behind establishing a separate purchasing department.

6.4.1. objectives of purchasing department :

1. To make continuous availability of materials.

2. To make purchase at the most economical prices.

3. To make purchase in reasonable quantilies.

4. To purchase proper quality of material.

5. To develop alternate sources of supply so that materials may be supplied without break.

Purchase department may be centralised or decentralised.

6.4.2. Centralised purchasing :

Centralised purchase department means that all the purchase functions are routed through one department. All purchases should be made by the purchase department to avoid duplicaiton, overlapping and the non - uniform procurements. All the other departments which require materials, suppliers, services, machines and tools should send indents or purchase requisitions to the centralised purchase department to make timely and suitable purchases.

Advantages :

Following are the advantages of centralised purchasing :

1. **Favourable terms :** When materials are purchased more trade discount or econo-mies in transport can be obtained because the quantity involved will be large.

2. **Specialised Knowledge :** The purchasing department can be staffed with highly paid officials who are experts in the art of purchasing the materials.

3. **Better control :** Better control on purchasing is possible. There are chances of reck-less buying when several persons are authorised to make purchases for their require-ments.

4. **Compilation & consultation of records :** All records with regard to purchases are kept at one place under the supervision of the purchase officer. This results in economy, both in compilation and consultation of records.

5. **Product standards :** It avoids duplications of efforts and is helpful in achieving product standards.

6. **Economy :** Centralised purchasing results in economy to a vendor because there is only one purchase officer to be dealt with instead of many persons under decentralised purchasing.

Disadvantages :

1. Centralised purchasing will cause delay because branches at different places will send their requirements to the purchasing department and the purchasing department will then look into their requirements and place the order for the purchase of materials.

2. There are chances of misunderstanding between the branch which requires the materials and the purchasing department with the result that wrong purchases of materials can be made.

3. It will lead to high initial cost because a separate purchasing department for the purchase of materials is to be set up.

   It is advantageous to have centralised purchasing if the branches or factories situated at different places need the same types of materials.

6.4.3. Decentralised purchasing :

Decentralised purchasing means purchasing function is decentralised. Heads of different departments purchase their requirments. Branches also purchase separately their requirements.

Advantages :

1. Delay in purchases can be reduced.

2. There are no chances of misunderstanding among the branches.

Disadvantages :

1. When purchases are decentralised, trade discounts or economies in transport cannot be obtained because the quantity involved will be less.

2. Better control on purchasing is not possible. There are chances of reckless buying when several persons are authorised to make purchases for their requirements.

6.5. LAYOUT OF STORES :

The stores department should be properly organised and equipped for handling of material coming in and going out. The stores department should be housed in a position which is readily accessible from any part of the factory and also as near to the road, railway siding or wharf as is possible in order that the minimum expenditure is incurred in unloading the materials purchased. A good location of layout of stores may bring down cost of production.

Types of stores layouts :

    1. centralised stores.

    2. decentralised stores

    3. sub- stores.

6.5.1. Centralised stores :

Under this system all materials are held in bulk in a place which is centrally located. Other decentralised stores draw their supplies from the central stores. Centralised store is always advisable from the point of view of control and economy.

Merits :

The advantages of purely centralised stores are -

1. Better supervision, better layout of stores and better control over stores.

2. Fewer obsolete articles.

3. Minimum investment in stock

4. Possibility of bulk buying at lower cost.

5. Inventory checks and inventory control facilitated.

Demerits :

1. Increased transportation costs

2. Inconvenience and delay in delivering goods to departments from central stores.

3. Production stoppages in departments due to breakdowns in transport or hold- ups in central store.

6.5.2. Decentralised stores :

Under the system stores are organised individually by different branches. These stores draw their supplies from centralised stores.

6.5.3. Sub - stores :

Sub - stores permit stocking of specialised materials for particular departments, closer liaison between storekeeper and the department he serves, easier detection of discrepancies in stores records and physical stocks and avoid delay in drawing stores. Each sub store is given as a commencing stock sufficient supplies for a little more than the re - stocking period. At the end of each week or other suitable period the sub- store keeper passes all its requisitions to the central store which reimburses it for these issues and there by restores the stock of each material to its imprest or original level. The control over such sub- stores is very good as over issues will not be reimursed. This system thus, combines the advantages of centralised buying and storage with the benefits of having stock conveniently available at several issuing points. But in this type of organisation centralised control may be lost, more space may be required and the storage cost may increase due to increased staff in stores and increased handling equipments.

6.6. THE STORE KEEPER :

All manufacturing concerns appoint a person known as the store keeper, chief store keeper or the stores superintendent who is in charge of the stores department and is responsible for stores control. The storekeeper should have technical knowledge and wide experience in stores routine and ability of organising the operations of the stores. He should be a man of undoubted integrity. His duties and responsibilities include the following.

1. Receiving the stores correctly and comparing by an indent, a purchase order, an inspection note and a goods received note.

2. Entering all receipts regularly in the Bin cards.

3. Keeping every item of stores in its allotted bin. The principle of good store keeping is a place for everything and every thing in its place.

4. Maintaining the stores in an orderly and tidy manner.

5. Ensuring that materials are issued only to these who present a duly signed requistion note.

6. Requisitioning from the purchasing department when the stock of a material reaches the re-order level.

7. Ensuring that the stocks do not exceed the maximum level nor go below the minimum level at any time.

8. Checking the Bin card balances with the physical quantities in the bins.

9. Maintaining and supervising the duties of the different members of staff under this charge.

10. Preventing unauthorised persons from entering into the stores.

6.7. LEVELS OF MATERIALS OR REQUISITIONING FOR STORES :

One of the duties of the store keeper is to send requistions for materials for replenishment in time so that the production may not hamper for want to materials. In this respect, he is guided by the re - order level, economic ordering quantity and maximum and minimum quantity which he is authorised to store in respect of each kind of material.

a. Re - ordering level :

Re - ordering level is the point at which if stock of a particular material in store approaches, the store keeper should initiate the purchase requisition for fresh supplies of that material. This level is fixed supplies of that material. This level is fixed somewhere between the maximum and minimum levels.

Re ordering level = Minimum level + consumption during the time required to get the fresh delivery.

(or)

Re - ordering level = Maximum consumption X Maximum re - order period.

Illustration :

Calculation the ordering level of material ' A ' Form the following particulars.

i) Minimum limit 1,000 units

ii) Maximum limit 2,500 units

iii) Daily requirement of material 200 units

iv) Time required for fresh delivery 20 days.

Solution :

Ordering level = Minimum limit + (consumption during the time required for fresh delivery)

= 1000 units + (200 units x 20)

= 1000 + 4000 = 5,000 units

order for the purchase of material should be placed when the material in stock reaches 5,000 units.

Factors governing re - order quantity are -

1. cost of placing orders

2. average consumption

3. cost of storage

4. Interest on captial

b. Maximum level :

The maximum stock level is that quantity above which the stock of any item should not be allowed to exceed. A maximum stock is generally fixed by taking into consideration the following factors namely -

1. Average rate of consumption

2. Re- order level and delivery time to obtain supplies

3. Amount of captial necessitated and available.

4. Keeping quality of material

5. Storage space and cost of storage.

6. Price fluctuations.

7. Risk of natural waste.

8. Economic ordering quantity

9. Incidence of Insurance.

Formula :

Maximum Level = Re - order level - Expected minimum consumption in units during minimum weeks required to obtain delivery + Re ordering quantity in use.

c. Minimum level :

The minimum stock level is that level below which the stock of any item should not be allowed to fall. A minimum stock level is fixed by taking into consideration the following factors.

1. Re-order level

2. Average rate of consumption of material

3. Average time required to obtain delivery of fresh supplies.

Formula :

Minimum Level = Re - order level - [normal or average usage per period x no. of periods required to obtain delivery (average)]

d. Danger level :

Danger level is a level at which normal issues of the material are stopped and issues are made only under specific instructions.

Dangel level = Average consumption x Max . re - order period for emergency purchases.

Average stock level

The average stock level is calculated by the following formula :

Average stock level = Minimum stock level + 1/2 of Re - order quantily

1/2 (minimum stock level + 1/2 of re- order quantity).

Illustration :

Two components X and Y are used as follows :

Normal usage 50 units per week each

Maximum usage 75 units per week each

Minimum usage 25 units per week each

Reorder quantity X = 400 units Y = 600 units

Reorder period X = 4 to 6 weeks Y = 2 to 4 weeks.

Calculate for each component -

a. Re-order level

b. Minimum level

c. Maximum level

d. average stock level

Solution :

a) Re-order level -

Re-order level = Maximum Reorder period x Maximum usage

X = 6x75 = 450 units

Y = 4x 75 = 300 units

b) Minimum level -

Minimum level = Re - order level - Normal usage per week X Average delivery time.

X = 450 - (50x 5) = 200 units

y = 300 - (50 x 3) = 150 units

c) Maximum level

Reorder level - Minimum consumption during minimum weeks + Re ordering quantity.

X = 450 - (25x4) + 400

y = 300 - (25x2) + 600

Average stock level = $\dfrac{\text{Maximum Level + Minimum Level}}{2}$

$X = \dfrac{750 + 200}{2} = 475$ units

$Y = \dfrac{850 + 150}{2} = 500$ units

Average delivery time =

$X = \dfrac{4 + 6}{2} = 5$

$Y = \dfrac{2 + 4}{2} = 3$

e. Economic ordering qunatity :

The quantity of material to be ordered at one time is known as economic ordering quantity. This quantity is fixed in such a manner as to minimise the cost of ordering and carrying the stock. Out of the total costs the only costs to be taken care of are ordering costs and carrying costs.

Carrying Cost : It is the cost of holding the materials in the store and includes.

    1. Cost of the storage space

    2. Cost of bins and racks.

    3. Cost of maintaining the materials to avoid deterioration.

    4. Amount of interest payable on the money locked up in the materials.

    5. Cost of spoilage in stores

    6. Transportation cost of material

    7. Cost of obsolescence

    8. Insurance costs

    9. clerical costs.

Ordering costs : It is the cost of placing orders for the purchase of materials and includes.

    1. Cost of staff posted in the purchasing, inspection and payment departments.

    2. Cost of stationery, postage and telephone charges.

The quantity to be ordered should be such which minimises the carrying and ordering costs. The order to be purchased should be large enough to earn more trade discount and to take advantage of bulk transport, but it should not be to large to incur heavy payment on account of interest, storage and insurance costs. If the price to be paid is stable, the quantity to be ordered each time can be ascertained by the following formula.

$$Q = \sqrt{\frac{2\,CO}{I}}$$

Q = Quantity to be ordered

C = Consumption of the material concerned in units during a year.

O = Cost of placing one order.

I = interest payment including variable cost of storing per unit per year i.e holding costs of inventory.

Illustraction :

Find out the economic ordering quantity from the following particulars.

Annual usage = 6,000 units

Cost of material per unit = Rs 20

Cost of placing and receiving one order = Rs 60

Annual carrying cost of one unit = 10 % of inventory value.

Solution :

$$\text{E.O.Q.} = \sqrt{\frac{2\,CO}{I}}$$

C = 6,000 units

O = Rs 60

$$I = \frac{20 \times 10}{100} = \text{Rs } 2$$

$$\text{E.O.Q.} = \sqrt{\frac{2 \times 6000 \times 60}{2}} = \sqrt{3,60,000} = 600 \text{ units}$$

E.O.Q. = 600 units

6.8 ILLUSTRATION :

Illustration - 1

Find out the ordering level from the following information

   a. Minimum stock 1000 units

   b. Maximum stock 2000 units

   c. Time required for receiving the material 15 days.

   d. Daily consumption of material 50 units

Solution :

Ordering level = Minimum stock + (consumption during the time required for fresh delivery)

= 1000 units + 50 x 15 = 1750

Ordering level = 1750 units

Illustration - 2

A manufacturer buys certain equipment from outside suppliers at Rs 30 per unit. Total annual needs are 800 units. The following further data are available

Annual return on investment 10%

Rent, Insurance, taxes per units per day Re 1

Cost of placing an order Rs 100

Determine the EOQ

Solution :

$$E.O.Q. = \sqrt{\frac{2\,CO}{I}}$$

Where   C = Annual requirment of material 800 units

O = ordering cost Rs 100

I = Carrying cost per unit = 1 + 10% of Rs 30.

$$E.O.Q. = \sqrt{\frac{2 \times 800 \times 100}{4}} = 200 \text{ units}$$

E.O.Q. = 200 units

Illustration -3

The components A and B are used as follows :

Normal usage 50 units per week each

Maximum usage 25 units per week each

Minimum usage 75 units per week each

Re order quantity A = 300 units

B = 500 units

Re-order period A = 4 to 6 weeks

B = 2 to 4 weeks.

Calculate for each component -

a. Re-order level

b. Minimum level

c. Maximum level

d. average level

Solution :

a) Re order level -

Re order level = Maximum usage x Maximum Reorder period

Re order level of Material A = 75 x6 = 450 units

Re order level of Material B = 75 x4 = 300 units

b) Minimum level -

Minimum level = Re - order level - (Normal consumption X Normal Re- order period).

Minimum level for material X = 450 - (50x 5) = 200 units

Minimum level for material y = 300 - (50 x 3) = 150 units

$$\text{Normal Re-order period} \ = \ \frac{\text{Minimum Period} \ + \text{Maximum Period}}{2}$$

$$\text{Normal Re-order period for material} \ = A = \ \frac{4+6}{2} = 5 \text{ weeks}$$

$$\text{Normal Re-order period for material} \ = B = \ \frac{2+4}{2} = 3 \text{ weeks}$$

c) Maximum level

Re-ordering level + Re-ordering quantity -

(Minimum consumption x Minimum Re-order level)

Material A = 450 - (25x4) = 650 units

Material B = 300 - (25x2) = 750 units

d) Average stock level = Minimum level + Half Re order quantity

Material A = 200 + 1/2 (300) =350 units

Material B = 150+ 1/2 (500) = 400 units

Illustration -4

From the following data calculate maximum stock level, minimum stock level, Re ordering level Average stock level.

a. Normal consumption 300 units per day

b. Maximum consumption 420 units per day

c. Minimum consumption 240 units per day

d. Re order quantity 3600 units per day

e. Re order time 10 to 15 days

f. Normal Re order time 12 days.

Solution :

Ordering level = Maximum consumption x Maximum delivery time

= 420 x 15 = 3,600 units

Minimum level = ordering level - (General consumption x general re - order level)

= 6,300 - (300 x 12) = 2,700 units

Maximum level = Ordering level + Re - order quantity - Minimum consumption x Minimum delivery period.

= 6,300 + 3,600 - (240 x 10) = 7,500 units

Average stock level = $\dfrac{\text{Maximum Level + Minimum Level}}{2}$

= $\dfrac{2,700 + 7,500}{2}$ = 5,100 units

Ilustraction - 5

Calculate EOQ

Annual consumption = 4,000 kgs

Cost per order = Rs 5

pirce per k.g = Rs 5

Carrying cost = 8 % on average inventory

Solution :

$$E.O.Q. = \sqrt{\frac{2\,CO}{I}}$$

C = 4,000 units

O = Rs 5

$$I = 8\% = \frac{5 \times 8}{100} = 0.40$$

$$E.O.Q. = \frac{2 \times 4000 \times 5}{0.40} = 316.23 Kgs$$

E.O.Q. = 316.23 Kgs

6.9 CONCLUSION :

Thus the stores department should be properly organised and equipped for handling of material, coming in and going out. In determining the location and layout of stores several important considerations should be kept in view. The stores department should be located in a position which is readily accessible from any part of the factory and also as near to the road, railway siding or wharf as is possible in order to reduce the expenditure.

6.10. SELF ASSESSMENT QUESTIONS :

Five Marks Questions :

1. Give the meaning of material control

2. Give a list of the functions of the purchasing department

3. What is E.O.Q.

4. What are the advatages of ABC analysis.

Ten Marks Questions :

1. How is centralised purchasing superior to decentralised purchasing.

2. Discuss the functions and advantages of a centralised purchasing department of a company.

3. Eplain different levels of stock

    4. Enumerate the advantages and disadvantages of a centralised stores system

Twenty Marks Questions :

1. From the following figures compute the maximum level and minimum level.

        Normal weekly requirement 1000 pieces

        Maximum weekly requirement 1300 pieces

        Minimum weekly requirement 800 pieces

        Time required to obtain supplies 6 to 8 weeks. Re order quantity 10,000 pieces.

                                      Ans - Min. level = 3,400 pieces

                                              Max. level = 15,600 pieces

2. Calculate Minimum and maximum stock levels from the following :

        Normal consumption 200 units per day

        Maximum consumption 300 units per day

        Minimum consumption 240 units per day

        Re order period 10 to 15 days

        Re order quantity 1500 units

        Normal Re order period 12 days.

                                      Ans - Min. level = 1620 units

                                              Max. level = 4000 units

3. Calculate Maximum, Minimum and Average stock levels from the following :

        Minimum consumption 1000 units per day

        Maximum consumption 1500 units per day

        Normal consumption 1200 units per day

        Re-order period 10 to 15 days

        Re-order quantity 15,000 units

        Normal Re order period 12 days.

                                    Ans - Min. level = 8,100

                                              Max. level = 27,500

                                              Ave. Stock level = 15,600

4. Two component A and B are used as follows :

Normal usage 100 units per week each

Minimum usage 50 units per week each

Maximum usage 150 units per week each

Re-order quantity A = 600 units

B= 1000 units

Re-order period A = 8 to 12 weeks

B = 4 to 8 weeks.

5. Calculate for each component

a. Re-order level

b. Minimum level

c. Maximum level and

d. Average stock level

6. Two component X and Y are used as follows :

Minimum usage 50 units per week each

Maximum usage 150 units per week each

Normal usage 100 units per week each

Re order quantity X = 600 units

Y= 1000 units

Re order period X = 4 to 6 weeks

Y = 2 to 4 weeks.

Calculate for each material Minimum level, Maximum level and ordering level

		x units	y units
Ans -	Min. level =	400	300
	Max. level =	1300	1500
	ordering level =	900	600

7. Calculate E.O.Q. form the following information

Annual usage 8000 units , cost per unit Rs. 0.30 , Buying cost Rs. 7 per order. Storage and carrying cost as percentage of average inventory holding 15 %

Ans - 1578 units

Calculate E.O.Q. from the following

A factory requires 2000 units of a material for a year cost of carrying one unit is Rs 1 p.a. Expenses of placing an order amount to Rs. 10.

Ans - 200 units

8. Form the following find out

a) How much should be ordered each time.

b) When should the order be placed

Annual consumption 12,000 units (360 days)

Cost per unit Rs 1, ordering cost Rs. 12 per

Order inventory carrying cost 24 % normal lead time 15 days and safety stock 30 days consumption

Ans - a - 1095 units

b - Safety stock + lead time

consumption i.e 1000 + 500 = 1500 units

9. From the following calculate reorder level, re- order quantity, Minimum level, Maximum level, Average stock level and Danger level :

1. Ordering cost per order Rs. 20

2. Annual consumption of material 5,000 units

3. Purchase price per unit Rs. 50

4. Annual cost of storage Rs. 5 per unit

5. Lead time : Average 10 days, Maximum 15days Minimum 6 days and Maximum for emergency purchases 4 days

6. Rate of consumption

Average 15 units per day

Maximum 20 units per day

Ans - ROL - 300 units ; ROQ = 200 units

Min. level 150 units ; Max level = 440 units

Av. level 250 units ; Danger level = 60 units

6.11 BOOKS RECOMMENDED :

1. Cost Accounting - Rudra Saibaba.

2. Cost & Management Accounting - S.P. Jain & K.L. Narang

3. Cost Accounting - B.K. Bhar.

4. Cost Accounting - S.P. Jain & K.L. Narang

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Lesson - 7

MATERIALS-II

7.0 OBJECTIVES:

After studying this lesson you should be able to understand-

➢ How to control cost through stores records

➢ What are the different methods of valuing material issues

➢ What is inventory Control

STRUCTURE:

7.1 INTRODUCTION:

Material is very significant fctor of production. It occupies more then 60% of cost of production. Material which form prt of a finished product is known as direct material. Hence proper control of material cost is necessary. Material control is acccomplished through functional organisation, assignment of responsibility, and documentary evidence obtained in various stages of operation

Effective control also requires the systematic preparation of periodic summaries and reports . The bin cards and the stores ledger are the two important stores records that are generally kept for making a record of the various items of stores.

7.2.STORES RECORDS OR MATERIAL RECORDS

For recording the purchges , issues and balance of stock availble, in the stores, the3 company prepares two stores records vize stores ledger and bin card , preparation and maintenance of stores ledger and bin card is the duty of store keeper.

7. 2.1. Bin Card :

The stock record maintained by stores department is known as Bin Card. Bin refers to as shelf or rack . It makes a record of the receipt and issue of material and is kept for each item of stores received is entered in the receipt column and the quantity of stores issued is recorded in the issue column of the bin card and a balance of the quantity stores is taken after every receipt or issue, so that the balance at any time can be readily seen. These cards are maintained by the storekeeper. These cards also assist the store keeper to control the stock. For each item of stores minimum quantity, maximum quantity and ordering quantity are stated on the card .

Double Bin System : Some concerns divide the bin, rack or shelf in two parts, namely the smaller part to store the quantity equal to the minimum quantity and the other part to store the remaining quantity and the other part to store the remaining quantily. The quantity in the smaller part is not issued so long as the quantity is available in the other part. This system helps in exercising stores control in an effective way as it facilitates physical verification and services as a signal when it becomes necessary to use the quantity kept in the smaller part.

Merits of bin card :

1. By seeing the bin card, the store keeper can send the material requisition for the purchase of material in time.

2. The store keeper should have a stock record under him.

3. Maintenance of bin cards is desired to have up to date balance of stock.

7.2.2 Proforma of Bin card :

'X' Company limited

BIN CARD

Bin card no.........

Name of the article.......

Code No...........

Stores ledges folio........

Bin no............

Maximum quantity ....

Miniumum quantity ....

Ordering quantity.......

DATE	RECEIPTS		ISSUES		BALANCE	DATE OF CHECKING	REMARKS	GOODS ON ORDER		
	Goods received note No.	Quantity	Stores Requisition Note No.	Quantity	Quantity			No. and Date of order	Quantity	Date of goods received

7. 2.3. Stores Ledger :

The stock record maintained by costing department is known as stores ledger. This ledger is kept in the costing department and is identical with the bin card except that receipts, issues and balances are shown along with their money values. Stores ledger contains an account for every item of stores.

7.2.4 Proforma of Stores Ledger :

'X ' Company limited

Stores Ledger

Name of the article...........
Code No...........
Bin no...........

Maximum quantity...........
Miniumum quantity...........
Ordering quantity...........

DATE	RECEIPTS					ISSUES					BALANCE			REMARKS
	G.R. No.	Quantity	Rate	amount	S.R. No.	Quantity	Rate	amount		Quantity	Rate	Amount	

7. 2.5. Differences between Bin Card and Stores Ledger :

	Bin Card		Stores Ledger
1.	Bin card is a record of only quantities	1.	Stores ledger is a record of both quantities and values
2.	It is maintained by the store keeper	2.	It is maintained by the costing department
3.	Transactions are posted normally just before the transaction takes place.	3.	Transactions are posted after the transaction takes place.
4.	Each transaction is individually posted.	4.	Transactions may be summarised and posted periodically
5.	Bin is usually kept inside the stores	5.	Stores ledger is kept outside the stores.

7. 2.6. Stores Requisition :

Materials are held in stores for utilisation but the storekeeper must not issue materials unless a properly authorised material requisition is presented to him. The store keeper is always to issue the material on proper authority. This authority is usually given by the foreman of the production department on a form known as material requisition. The proforma is given below :

7.2.4 Proforma of Stores Ledger :

' X ' Company limited

Stores Requisition

Department ....   No ....

Job No.....................................   Date ....
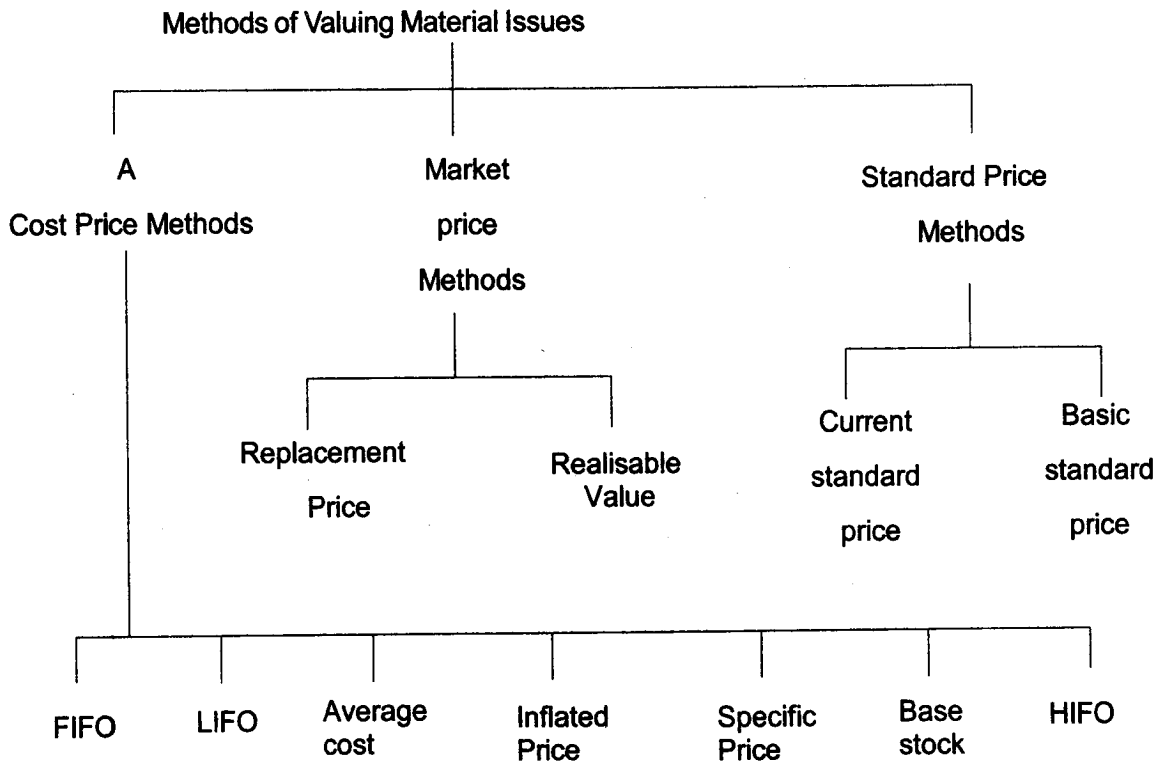
     To

     The store keeper

     please issue the materials stated here in

Description	Code No.	Quantity	For cost Rate	Office Amount	Bin Card No.	Stores Ledger folio	Remarks

7.3 METHODS OF VALUING MATERIAL ISSUES :

Materials issued form the stores are debited to the jobs or work orders which received them and credited to the materials account. These jobs are debited with the value of materials issued to them. There are many methods of pricing material issues. A very careful choice has to be made of the methods of valuing the material issues bacause it influences the cost of the job and the value of the closing balances of material in the stores. The various methods of pricing material issues given above are the cost assignment methods and do not necessarily relate to the physical flow of materials on and off the shelves. A good method of valuing materials, issues should satrisfy the following conditions.

1. The issue price should recover the cost price of the materials

2. The issue price must be near the market price

3. The issue price should not lead to any variation in cost of similar jobs from period to period.

4. The issue price should not necessitate adjustments in values of stock of materials.

5. The price should consider management policy relating to valuation of closing stock.

6. A method of valuation of material issues should take into consideration the nature of materials used. There are many methods of pricing material issues, the most important are -

    A. Cost price methods -

        i.   First in first out

        ii. Last in First out

        iii. Average cost

        iv. Inflated price

        v.   Specific price

        vi. Base stock

        vii. Highest in First out.

    B. Market price Methods -

        i.   Replacement price

        ii. Realisable value

    C. Standard price methods

        i.   Current standard price

        ii. Basic standard price

Methods of Valuing Material Issues

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                    Methods of Valuing Material Issues
                                    |
        ┌───────────────────────────┼───────────────────────────┐
        A                        Market                     Standard Price
  Cost Price Methods              price                         Methods
                                 Methods                           |
        |                           |                      ┌───────┴───────┐
        |                  ┌────────┴────────┐          Current          Basic
        |              Replacement        Realisable    standard         standard
        |                Price              Value         price            price
        |
┌────┬────┬────────┬────────┬────────┬────────┬──────┐
FIFO  LIFO  Average  Inflated  Specific   Base    HIFO
             cost     Price     Price     stock
```

7. 3.1. Cost price Methods :

A. First in First Out Method [FIFO] :

Under this method materials received first are issued first. The units in the opening stock of materials are treated as if they are issued first, the units from the first purchase issued next, and so on until the units left in the closing stock of materials are valued at the latest cost of purchases. It follows that unit costs are apportioned to cost of production according to their chronological order of receipts in the store.

This method is suitable in times of falling prices. It is not suitable in case of rising prices.

Merits :

1. The FIFO method is simple to understand and easy to operate.

2. Materials are issued in order of purchases, so materials received first are utilised first.

3. This method recovers the cost price of the materials because materials are issued at the purchase price.

4. In case of falling prices this method is useful.

5. This method is useful when transactions are not too many.

Demerits :

1. There is scope for clerical errors, if consignments are received frequently at fluctuating prices.

2. In case of fluctuations in prices of materials comparison between one job and the other job becomes difficult.

3. In case of rising prices this method is not useful.

Illustration :

From the following information write at the stores ledger account in respect of the materials for the month of january. Issues are to be priced on the principle of first in first out.

Jan 1 opening balance : 500 units at Rs 4.00.

Jan 5 received from vendor   200 units at Rs. 4.25.

Jan 12 received from vendor 150 units at Rs. 4.10.

Jan 20 received from vendor 300 units at Rs. 4.50.

Jan 25 received from vendor 400 units at Rs. 4.00.

Issues of material were as follows :

Jan 4 - 200 units

Jan 10 - 400 units

Jan 15 - 100 units

Jan 19 - 100 units

Jan 26 - 200 units

Jan 30 - 250 units

FIFO METHOD :

Material..................................

Size..................................

Location..................................

STORES LEDGER ACCOUNT

Bin no.................................. Folio..................................

Code No.................................. Maximum No..................................

Miniumum No..................................

DATE	Particulars	RECEIPTS Quantity Units	RECEIPTS Total Cost Rs	RECEIPTS Unit Cost Rs.	ISSUES Quantity Units	ISSUES Total Cost Rs	ISSUES Unit Cost Rs.	BALANCE Quantity Units	BALANCE Amount Rs.	BALANCE Per unit Rs.
Jan 1	Balance b/d	-	-	-	-	-	-	500	2000	4.00
Jan 4	Issue	-	-	-	200	800	4.00	300	1200	4.00
Jan 5	Goods received	200	850	4.25	-	-	-	300 200	1200 850	4.00 4.25
Jan 10	Issue	-	-	-	300 200	1200 425	4.00 4.25	100	425	4.25
Jan 12	Purchases	150	615	4.10	-	-	-	100 150	425 615	4.25 4.10
Jan 15	Issue	-	-	-	100	425	4.25	150	615	4.10
Jan 19	Issue	-	-	-	100	410	4.10	50	205	4.10
Jan 20	Purchases	300	1350	4.50	-	-	-	50 300	205 1350	4.10 4.50
Jan 12	Purchases	400	1600	4.00	-	-	-	50 300 400	205 1350 1600	4.10 4.50 4.00
Jan 10	Issue	-	-	-	50 150	205 675	4.10 4.50	150 400	675 1600	4.50 4.00
Jan 10	Issue	-	-	-	150 100	675 400	4.50 4.00	300	1200	4.00

Ilustration : 2

From the following particulars, prepare stores ledger account, showing the princing of materials issues, by adopting FIFO method.

1- 12 - 2007 Opening stock 500 unit at Rs 2 each

3- 12 - 2007 Purchased 400 unit at Rs 2 -10 each

5- 12 - 2007 Issued 600 unit to job K

7- 12 - 2007 Purchased 800 unit at Rs 2.40 each

9- 12 - 2007 Issued 500 unit to job p

12- 12 - 2007 returned from job k 200 units

17- 12 - 2007 purchased 400 unit at Rs 2.50 each

25- 12 - 2007 Issued 600 unit to job y.

solution :

Note ; 1. It has been presumed that the return of material too is in accordance with the method i.e. FIFO followed.

2. Receipts of goods returned has been considered as a fresh receipt.

FIFO METHOD :

Material..
Size..
Location ....

STORES LEDGER ACCOUNT

Bin no..
Code No...

Folio..
Maximum No ....
Miniumum No ....

DATE	RECEIPTS			ISSUES			BALANCE		
	Quantity	Rate Rs	Amount Rs.	Quantity	Rate Rs	Amount Rs.	Quantity	Rate Rs	Amount Rs.
1-12-2007	-	-	-	-	-	-	500	2.00	1000
3-12-2007	400	2.10	840	-	-	-	500 400	2.00 2.10	1000 840
5-12-2007	-	-	-	600	500x2 100x2.10	1000 210	300	2.10	630
7-12-2007	800	2.40	1920	-	-	-	300 800	2.10 2.40	630 1920
9-12-2007	-	-	-	500	300x2.10 200x2.40	600 480	600	2.40	1440
12-12-2007	Return 200	100 x 2-00 100 x 2-10	200 210	-	-	-	600 100 100	2.40 2.00 2.10	1440 200 210
17-12-2007	400	2.50	1000	-	-	-	600 100 100 400	2.40 2.00 2.10 2.50	1440 200 210 1000
25-12-2007	-	-	-	600	2.40	1440	100 100 400	2.00 2.10 2.50	200 210 1000

Closing stock - 600 units

Value   Rs. 1410.

B. Last in First Out [LIFO] :

Under this method the issues are priced in the reverse order of purchase i.e the price of the latest available consignment is taken. This method is sometimes called replacement cost method. This method is suitable in times of rising prices because material will be issued from the latest consignment at a price which is closely related to the current price levels.

This method is suitable in times of falling prices. It is not suitable in case of rising prices.

Merits :

1. This method is simple to operate and is useful when transactions are not too many and the prices are fairly steady.

2. FIFO method recovers cost from production because actual cost of material is charged to production.

3. In times of rising prices, LIFO method is suitable.

Demerits :

1. This method may lead to clerical errors as every time an issue is made.

2. Comparison between two jobs will become difficult.

3. For pricing a single requisition, more than one price has often to be adopted.

Illustration 3 :

From the following information prepare stores ledger accounts under LIFO method.

2- 1 - 2008 Purchased 4000 unit at Rs 4.00 per unit

20- 1 - 2008 Purchased 500 unit at Rs 5.00 per unit

5- 2 - 2008 Issued 2000 units

10- 2 - 2008 Purchased 6000 units at Rs. 6.00 per unit

12- 2 - 2008 Issued 4,000 units

2- 3 - 2008 Issued 1000 units

5- 3 - 2008 Issued 2000 units

15- 3 - 2008 Purchased 4500 units at Rs 5.50 per unit

20- 3 - 2008 Issued 3000 units

LIFO METHOD :

STORES LEDGER ACCOUNT

DATE	PURCHASES			ISSUES			BALANCE		
	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.
20-1-2008	4000	4.00	16000	-	-	-	4000	4.00	16000
20-1-2008	500	5.00	2500	-	-	-	4000 / 500	4.00 / 500	16000 / 2500
5-2-2008	-	-	-	500 / 1500	5.00 / 4.00	2500 / 6000	2500	4.00	10000
10-2-2008	6000	6.00	36000	-	-	-	2500 / 6000	4.00 / 6.00	10000 / 36000
12-2-2008	-	-	-	4000	6.00	24000	2500 / 2000	4.00 / 6.00	10000 / 12000
2-3-2008	-	-	-	1000	6.00	6000	2500 / 1000	4.00 / 6.00	10000 / 6000
5-3-2008	-	-	-	1000 / 1000	6.00 / 4.00	6000 / 4000	1500	4.00	6000
15-3-2008	4500	5.50	24750	-	-	-	1500 / 4500	4.00 / 5.50	6000 / 24750
20-3-2008	-	-	-	3000	5.50	16500	1500 / 1500	4.00 / 5.50	6000 / 8250

Closing stock - 3000 units, Rs. 14,250.

Ilustration : 1

From the following date prepare stores ledger account by LIFO method.

1- 1 - 2008 Opening balance 200 unit at Rs 3

3- 1 - 2008 Purchased 300 units at Rs 4.

4- 1 - 2008 Issued 250 units

7- 1 - 2008 Purchased 100 units at Rs. 2.

9- 1 - 2008 Issued 50 units

10- 1 - 2008 purchased 300 units at Rs. 3.

11- 1 - 2008 Issued 200 units

On 8th January 2008 stock is verified and 10 units of shortage is identified.

solution :

Note ;   The identified shortage of stock is treated as issue.

STORES LEDGER
LIFO Method

DATE	RECEIPTS			ISSUES			BALANCE		
	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.
1- 1 - 2008	-	-	-	-	-	-	200	3	600
3- 1 - 2008	300	4	1200	-	-	-	200	3	600
							300	4	1200
4- 1 - 2008	-	-	-	200	3	600			
				50	4	200	250	4	10000
7- 1 - 2008	100	2	200	-	-	-	250	4	10000
							100	2	200
8- 1 - 2008 shortage	-	-	-	10	4	40	240	4	960
							100	2	200
9- 1 - 2008	-	-	-	50	4	200	190	4	760
							100	2	200
10- 1 - 2008	300	3	900	-	-	-	190	4	760
							100	2	200
							300	3	900
11- 1 - 2008	-	-	-	190	4	760	90	2	180
				10	2	20	300	3	900

C. Average cost Method :

Under this method all of the materials in store are so mixed up that an issue cannot be made from any particular lot of purchases and therfore it is proper if the materials are issued at the average cost of materials in store. Average may be of two types.

i. Simple Arithmetic Average

ii. Weighted Arithmetic Average

i. Simple Arithmetic Average :

Simple average price is calculated by dividing the total of unit purchase prices of different lots in stock on the date of issue by the number of prices used in the calculation and quantity of different lots is ignored.

$$\text{Average Price} = \frac{\text{Total of unit purchase prices}}{\text{No. of Prices}}$$

ii. Weighted Arithmetic Average :

The weighted average price takes into account the price and quantity of the materials in store. Weighted Average price is a price which is calculated by dividing the total cost of materials could be drawn by the total quantity of materials in that stock.

$$\text{Weighted Average price} = \frac{\text{Value of Stock}}{\text{Quantity of Stock}}$$

Merits :

1. This method is rational, systamatic and not subject to manipulation.

2. Average price method is considered to be the best method when prices fluctnate considerably.

3. Issue prices changes only when new lot of materials is received.

4. This method recovers the cost of materials from production.

5. Average cost method is mostly used by different organisations because it satisfies most of the conditions of a good method of valuing material issues.

Demerits :

1. This method involves tedious calculation.

2. There are chances of clerical errors.

3. At the time of rising prices, it over-states profit.

4. Closing stock is not valued at current cost.

Illustration 5 :

The following transactions took place in respect of an item of material.

Date	Receipts Quantity	Rate Rs.	Issue Quantity
2-3-2007	200	2.00	-
10-4-2007	300	2.40	-
10-4-2007	-	-	250
28-5-2007	250	2.60	-
6-6-2007	-	-	200

Record the above transactions in the stores ledger, pricing the issues at :

a) Simple Average rate

b) Weighted Average rate.

STORES LEDGER
Average price method

DATE	PURCHASE			ISSUES			BALANCE		
	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.
2-3-2007	200	2.00	400	-	-	-	200	-	400
10-4-2007	300	2.40	720	-	-	-	200 300	- 500	400 720 1120
20-4-2007	-	-	-	250	2.20	550	250	-	570
28-5-2007	250	2.60	650	-	-	-	250 250	- 500	570 650 1220
6-6-2007	-	-	-	250	2.50	500	300	-	720

Simple Average prices

$$1. \left(\frac{Rs\ 2 + Rs\ 2.40}{2} \right) = 2.20$$

$$2. \left(\frac{Rs\ 2.40 + Rs\ 2.60}{2} \right) = 2.50$$

STORES LEDGER ACCOUNT
Weighted Average price

DATE	RECEIPTS			ISSUES			BALANCE		
	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.
2-3-2007	200	2.00	400	-	-	-	200	-	400
10-4-2007	300	2.40	720	-	-	-	500	-	1120
20-4-2007	-	-	-	250	2.24	560	250	-	560
28-5-2007	250	2.60	650	-	-	-	500	-	1210
6-6-2007	-	-	-	200	2.42	484	300	-	720

$$1. \left(\frac{400 + 720}{200 + 300} \right) = 2.24$$

$$2. \left(\frac{560 + 650}{250 + 250} \right) = 2.42$$

D. Inflated price method :

There are some materials which are subjected to natural wastage. In such cases, the materials are issued at an inflated price (a price higher than the actual cost) So as to recover the cost of natural wastage of materials from the production. For Ex. materials lost due to loading and unloading.

E. Specific price method :

Under this method materials issued to production are priced at their purchase prices. The basic assumption in following this method is that materials in the stores are capable of being identified as belonging the specific lots. Identification can be made by placing some distingushing mark usually price tag on every lot. When materials are issued price tags are removed and forwarded to the costing department for assertaining the material cost of production.

Merits :

1. This method is simple in its mechanism and operation.

2. This method does not create accounting complications.

3. This method is useful where job costing is in operation.

4. It is suited to the needs of a small business enterprises.

F. Base stock Method :

Each concern always maintains a minimum quantity of material in stock. This minimum quantity is known as safety or base stock and this should be used only when an emergency arises. The base stock is created out of the first lot of the material purchased and therefore, it is always valued at the cost price of the first lot and is carried forward as a fixed asset.

This method is generally used with FIFO or LIFO method. Any quantity over and above the base stock is issued in accordance with the other method which is used in conjunction with this method. The objective of this method is to issue the method according to the current prices.

Merits :

1. It is easy to estimate value of closing stock.

2. This method is easy to understand and simple to operate.

Demerits :

1. Value of closing stock should not reflect market price.

2. Inventory at low cost is showed in balance sheet.

Illustration 6 :

From the following information prepare stores ledger accounts following FIFO and LIFO methods keeping 1,000 units as base stock.

1- 4 - 2008 stock of material 4000 units at Rs 5 each

2- 4 - 2008 Purchased units 1000 at Rs. 5.50 each

6- 4 - 2008 Issued 4000 units

10- 4 - 2008 Purchased 6000 units at Rs. 6.00 each

15- 4 - 2008 Issued 5000 units

20- 4 - 2008 purchased 5000 units at Rs. 6.50 each

25- 4 - 2008 Issued 6000 units

27- 4 - 2008 purchased 8000 units at Rs. 7.00 each

30- 4 - 2008 Issued 5000 units

STORES LEDGER ACCOUNT

FIFO

Base stock - 1,000 units

DATE	PURCHASES			ISSUES			BALANCE		
	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.	Quantity	Price Rs	Amount Rs.
1-4-2008	-	-	-	-	-	-	4000	5.00	20000
2-4-2008	1000	5.50	5500	-	-	-	4000 1000	5.00 5.50	20000 5500
6-4-2008	-	-	-	3000 1000	5.00 5.50	15000 5500	1000	5.00	5000
10-4-2008	6000	6.00	36000	-	-	-	1000 6000	5.00 6.00	5000 36000
15-4-2008	-	-	-	5000	6.00	30000	1000 1000	5.00 6.00	5000 6000
20-4-2008	5000	6.50	32500	-	-	-	1000 1000 5000	5.00 6.00 6.50	5000 6000 32500
25-4-2008	-	-	-	6000	1000 x 6.00 5000 x 6.50	6000 32500	1000	5.00	5000
27-4-2008	8000	7.00	56000	-	-	-	1000 8000	5.00 7.00	5000 56000
30-4-2008	-	-	-	5000	7.00	35000	1000 3000	5.00 7.00	5000 21000

STORES LEDGER ACCOUNT

LIFO

Base stock - 1,000 units

DATE	PURCHASES			ISSUES			BALANCE		
	Quantity	Rate Rs	Amount Rs.	Quantity	Rate Rs	Amount Rs.	Quantity	Rate Rs	Amount Rs.
1-4-2008	-	-	-	-	-	-	4000	5.00	20000
2-4-2008	1000	5.50	5500	-	-	-	4000 1000	5.00 5.50	20000 5500
6-4-2008	-	-	-	1000 3000	5.50 5.00	5500 15000	1000	5.00	5500
10-4-2008	6000	6.00	36000	-	-	-	1000 6000	5.00 6.00	5000 36000
15-4-2008	-	-	-	5000	6.00	30000	1000 1000	5.00 6.00	5000 6000
20-4-2008	5000	6.50	32500	-	-	-	1000 1000 5000	5.00 6.00 6.50	5000 6000 32500
25-4-2008	-	-	-	-	5000 1000	6.50 6.00	1000	5.00	5000
27-4-2008	8000	7.00	56000	-	-	-	1000 8000	5.00 7.00	5000 56000
30-4-2008	-	-	-	5000	7.00	35000	1000 3000	5.00 7.00	5000 21000

G. Highest in first out method :

This method is based on the assumption that the closing stock of materials should always remain at the minimum value, so the issues are priced at the highest value of the available consignments in the store. This method is not popular as it always under values the stock which amounts to creating a secret reserve.

H. Market Price method :

Market price can either be the replacement price or the realisable price. The replacement price is used in case of the items which are held in stock for use in production while realisable price is used in respect of the items which are kept in stock for sale. Under this method, materials are issued at a price at which they can be replaced. Therefore cost of the materials issued is not considered but materials are issued at the market price prevailing on the date of issue.

Merits :

1. This method is considered to be the best method where quotations have to be sent because quotations sent would reflect the latest competitive conditions.

2. This method discloses whether the buying is efficient or in efficient.

Demerits :

1. This method does not recover cost price of the material from production because materials are issued at the market price which may be more or less than the cost price.

2. It makes stores ledger complicated by introducing the element of profit or loss.

I. Standard price method :

Standard price is the predetermined price and both the receipts and issues will be valued at this price. This method is used by concerns which follow standard costing.

Merits :

1. This method is easy to operate.

2. Material price variance can be used as a management tool for control of material cost.

Demerits :

1. The standard price does not recover the costs of material.

2. It creates problems of material price variance and stock adjustment.

Pricing of returns :

1. The returned material is valued at the original price at which it was issued

<div align="center">OR</div>

2. The returned material is priced at the rate at which any materials requistion placed on that date would have been priced.

7.4 INVENTORY CONTROL :

Inventory control is the system devised and adopted for controlling investment in inventory. It includes control over raw materials stores, supplies, spare parts, tools, components, work in process and finished goods. Inventory control is a system which ensures the provision of the required quantity of inventories of the required quality at the required time with the minimum amount of capital. The function of inventory control is to obtain the maximum inventory turnover with sufficient stock to meet all requirements. The main objectives of inventory controll are as follows.

Objectives of inventory control :

1. Maintaining adequate inventory so as to avoid production heldup leading to customer dissatisfaction, loss of revenue etc.

2. Avoiding excessive investment in inventory.

3. Relieving management in taking inventory decisions for each and every item of inventory.

4. Supervising the stores inventory subsidiary ledgers.

5. Maintaining up - to - date price record of all items.

6. Preparing material abstract.

Methods of Inventory control :

The common methods adopted for inventory control are -

i. Periodical inventory control method.

ii. Perpetual inventory control method.

iii ABC analysis.

i. Periodical inventory control method :

In this method the stock is verified at the end of the stipulated period by stock taking committee constituted by the top management it consists the members drawn from different departments of the company and its term is temporary. Committee physically counts, weights, measures the stock in stores and gives the report to the management.

ii. Perpetual inventory control method :

The perpetual inventory system is a method of recording stores balances after each receipt and issue, to facilitate regular checking and to obviate closing down of work for stock taking. In order to ensure accuracy of perpetual inventory records, physical stocks should be checked. Thus an essential feature of the perpetual inventory system is the continuous checking of stock. The use of Tag system is a common arrangement for recording units counted.

Actual stock of material may differ from card or stores ledger balances on account of avoidable causes and unavoidable causes.

A. Avoidable causes :

i. Errors in posting or calculation of receipts, issues or balances on bin cards or on stores Ledger accounts.

ii. Pilferages and breakages.

iii. Entering transations in the wrong bin card or in the wrong stores ledger account.

iv. Goods received and deposited in wrong bins, wrong issues, over - issues or under issues.

B. Un Avoidable causes :

i. Shrinkage and evaporation .

ii. Losses arising out of breaking up bulk material for issue as in sawing wood, loss in pouring liquid etc.

iii. Climatic conditions causing deterioration eg., absorption, crumbling.

iv. Small defective units e.g. bolts and screws.

v. Metarials purchased by weight but issued in quantities.

The maintenance of a satisfactory perpetual inventory records has the following advantages-

i. It obviates the need for the physical checking of all stocks at the year end.

ii. A detailed reliable check on the stores is obtained.

iii. It avoids the dislocation of production which arises when the stocks are checked at one time.

iv. Errors, Irregularities and loss of stock are readily discovered. It helps in preventing a recurrence in future.

v. As the work is carried out systematically and without undue haste, the figures are generally reliable.

vi. The disadvantages of excess stocks are avoided and capital tied up in stores materials cannot exceed the target.

iii ABC analysis :

ABC analysis intends to concentrate on these items which are considered precious and require effective control on selective items only. Usually the materials used in an organisation are grouped into three categories A, B and C items under A category would be of high value, those under B would be of medium value and under C category would be of low value.

ABC analysis measures the cost significance of each item of material. It concentrates on important items. So it is also known as control by importance and exception (C.I.E.) The significance of this analysis is that a very close control is exercised over the items of A group

which account for a high percentage of costs while less stringent control is adequate for category B and very little control would suffice for category C items.

Advantages :

1. A strict control is exercised on the items which represent a high percentage of the material costs.

2. Investment in inventory is reduced to the minimum possible level because a reasonable quantity of A items representing a significant portion of the material costs is purchased.

3. Storage cost is reduced as a reasonable quantity of materials, which account for high percentage of value of consumption will be maintained in the stores.

7.5. CONCLUSION :

Thus the fixation of the price at which issues of materials are to be charged to production is an important one from the point of view of cost accounting. There are numerous factors to be taken into account in pricing the materials issued to production. Where purchase prices remain constant for a long period, there is little difficulty in correct accouting for materials in practice we find that prices of materials fluctuate on account of changes in the value of money, changes in world commodity prices, buying from different sources and differences in quantity discounts. Under these circumstances it may be observed that there may be a number of identical articles bought at different prices. While issuing these articles it is essential to consider the price at which it should be charged to production. There are various methods in use with attendent advantages and disadantages from the point of view of both convenience and accounting aspects.

7.6. SELF ASSESSMENT QUESTIONS :

Five Marks Questions :

1. What is bin card ? What are its uses ?

2. Explain stores ledger

3. Differentiate bincard from stores ledger

4. What is base stock method.

Ten Marks Questions :

1. Explain FIFO and LIFO methods of material issues.

2. How to fix prices to issue of material under average cost method ?

3. What are merits and demerits of market price method.

4. Explain ABC analysis.

Twenty Marks Questions :

1. Explain briefly various methods of valuation of material issues.

2. What are the methods of inventory control.

3. Show the stores ledger entries as they would appear when using FIFO and LIFO methods of pricing the issues.

   1- 4 - 2008 Balance 300 units value Rs. 600

   2- 4 - 2008 Purchased 200 units, value Rs. 440

   4- 4 - 2008 Issued 150 units

   6- 4 - 2008 Purchased 200 units , value Rs. 460

   17- 4 - 2008 Issued 150 units

   19- 4 - 2008 Issued 200 units

   22- 4 - 2008 Purchased 200 units, value Rs. 480

   29- 4- 2008 Issued 250 units

   Ans - [Stock Value - FIFO 360 ; LIFO 300]

4. Prepare a stores ledger account showing the receipts and issues under FIFO and LIFO methods.

Date	Quantity	Rate per unit	Purchase/ Issue
1-5-2008	200	20.00	Purchase
4-5-2008	100	-	Issued
10-5-2008	50	-	Issued
18-5-2008	309	18.00	Purchase
20-5-2008	250	-	Issued
30-5-2008	100	16.00	Purchase
31-5-2008	100	-	Issued

5. Prepare stores ledger accounts by using FIFO and LIFO methods.

   4- 1 - 2008 500 metres of type M at Rs 20 per metre

   7- 1 - 2008 800 metres of type N at Rs 30 per metre

   9- 1 - 2008 1150 metres of type M at Rs 24 per metre

   17- 1 - 2008 1500 metres of type N at Rs 32 per metre

   26- 1 - 2008 400 metres of type M at Rs 19 per metre

Issues were as follows :

8- 1 - 2008 350 metres of M

12- 1 - 2008 600 metres of N

28- 1 - 2008 710 metres of M

29- 1 - 2008 1430 metres of N

31- 1 - 2008 790 metres of M

Ans - FIFO - M - 3,800 N- 8640

LIFO - M - 4,200 N- 8240

6. From the following prepare stores ledger A/C by LIFO method.

Jan 2 Purchased 4000 units at Rs. 4 per unit

Jan 20 Issued 500 units at Rs. 5 per unit.

Feb 5 Issued 2000 units

Feb 10 Purchased 6000 units at Rs. 6.00 per unit

Feb 12 Issued 4000 units

March 2 Issued 1000 units

March 5 Issued 2000 units

March 15 Purchased 4500 units at Rs. 5.50 per unit

March 20 Issued 3000 units

Ans - 14,250

7. Prepare stores ledger A/C by base stock method when it operates in conjunction with FIFO and LIFO methods. Base stock is 200 units.

2007 Dec,1 Purchased 500 tonnes at Rs. 2.00 per ton

2007 Dec,10 Purchased 300 units at Rs. 2.10 per ton

2007 Dec,15 Issued 600 tonnes

2007 Dec, 20 Purchased 400 units at Rs. 2.20 per ton

2007 Dec, 25 Issued 300 tonnes

2007 Dec, 27 Purchased 500 units at Rs. 2.10 per ton

2007 Dec, 31 Issued 200 tonnes

8. Following transactions took place in the month of March :

Date	Receipts kgs	Rate Rs.	Issue Kgs.
2007 Dec, 2	200	2.00	-
2007 Dec, 10	300	2.40	-
2007 Dec, 15	-	-	250
2007 Dec, 18	250	2.60	-
2007 Dec, 20	-	-	200

Stock verifier reported a loss of 50 kg on 15th March. Prepare stores ledger A/C by simple average and weighted average methods.

Ans - SAM - 250 Kgs - Rs 600

WAM - 250 Kgs - Rs 614

9. Prepare stores ledger by adopting simple average method and weighted average method.

2008 Jan 1 Balance 500 units at Rs. 25 per unit

2008 Jan 3 Issues 250 units

2008 Jan 10 Purchases 200 units at Rs. 26 per unit

2008 Jan 12 Returns from a work order 15 units at Rs. 24 per unit

2008 Jan 15 Issues 180 units

2008 Jan 16 stock verification reveals a loss of 5 units.

2008 Jan 20 Purchases 320 units at Rs. 30 per unit

2008 Jan 28 stock verification reveals a loss of 8 units.

2008 Jan 30 Issues 112 units

Ans - SAM - 430 units, Value Rs 13,635

WAM - 430 units, Value Rs 12,623

10. XYZ Ltd. has purchased and issued the material 'Q' in the following order.

2007		Units	Unit cost
Dec, 1	Purchase	300	3
Dec, 4	Purchase	600	4
Dec, 6	Issue	400	-
Dec, 10	Purchase	600	4
Dec, 15	Issue	1000	-
Dec, 20	Purchase	400	5
Dec, 23	Issue	200	-

Which of the methods of pricing issue of materials would you recommend in the above case ? Ascertain the quantity of closing stock as on 31st December and state what will be its value in each case if issues are made under the

1. Method recommended by you

2. Weighted average cost.

7.7 BOOKS RECOMMENDED :

1. Cost & Management Accounting - S.P. Jain & K.L. Narang

2. Practivcal costing - Khanna ; Pandey ; Ahuja.

3. Cost Accounting - S.P. Jain & K.L. Narang

4. Cost Accounting - Rudra Saibaba.

Dr. K. Kanaka Durga

Lesson - 8

LABOUR COST - CONTROL

8.0 OBJECTIVES:

After studying this lesson you should be able to understand -

➢ What is labour

➢ What are the types of labour

➢ How to control the labour cost

➢ Role of different departments in control of labour cost.

➢ Wage payment methods.

STRUCTURE:

8.1 INTRODUCTION:

Labour cost is a second majour element of cost. Remuneration paid to labour is called labour cost or wages. Proper control and accounting for labour cost is one of the most important problems of a business enterprise. Labour can be devided into direct labour and indirect labour. Direct labour is that labour which is directly engaged in the production of goods and services. Payment of direct labour is a part of prime cost whereas payment of indirect labour is an item of indirect expenses. Since labour cost constitute a significant portion of the total cost of a product, economic utilisation of labour is a need of the present day industry to reduce the cost of production. Control of labour cost depends upon the co-operation of every member of the supervisory force from the top executive to foremen. A high labour turnover increases cost of production. With the help of some techniques such as motion study, time study, job analysis, time keeping, time booking cost of production can be reduced. Idletime should be reduced to control cost. Overtime work should be avoided because job done in overtime cost more as compared to the job done during normal time.

6.2. TYPES OF LABOUR:

Labour refers to the part of human effort by which raw materials are shaped into finished goods. Labour cost is classified as direct labour cost and indirect labour cost.

a. Direct Labour :

Direct labour cost is that cost which can be conveniently allocated to a particular job, product or process for example labour engaged in making the bricks in a kiln is direct labour because labour charges paid for making 10,000 bricks can be conveniently allocated to the cost of 10,000 bricks. Payment of direct labour is a direct expenditure and is a part of prime cost.

b. Indirect Labour :

Indirect Labour is that labour which is not directly engaged in the production of goods and services but which indirectly helps the direct labour engaged in production. The cost of indirect labour can not be conveniently allocated to a particular job, order, process or article. Payment of indirect labour is an item of indirect expenditure and is shown as works, office selling & distribution expenditure according to the nature of the time spent by the indirect worker. The indirect workers are mechanics, supervisor, chowkidars, sweepers, foremen, watchmen, time keeper, cleaners, repairers etc,.

8.3. LABOUR COSTS :

Labour costs include various items of expenditure incurred on workers towards monetary benefits and frings benefits.

A. **Moneteny Benefits :** Examples - Basic pay, Dearness pay, Employer's contribution to provident fund and state insurance scheme, production bonus, profit Bonus pension and gratvity.

B. **Frings Benefits :** Examples - Subsidised food, subsidised housing, subsidised education to the children of the workers, medical facilities, recreation facilities etc,.

8.4. CONTROL OVER LABOUR COSTS :

Labour costs constitute a significant portion of the total cost of a product. Labour cost may increase due to inefficiency of labour, more wastage of materials by labour due to lack of proper supervision, high labour turnover, idle time and unusual overtime work etc,. Therefore, economic utilisation of labour is a need of the industry to reduce cost of production management is interuted in labour costs on account of the following causes -

i.   to use direct labour cost as a basis for increasing the efficiency of workers.

ii. to identify direct labour cost with product for ascertaining the cost of every product.

iii. to use direct labour cost as a basis for absorption of overhead.

iv. to determine indirect labour cost to be treated as overhead.

Hence control of labour costs is an important objective of management. To reach the object management seeks the cooperation of every member of the organisaiton. Following six departments contribute much to control labour cost.

1. Personal Department

2. Engineering Department

3. Time and Motion study Department

4. Time keeping Department

5. Cost Accounting Department

6. Pay - roll Department

8.4.1. Personal Department :

Personal department is responsible for the implementation of managerial decisions regarding recruitment training and placement of employees. Proper planning of this process helps the managment to take steps to improve the working conditions so that there may not be frequent changes in the labour force. Mechanisation of operations should be considered if it is helpful in reducing labour costs. One of the important functions of the personal department is handling labour turnover.

8.4.1. 1. Labour Turn over :

Labour turnover denotes the percentage change in the labour force of an organisation. High percentage of labour turnover denotes that labour is not stable and there are frequent changes in the labour force because of new workers engaged and workers who have left the organisation. A high labour turnover is not desirable. Labour turnover is assessed according to replacement method with the help of following principle.

$$\text{Labour Turnover} = \frac{\text{Number of workers replaced during a period}}{\text{Average number of workers during the period}} \times 100$$

8.4.1. 2. Causes of labour turnover :

Causes of labour turnover can be divided into three heads they are

> a) Personal causes
>
> b) Un avoidable causes
>
> c) Avoidable causes.

a. **Personal Causes** : Workers may leave the organisation on personal grounds such as-

> 1. Retirement
>
> 2. Domestic problems
>
> 3. Accident making workers permanently incapable of doing work.
>
> 4. Women workers may leave after marriage
>
> 5. Dislike for the job
>
> 6. Death.
>
> 7. Finding better jobs at some other places

In all these cases turnover is unavoidable.

b. **Unavoidable causes** : In some cirumstances it becomes necessary for the management to ask some of the workers to leave the organisation for instance.

> 1. Workers may be discharged due to Insuburdination or inefficiency
>
> 2. Workers may be discharged due to continued or long absence.
>
> 3. Workers may retrenched due to shortage of work

C. **Avoidable causes** : Low wages and allowances may induce workers to leave the factory and join other factories where higher wages and allowances are paid. Other causes are -

> 1. Unsatisfactory working conditions
>
> 2. Job dissatisfaction on account of wrong placement of workers.
>
> 3. Lack of fringe benefits
>
> 4. Long hours of work
>
> 5. Lack of promotion opportunities
>
> 6. Unsympathetic attitude of the management.

The personnel department should prepare periodical reports on the labour turnover listing out the various reasons due to which workers have left the organisation. The report should be sent to the management with the necessary recommendations so that corrective measures may be taken to reduce labour turnover.

8.4.2. Engineering Department :

This department is required to maintain control over working conditions and production methods for each job by preparing specifications for each job, inspecting and maintaining safety working conditions.

8.4.3. Time and Motion study department :

This department performs following functions to reduce cost of labour.

1. Motion study

2. Time study

3. Job analysis.

1. **Motion study** : The determination of the best way of performing an operation is made possible by motion study. It is a study of the movements of a worker or a machine in performing an operation for the purpose of eliminating useless movements in order to improve productivity.

Advantages :

1. the efficiency of workers is increased

2. It helps in simplifying the existing operations

3. It leads to economy in labour cost.

2. **Time study** : Time study may be defined as the art of observing and recording the time required to do each detailed element of an industrial operation. The main object of this study is to determine the proper time required to complete the job. Such study is conducted after the motion study because time is to be noted down for the necessary movement, which are decided by motion study.

Advantages :

1. the efficiency of workers is increased

2. the labour requirements are correctly assessed because standard time for various jobs are known.

3. The study facilitate budgeting of labour costs.

4. Time study helps in reduction of cost through proper production control.

3. **Job analysis** : Job analysis is the ranking, grading and weighing of all work character-istics i.e skill, effort, responsibility etc, of all jobs and is concerned with putting money values on them. Thus job analysis is the complete study of the job.

8.4.4. Time keeping :

Time keeping is concerned with the recording of time of workers for the purpose of attendence and wage calculations. It serve the following purposes -

1. preparation of pay rolls in case of time paid worker.

2. meeting the statutory requirements.

3. ensuring discipline in attendance

4. recording of each workers time

5. time keeping is useful for overhead distribution.

8.4.4.1. Methods of Time - keeping :

The methods of time - keeping may be either manual or mechanical. The selection of a particular method depends upon the requirements and policy of a firm.

Methods of Time - Keeping

- Mannual Methods
  - Attendance Register Methods
  - Metal disc Methods
- Mechanical Methods
  - Time Recording clocks
  - Dial time Records
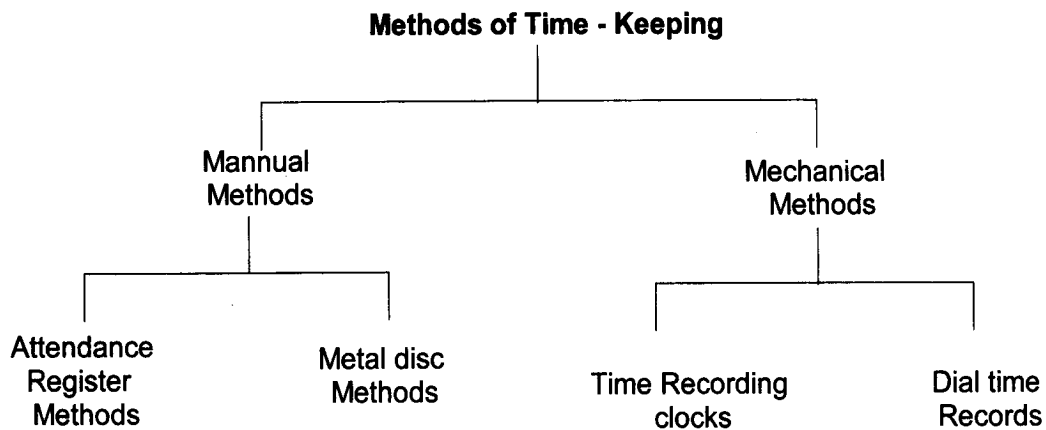
I. Manual Methods : The manual methods of time keeping are as following -

a. **Attendance Register Method** : It is the oldest method of recording time. Under this method, an attendance register or Muster Roll is kept in the time office adjacent to the factory gate or in each department. The attendance register contains such columns as the name of the worker, number of the worker, the name of the department, the rate wage, the time of arrival and departure, normal time, over time. The time of arrival and departure, may be noted down by an employee known as time keeper

Merits :

1. This method is simple and inexpensive

2. It is useful in small firms where number of workers is not large.

3. This method is suitable for the recording time of the worker who work at customer's premises which are situated at a distance from the factory.

Demerits :

1. This method may lead to dishonest practice of recording wrong time because there is possibility of collusion between some of the workers and the time keeper.

2. It is not suitable to industries where number of workers is large.

b. **Metal Disc Method :** Under this method, each worker is allotted a metal disc or a token with a hole bearing his identification number. A board is kept at the gate with pegs on it and all tokens are hung on this board. As the workers enter the factory gate, they remove theire respective discs or tokens and place them in a box or tray kept near the board. After scheduled time the box is removed and the late comers will have to give their tokens to the time - keeper personally so that the exact time of their arrival could be recorded. The discs left on the board represent the absentee workers.

Merits :

1. This method is simple

2. Illiterate workers also easily understand the procedure

3. This method is useful when the number of employees is not large.

Demerits :

1. Thes are chances that a worker may try to remove his companion's token from the board in order to get his presence marked when he is absent.

2. There are chances of disputes regarding the exact time of arrival of a worker.

3. There is no authentic proof of the presence or absence of the workers.

4. There are chances of inclusion of dummy workers.

II. Mechanical Methods : The Mechanical methods of time keeping are time recording clocks and dial time records.

a. **Time Recording Clocks :** The time recording clock is a mechancial device which automatically records the time of the workers. Under this method each worker is given a time card usually of one week duration. Time cards are serially arranged in a tray near the factory gate and as the worker enters the gate. He picks up his card from the tray, puts it in the time recording clock which prints the exact time of arrival in the proper

space against the particular day. The process is repeated for recording time of departure for lunch, return from lunch and time of leaving the factory in the evening. Late arrivals, early leavings and overtime are printed in red to attract the attention of the management

Merits :

1. This method is useful when the number of workers is large.

2. There are no chances of disputes arising in connection with recording of time of worker because time is recorded by the time recording clock.

3. There is no scope for partically or carelessness of the time keeper as in case of manual methods.

Demerits :

1. There are chances that a worker may try to get his friends time card in order to get him marked present, when his friend is late or absent.

2. Some times, the time recording clock goes out of order and the work of recording of time is dislocated.

b. **Dial Time Records** : The dial time recorder is machine which has a dial around the clock. This dial has a number of holes and each hole bears a number corresponding to the identification number of the worker concerned. There is one radial arm at the centre of the dial. As a worker enters the factory gate, he is to press the radial arm after placing it at the hole of his number and his time will automatically be recorded on roll of a paper inside the dial time recorder against the number. The sheet on which the time is recorded provides a running account of the workers time.

Merits :

1. This machine allows greater accuracy and can itself transcribe the number of hours to the wage sheets.

2. This machine can also calculate the wages of the workers and thus avoids much loss of time.

Demerits :

1. It requires high installation cost.

2. It is useful only when number of workers is limited.

8.4.5. Time Booking :

Time booking is the recording of time spent by the worker on different jobs or work orders carried out by him during his period of attendence in the factory. Following are the objects of time booking.

1. To ascertain the labour cost.

2. To calculate idle time

3. To assess bonus payment

4. To provide base for the apportionment of over head expenses.

5. To know the efficiency of workers.

8.4.5.1. Methods of Time - booking :

Following documents are generally used for time booking -

a) Daily time sheets

b) Weekly time sheets

c) Job tickets or job cards.

a. **Dial Time sheets :** This sheet is a daily record of the work done by a worker on different jobs. The worker completes the sheet every day and gives it to the foreman for signature to ensure the correctness of the sheet.

Demerits :

1. Use of daily time sheets are suitable only to small organisations.

2. Use of new time sheets daily, incurs large amount of expenditure.

b. **Weekly time sheet :** This sheet is a weekly record of the workdone by a worker on different jobs. This sheet is an improvement over the daily time sheet.

Demerits :

1. There are chances of these sheets being lost or mutilated because they are continu ously left in the hands of the workers for a long period of one week.

c. **Job tickets or Job cards** : A job card is used to keep a close watch on the time spent by a worker on each job so that the labour cost of a job may be conveniently assertained. Four types of job cards, are generally used namely.

i. Combined time and job cards.

ii. Job card for each worker

iii. Job card for each job

iv. Piece work card.

Merits :

1. A reconciliation is possible between the time showed and time booked against job.

2. Labour cost can be easily assessed.

Demerits :

    1. This method is not suitable when the number of workers is large.

    2. It is not possible to assess idle time.

8.5. IDEAL TIME :

The difference between the time booked to different jobs or work orders and gate time is known as idle time. Idle time is that time for which the employer pays, but from which he obtains no production. Idle time is of two types -

    1. Normal idle time

    2. Abnormal idle time.

1. **Normal idle time** : Normal idle time represents the wastage of time which cannot be avoided. therefore, the employer must bear the labour cost of this time. Following are some of the examples of normal idle time.

    1. The time taken in going from the factory gate to the work place and coming from the work place to factory gate.

    2. The time taken in picking up the work for the day.

    3. The time taken between two jobs.

    4. The time taken for personal needs and tea breaks.

Treatment of cost of Normal idle time : Since it is unavoidable cost and as such should be included in cost of production. It is treated as an item of factory expenses and recovered as an indirect charge, or it may charged direct to production at a grossed - up rate to include normal idel time.

2. **Abnormal idle time** : It is that time the wastage of which can be avoided if proper precautions are taken. Following are examples of abnormal idle time.

    1. The time wasted due to breakdown of machinery on account of the inefficiency of the works engineers.

    2. The time wasted on account of the failure of the power supply.

    3. The time wasted due to shortage of material

    4. The time wasted due to strikes or lock - outs in the factory.

Treatment of cost of Abnormal idle time : The wages paid for abnormal idle time should be debited to costing profit and loss account.

8.6. OVER TIME :

Usually the workers are supposed to work for a given time per day or per week. It is called the normal work period whereas overtime is the work done beyond the normal work period. In India, according to the factories Act overtime wages should be paid at double the usual rate of wages. If a worker works for more than 9 hours on any day or for more than 48 hours in a week, he is treated to be engaged on overtime and is given wages at double the basic hourly rate for the overtime put in by him. Double rate for overtime is paid to give incentive for late hours. The additional amount paid on account of overtime is known as overtime premium.

Overtime work should be avoided because jobs done in overtime cost more as compared to the jobs done during normal hours.

Treatment of overtime premium :

Normal wages are grossed up to allow for overtime premium and, therefore, each job, whether done in normal time or overtime is charged at the same rate of wages. This method of treatment of overtime is suitable when the sequence of jobs is a matter almost of chance, but if overtime is needed in case of a rush job at customers' request so as to complete it within a particular time, it is proper to charge the overtime premium to the cost of the rush job.

Where however overtime arises due to any abnormal reason such as break down of machinary or failure of power, overtime premium is excluded from the cost of production and is debited to the costing profit and loss account.

8.7 WAGE PAYMENT METHODS :

The amount of wages payable to the workers determines their attitude towards their work and the employer. On the other hand, the employers try to keep down the labour cost and try to pay less. To solve this problem the method of wage payment adopted should be such which reduces labour cost per unit and at the same time workers are paid reasonably for their work.

8.7.1 Essentials of a good wage system :

A wage system will be treated as fair if it has the following features -

a. The system should be fair both to the employer and the employee.

b. The worker should be assured of a guaranteed minimum wage at satisfactory level.

c. Workers should be paid according to their skills.

d. The system should ensure equal pay for equal work.

e. The system should be flexible.

f. The system should be simple and capable of being understood by the workers.

g. The system should ultimately result into higher production.

There are two principal wage systems such as -

1. Payment on the basis of time spend in the factory - Time wage system

2. Payment on the basis of work done - Piece rate system

8.7.2. Time wage system :

Under this method of wage payment, the worker is paid at an hourly daily, weekly or monthly rate. Payment is made according to the time worked irrespective of the quantity of work done. This method of wage payment is most suitable for the highly skilled and the unskilled workers including apprentices. The principle to calculated wage under this method is -

Wage = Time x Rate per hour .

This method is also suitable for the following types of work :

1. Where goods are in artistic nature

2. When the production is automatic

3. Where output cannot be measured   Ex: repair work

4. Where close supervision is possible.

Merits :

1. Time wage method is easy and simple to follow

2. Under this method worker is assured payment of wage for the time spent by the worker.

3. Under this method material wastage can be reduced.

Demerits :

1. Workers are not paid according to skills.

2. Efficient workers will become inefficient workers because they notice that inefficient workers also get the same wages.

3. Management is forced to pay for idle time also.

4. It will encourage a tendency among workers to go slow so as to earn overtime wages.

Example : From the following information calculate wages of a worker under time wage system.

Rate per hour - Rs 50

Time required to complete a job - 10 hours

Ans -

Rate per hour - Rs 50

Time required to complete a job - 10 hours

Wage = T x R = 10 x 50 = Rs. 500.

8.7.3. Piece wage system :

According to piece wage system wage is paid on the basis of work completed. A fixed rate is paid for each unit produced, job completed or an operation performed. An equitable piece work rate should be fixed to give an inducement to the workers to produce more. Rate can be fixed with the help of time and motion study and job analysis. Different piece rates should be determined for different types of jobs. Principle to calculate piece wage is -

Wage = Work done x Rate per piece

or

Wage = Time taken x Rate per hour.

This method is suitable in the following conditins :

1. When the close supervision is not possible

2. When the production is on large scale.

3. Where out put can be measured.

4. Where the work is repetitive nature.

Merits :

1. Workers are paid according to skills

2. An inducement is given to the workers to increase their production.

3. The employer is able to know his exact labour cost per unit.

4. Idle time is not paid.

Demerits :

1. Low piece rate will frustrate the workers.

2. The quality of output will suffer because workers will try to produce more to earn more wages.

3. There may not be an effective use of material, due to the efforts of workers to increase the production.

4. Cost of production may increase due to more wastage of material.

5. Workers have the fear of losing wages because of no guaranteed wage.

6. The system will cause discontentment among the slower workers because they are not able to earn more wages.

Example :

Rate per hour - Rs 3.

Time alloted to produce a product = 15 minutes

In an 8 hours day 'P' produced 36 products, Q produced 30 products. Calculate their wages under piece wage method.

Ans -   Wage per hour = Rs. 3.

Time to produce one product = 15 minutes.

Production per hour = 15 - 1

60 - 1

$$= \frac{60 \times 1}{15} = 4$$

Wage per product = 4 - 3

1 - ?

$$= \frac{3.00}{4} = 0.75$$

'P' Production = 36 units

wage   = 36 x 0.75

= Rs. 27

Q production = 30 units

= 30 x 0.75

= Rs. 22.50

8.8 CONCLUSION :

Thus the labour cost, its control and computation are very significant in the cost of production of a product. Labour cost may be more due to inefficiency of labour, wastage of material by labour, high labour turnover, idletime and unsual overtime work, inclusion of bogus workers in the wage sheet etc,. Hence control of labour cost is an important objective of management. With the co-ordination of various departments labour cost can be controlled to a large extent. If labour cost is controlled it leads reduction in cost of production which ultimately leads reduction of price in the market and increase the demand.

8.9. SELF ASSESSMENT QUESTIONS :

Five Marks Questions :

1. What is labour, what are the types of labour

2. Explain Time study

3. Describe Motion study

4. What is job analysis

5. What is meant by over time.

Ten Marks Questions :

1. Explain labour turnover

2. What is meant by idle time

3. What is Time booking

4. What are essentials of good wage system.

Twenty Marks Questions :

1. Explain briefly how to control labour costs.

2. What are the merits and demerits of Time keeping.

3. Explain wage payment methods.

8.10 BOOKS RECOMMENDED :

1. Cost & Management Accounting - S.P. Jain & K.L. Narang

2. Cost Accounting - S.P. Jain & K.L. Narang

3. Cost Accounting - S.P Gupta

4. Cost Accounting - N.K. Prasad

Dr. K. Kanaka Durga

Lesson - 9

METHODS OF PAYMENT OF INCENTIVES
(Labour Incentive Schemes)

9.0 OBJECTIVES:

After studying this lesson you should be able to understand the following

➤ Features of incentive schemes

➤ Methods of payment of incentives

STRUCTURE:

9.1 Introduction

9.2 Features of incentive schemes

9.3 Method of payment of incentives

9.4 Solved Problems

9.5 Self Assessment Questions

9.6 Books Recommended

9.1 INTRODUCTION:

Incentive or Bonus means money or an equivalent given in addition to an employees usually compensation. The objective of an incentive plan is to increase the production by giving an inducement to the workers in the form of higher wages for less time worked. This system of wage payment is in between the time wage system and piece wage system. In time wage system worker does not get any reward for the time saved and in piece work system, the worker gets full payment for the time saved, whereas in a premium plan, both the worker and the employer share the labour cost of the time saved. The employer is able to save wages for a proportion of the time saved and on the other hand the worker is able to get extra wages for a fraction of the time saved. The incentive scheme is also known as bonus scheme because a worker has the incentive to earn more wages by completing the work in less time.

The procedure of payment of incentive is standard time is fixed for the completion of a specified job or operation and the worker is paid for the time taken by him to complete the job or operation at an hourly rate plus wages for a certain fraction of the time saved on the standard by way of a bonus.

9.2. FEATURES OF INCENTIVE SCHEMES :

A satisfactory premium plan should take into consideration the following factors -

i.   The plan should be simple

ii. The plan should be easily understood by all workers

iii. The plan should appear reasonable both to the employer and the employee.

iv. Standard time should be determined on the basis of time and motion study.

v.   An average worker should be able to complete the work within the standard time.

vi. Standards once fixed should not be altered unless there is a permanent change in the method of work.

vii. The system should result in increased production and lower cost of production.

viii. incentive plans should be framed according to the provisions of labour Acts.

9.3. METHODS OF PAYMENT OF INCENTIVES :

Incentive schemes can be classified into four categories such as -

1. Premium Bonus plans   - Halsey plan

                            - Rowan plan

2. Differential piece rate plans - Taylor plan

                            - Merrick plan

3. Bonus plans of combination of time and piece rates -

                            a. Gantt task bonus scheme

                            b. Emerson efficiency scheme

                            c. Bedaux plan.

4. Group bonus schemes   - Co partnership

                            - profit sharing schemes

Incentive schemes

```
                              Incentive schemes
                                    │
      ┌───────────────┬─────────────┴──────────────┬──────────────────┐
   Premium        Differencial        Combination of           Group Schemes
   Bonus plan     piece rate          Time & piece
                  plans               rates
      │               │                    │                        │
    ─ Halsey        ─ Taylor            ─ Gantt task bonus        ─ Co- Partnership
                                          scheme
                                        ─ Emerson efficiency
    ─ Rowan         ─ Merrick             scheme                  ─ Profit sharing schemes
                                        ─ Bedaux plan
```
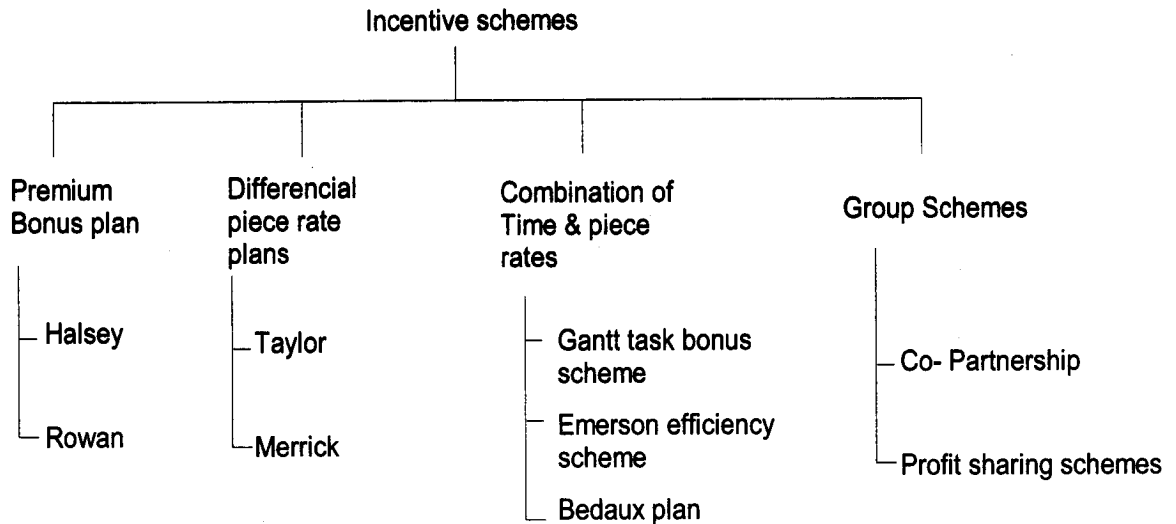
9.3.1. Premium Bonus Plans :

A. **Halsey premium plan** : Under this method standard time for doing each job or operation is fixed and the worker is given wages for the actual time he takes to complete the job or operation at the agreed rate per hour plus a bonus equal to one - half of the wages of the time saved. In practice the bonus may vary from 33 1/3 % to 66 2/3% of the wages of the time saved. Under Halsey plan the total earnings of a worker will be calculated with the help of the following principle.

Total earnings = T x R + 50 % (S - T) R

T = Time taken

S = Standard time

R = Rate per hour

% = The percentage of the wages of time saved to be given as bounds.

Illustration - 1

Standard time = 48 hours

Time taken = 44 hours

Rate per hour = Rs. 2.

From the above information calculate total earnings of a worker under Halsey scheme.

Total earnings = T x R + 50 % (S - T) R

$$S = 48 \text{ hours}$$

$$T = 44 \text{ hours}$$

$$R = Rs\ 2.$$

Total earnings = $44 \times 2 + \dfrac{50}{100}(48-44) \times 2$

$$= 88 + \dfrac{50}{100}(4) \times 2$$

$$= 88 + (2 \times 2)$$

$$= Rs\ 92.$$

Halsey - weir plan : Under the Halsey - weir premium plan the premium is set at 30% of the time saved.

Advantages of Halsey premium plan :

  i. It is simple to understand and easy to operate

  ii. It guarentees time wages.

  iii. The wages of time saved are shared by both employers and workers.

  iv. Since this scheme provides incentive to efficient worker it makes distinction between efficient workers and inefficient workers.

Disadvantages of Halsey premium plan :

  i. Quality of work suffers because workers are in a hurry to save more and more time to get more bonus.

  ii. Workers criticise this method on the ground that the employer gets a share of wages of the time saved.

B. **Rowan plan :** Under this method, the worker is again guaranteed wages at the ordinary rate for the time taken by him to complete the job or operation. Bonus is calculated as the proportion of the wages of the time taken which the time saved bears to the standard time allowed. The principle to calculate the total earnings of the worker is -

$$\text{Total earnings} = T \times R + \dfrac{S-T}{S} \times T \times R$$

T = Time taken

R = Rate per hour

S = Standard time

Illustration - 2

Standard time = 10 hours

Hourly rate = Re 1

Time taken = 6 hours

Total earnings = $T \times R + \dfrac{S-T}{S} \times T \times R$

T = 6hours

R = Rate per hour i.e Re 1

S = 10 hours

Total earnings = $6 \times 1 + \dfrac{10-6}{10} \times 6 \times 1$

= 6 + 2.40

= 8.40

Advantages of the Rowan premium plan :

i.   It guarantees time wages to workers.

ii. labour cost per unti is reduced because wage of the time saved are shared by the employer and the worker.

iii. Fixed overhead cost per unit is reduced with increase in production.

Disadvantages of the Rowan premium plan :

i.   Under this system the workers do not get the full benefit of the time saved by them as they are paid bonus for a portion of the time saved.

ii. The Rowan plan suffers from another draw back that two workers one very efficient and the other not so efficient may get the same bonus.

9.3.2. Comparision between the Halsey plan and the Rowan plan :

Both the plans are criticised by workers on the groung that they do not get the full benefit of time saved by them as they are paid bonus for a proportion of the time saved. The Rowan plan has another drawback that two workers, one very efficient and the other not so efficient, may get the same bonus.

A worker gets more premium under Rowan premium plan compare to Halsey premium plan when time saved is less than half of the standard time.

A worker gets more premium under Halsey premium plan compare to Rowan plan when time saved is more than half of the standard time. For instance the following problems depects it.

Illustration

Standard time = 40 hours

Time taken = 16 hours

Rate per hour = Rs. 2.

Calculate wage under both Halsey and Rowan plans.

Solution :

According to Halsey plan the wage is -

Total earnings = T x R + 50 % of Time saved X Rate per hour

$$= 16 \times 2 + \frac{50}{100} \times 24 \times 2$$

$$= 32 + (12 \times 2)$$

$$= 32 + 24$$

$$= 56$$

Wage under Halsey plan = Rs 56.

According to Rowan plan the wage is -

Total earnings = T x R + $\frac{S - T}{S}$ x T x R

$$= 16 \times 2 + \frac{40 - 16}{40} \times 16 \times 2$$

$$= 32 + \frac{24}{40} \times 16 \times 2$$

$$= 32 + 19.2$$

$$= 51.2$$

Wage under Rowan plan = Rs. 51.2

In this Illustration time saved by worker is more than half of the standard time so worker gets more wage in Halsey plan compare to Rowan plan i.e

Wage under Halsey plan = Rs 56.

Wage under Rowan plan = Rs. 51.2

9.3.3. Differential piece rate plans :

Under differential piece rate plans workers are paid according to their merits because distinction is made between efficient and inefficient workers. An efficient worker can earn more wages because wages are linked to output. Following are the important differential piece rate plans.

A. **Taylor's Differential piece rate system :** This system was introduced by F.W. Taylor, the father of scientific management. This system penalise a slow worker by paying him a low piece rate for low production and reward an efficient worker by giving him a higher piece rate for a higher production. Taylor proceeded on the assumption that through time and motion study it is possible to fix a standard time for doing a particular task. To encourage the workers to complete the work within the standard time. According to him if a worker performs the work within or less than the standard time, he is paid a higher piece rate, and if he does not complete the work within the standard time, he is given a lower piece rate. Differential rates are usually as follows -

1. 80% of piece rate for below standard

2. 120% of piece rate for above standard.

Illustration :

Calculate the earnings of workers A and B under straight piece - rate system and Taylor's differential piece - rate system from the following particulars.

Normal rate per hour - Rs 18

Standard time per unit - 20 seconds

differentials to be applied :

80% of piece rate for below standard

120% of piece rate for above standard.

Worker A produces 1,300 units per day and

Workder B produces 1,500 units per day.

solution :

Standard production per 20 seconds = 1 unit

Standard production per 1 minute = $\dfrac{18.00}{180}$ = 3 unit

Standard production per 1 hour = 3 x 60 = 180 unit

Standard production per day of 8 hours = 180 x 8 = 1, 440 unit

Low piece rate = $\dfrac{10\,p \times 80}{100}$ = 8 paisa

high piece rate = $\dfrac{10\,p \times 120}{100}$ = 8 paisa

Earnings of Worker A :

1,300 units X 8 paisa = Rs 104

Earning of worker B = 1500x 12 paisa = Rs 180

Low piece rate has been applied in case of worker A because worker A's daily production of 1,300 units is less than the standard daily production of 1,440 units.

High piece rate has been applied to worker B because worker

B's daily productions of 1,500 units is more than the standard daily production of 1440units.

Advantages of Taylor's differential piece rate plan :

   i.   An efficient worker can earn more wages.

   ii. Worker try to adopt better methods of production to increase their production.

   iii. Increased production will reduce fixed expenses.

Disadvantages of Taylor's differential piece rate plan :

   i.   Workers have the fear of losing wages if they are not able to work due to some reason.

   ii. Workers may work at a very high speed for a few days earn good wages and then absent themselves for a few days, up setting the uniform flow of production.

   iii. Time is not guarented under this method.

   iv. Under this system if a worker just fails to complete the work within the standard time he earns much less wages than a worker who just completes the job within the standard time.

B. **Merrick's Multiple piece Rate system** : This method seeks to make an improvement in the Taylor's differential piece rate system. Under this method, three piece rates are applied for workers with different levels of performance.

Percentage of standard	Wage rate
Less than 83%	Normal Piece rate
83% to 100%	110% of normal piece rate
More than 100 %	120% of normal piece rate

This method is not as harsh as the Taylor's piece rate because penalty for slow workers is relatively lower.

Illustration :

The following particulars apply to a particular job :

Standard production per hour 6 units : Normal rate per hour Rs. 1.20

In an 8 hour day Mohan produces 32 units, Sohan produces 42 units, Lakhan produces 50units.

Calculate the wages of the workers under merrick differentil piece rate system

Solution :

Standard production per hour 6 units.

Normal rate per hour Rs. 1.20.

Piece rate = = 0.20

Merrick differential piece rates are

efficiency	Rate
upto 83%	Re 0.20
from 83% to 100%	110 % of Re 0.20 i.e 0.22
above 100 %	120% of Re 0.20 = Re 0.24

earnings of workers :

Mohan produces 32 units which means his efficiency is x 100 = 67% i.e below 83%.

Hence first rate will apply to him. His earnings will be $\dfrac{32}{48}$ = 32 x 0.20 = Rs. 6.40.

Sohan produces 42 units, which means his efficiency is $\dfrac{42}{48}$ x100 = 87.5 %

i.e. above 83% but below 100 % Hence second rate will apply to him.

His earnings will be = 42 x 0.22 = Rs 9.24.

Lakhan produces 50 units which means his efficiency is $\dfrac{50}{48}$ x100 = 104 %

i.e above 100%. Hence third rate will apply to him.

His earnings will be = 50 x 0.24 = Rs. 12.00

9.3.4. Bonus plans of combination of Time and Piece Rates :

A. Gantt task Bonus plan :

This plan is based on careful time and motion study. A standard time is fixed for doing a particular task, worker's actual performance is compared with the standard time and his efficiency determined. If a worker takes more risk than the standard time to complete. The task he is given wages for the time taken by him and if a worker takes the standard time to perform the task he is given wages for the standard time and a bonus of 20% on the wages earned. If the worker completes the task in less than the standard time he is given wages for the standard time plus a bonus of 20% of the wages for the standard time.

Production	Wage Payment
production less than standard	Time rate
standard production	Time rate + 20 % Bonus
production more than standard	High piece rate.

Thus with every reduction in time the plan ensures progressive increase in total wages.

For this reason the plan is also known as ' Progressive rate ' system.

Illustration :

Form the following information of P,Q, R. workers calculate their wages under grantt task method.

Monthly standard production of each worker - 100 units

unit rate   - 0.80 paisa

Actual production -   P = 800 units

Q = 1000 units

R = 1200 units

Solution :

P wage :

Standar production per month = 1000 units

per unit = 0.80 paisa

P production = 800 units

efficiency level = $\dfrac{800}{1000}$ x 100 = 80%

Since his efficiency is less than standard production, he gets guarantee wage i.e.

wage = standard units 0.80 = 800\

Q Wage :

Actual production = 1000 units

Standard production = 1000 units

Rate = 0.80

efficiency level = $\dfrac{1000}{1000}$ x 100 = 100 %

Since his efficiency is 100% He gets 20% extra as bonus in addition to wage.

Wage = units produced x unit rate x $\dfrac{120}{100}$

= 1000 x 0.80 x $\dfrac{120}{100}$ = 960

wage = Rs 960

R Wage :

Standard production = 1000 units

Actual production = 1200 units

Rate = 0.80 paisa

efficiency level = $\dfrac{1200}{1000}$ x 100 = 120 %

Since his efficiency is more than 100% he gets 20% bonus along with piece wage.

Wage = units produced x unit rate x $\dfrac{120}{100}$

= 1200 x 0.80 x $\dfrac{120}{100}$ = 1152

wage = Rs 1152

Advantages :

    i.   It is simple to understand

    ii. It is acceptable by workers because it gives gurantee wage.

    iii. This system is advantageous to less efficient workers

    iv. Inefficient workers are motivated to become efficient and earn more wages by producing more.

Disadvantages :

    i.   Distinction is made between efficient and inefficient workers

    ii. The quality of the output will suffer because workers will try to produce more to earn more wages.

B. **Emerson's efficiency bonus system** : Under this bonus scheme bonus is paid according to the efficiency of the worker.

Efficiency	Bonus
a. below 66 2/3 %	guaranteed time wage only
b. 66 2/3 % to 100 %	a bonus increasing from 0.01% to 20% above basic wage on 100 % efficiency.
c. over 100 %	a bonus of 20% above basic wage plus 1% for each 1% increase in efficiency.

Under this system less efficient workers get guaranteed time wage.

C. **Bedaux system** : Under this bonus scheme the wage is calculated as -

If 75 % bonus is paid to the workers the formula is

$$T \times R + 75\% \left(\frac{P \times R}{60} \right)$$

P = Points saved

T = Time taken

R = Rate

If 100 % bonus is paid, the formula is $T \times R + 100\% \left(\dfrac{P \times R}{60} \right)$

9.3.5. Group Bonus schemes :

Co partnership and profit sharing schemes :

These schemes are becoming very popular now - a - days. Under there schemes, worker get a share of the yearly profits of the company. This is done with a view of getting the cooperation of workers by giving then the feeling that they are to share the prosperity of the business. Workers can be given their share of profits in the form of cash or shares in the company :

Advantages

i. Under these schemes workers get share in the profits

ii. If the company pay share of profit in the form of shares, workers get participation in the company's management.

iii. Workers get interest in the future of the business.

Disadvantages

i. It is difficult to fix the percentage of profits to be given to workers. If the share is not given to the satisfaction of the workers, they may resort to strikes.

ii. The share of profits is given to all workers, so no distinction is made between efficient and inefficient workers.

The payment of bonus Act 1965 has mad profit sharing compulsory in all industries and provides that to the eligible employees a minimum bonus of 8 1/3 % of gross annual earnings will have to be paid irrespective of profits made or losses incurred.

9.4 SOLVED PROBLEMS :

1. From the following information calculate wage of a worker under Halsey premium plan.

Time Rate per hour = Rs. 2.

Standard time = 40 hours

Time taken = 20 hours

Bonus = 50 % of time saved.

Solution :

$$\text{wage} = T \times R + 50\% (S - T) \times 2$$

$$= 20 \times 2 + \frac{50}{100}(40 - 20) \times 2$$

$$= 20 \times 2 + \frac{50}{100} \times 20 \times 2$$

$$= 40 + 20 = Rs\ 60.$$

2. In order to finish a task, standard time of 15 hours was determined by time and motion study Ram took 16 hours to finish the job while shyam took 12 hours. Time rate is Rs3. per hour calculate the earnings of the workers if 50 :50 Halsey premium plan is in operation.

Solution :

The Formula is

$$E = RT \times P(S-T)R$$

$$S = 15 \text{ hours}$$

Ram wage :

Ram could not finsih his work within the standard time. So he will not be paid any bonus. His earnings will be :

$$= 16 \times 3 = \text{Rs } 48.$$

Shyam wage :

Shayam's earnings for 12 hours will be as follows :

$$E = 12 \times 3 + 50\% (15-12)3$$

$$= 36 + 4.50 = \text{Rs } 40.50$$

3. The following particulars apply to a job :

Standard time = 10 hours

Time rate = Rs. 2 per hour

Time taken = 8 hours

Calculate earnings under Rowan plans.

Solution :

Under Rowan system earnings will be calculated as follows -

$$E = T \times R + \frac{S-T}{S} \times T \times R$$

$$= 8 \times 2 + \frac{10-8}{10} \times 8 \times 2$$

$$= 16 + \frac{2 \times 8}{10} \times 2$$

$$= 16 + 3.20 = \text{Rs. } 19.20$$

4. From the following information calculate wage of a worker under Rowan plan.

Standard time = 32 hours

Actual time = 28 hours

Time saved = 4 hour

Solution :

$$\text{Wages} = T \times R + \frac{S - T}{S} \times T \times R$$

$$= 28 \times 1 + \frac{4}{32} \times 28 \times 1$$

$$= 28 + 3.50$$

$$= 31.50$$

Wage = Rs. 31.50

5. Calculate the earnings of a worker from the following information under :

a. Time rate method

b. Piece rate method

c. Halsey plan

d. Rowan plan

Standand time = 30 hours

Time taken = 20 hours

Hourly rate of wages is Re 1 per hour Plux a dearnars allowance at 50 paise per hour worked.

Solution :

	Rs.
a. Earnings under time rate method -	
Wages for 20 hours (time taken) at Re 1 per hour	20
D. A for 20 hour at 50 paise per hour	10
Wage = Rs.	30
b. Earnings under piece rate method -	
Wages for 30 hours at Re 1 per hour	30
D. A for 20 hour at 50 paise per hour	10
Wage = Rs.	40.

| | | | | | | Rs |

c. Earnings under Halsey plan   Rs

Wages for 20 hours at Re 1 per hour   20

Bonus for half of the time saved

$$\frac{S - T}{S} \times R = \frac{30 - 20}{2} \times 1 \qquad\qquad 5$$

D. A at 50 paise for 20 hour $\underline{10}$

$$\text{Wage = Rs. } \underline{35}$$

d. Earnings under Rowan plan   Rs

Wages for 20 hours at Re 1 per hour   20

Bonus $\dfrac{S - T}{S} \times T \times R$

i.e $\dfrac{30 - 20}{30} \times 20 \times 1$ 6.67

D. A at paise 50 paise per hour (20x 0.50) $\underline{10}$

$$\text{Wage = Rs. } \underline{36.67}$$

6. In an Assembly shop of a Motor car factory a workmen A, B, C and D work together as a team and are paid on group piece rate. They also work individually on daily rate jobs. In a 44 hour week the following hours have been spent by A, B, C, and D on group piece work. Viz, A - 40 hour, B-40hours, C - 30 hours and D - 20 hours. The balance of the time has been booked by each worker on day works jobs.

Their hourly rates are ;

     A   0.50 paise

     B   0.75 paise

     C   1.00

     D   1.00

The group piece rate is Re 1 per unit and the team has produced 150 units. Calculate the gross weekly earning of each workman taking into consideration that each individual is entitled to dearness allowance of Rs 20 per week.

Solution :

	Rs	
Group wages for 150 units at		
Rs. 1 per unit	150	
Less individual wages :	Rs	
Workman A - 40 hours x 0.50	20	
Workman B - 40 hours x 0.75	30	
Workman C- 30 hours x 1.00	30	
Workman D- 20 hours x 1.00	20	100
Group Bons		50

Group bonus is to be divided among workmen in proportion to their time wages i.e 20:30:30 :20

		Rs
Workman A 's share	$50 \times \dfrac{20}{100}$	10
Workman B's share	$50 \times \dfrac{30}{100}$	15
Workman C's share	$50 \times \dfrac{30}{100}$	15
Workman D's share	$50 \times \dfrac{20}{100}$	10

Statement of Gross weekly earnings

	Worker A	Worker B	Worker C	Worker D
Time wages on group work	20	30	30	20
Time wages on day work				
Jobs (balance of the time				
of the week of 44 hours	2	3	14	24
	(4x50p)	(4x75p)	14x 1Re)	(24x1Re)
Share of bouns	10	15	15	10
Dearness allowonce	20	20	20	20
Gross	52	68	79	74

7. On the basis of the following information calculate the earnings of Ram and shyam under straight piece basis and Taylor's Differential piece rate system.

Standard production 8 units per hour

Normal time rate Re. 0.40 per hour

Differential to be applied

80% of piece rate for below standard

120% of piece rate for above standard.

In a 9 hour day

Ram produces 54 units

Shyam produces 75 units

Solution :

1. Straight piece Basis

Earnings = No. of units x Rate per hour

Piece rate = 0.04 ÷ 8 = 5 paise

Ram's earnings = 54 x 5 paise = 2.70

Shyam's earnings = 75 x 0.05 = 3.75

2. Tylor's piece rate basis

Standard production in a 9 hour day = 8x9 = 72 units

Low piece rate $= 0.05 \times \dfrac{80}{100}$ = 4 paise

high piece rate $= 0.05 \times \dfrac{120}{100}$ = 6 paise

Ram's earnings = 54 x 4 paise = 2.16

Shyam's earnings = 75x 6 paise = 4.50

9.5. SELF ASSESSMENT QUESTIONS :

Five Marks Questions :

1. What is meant by an incentre plan ? What are its features.

2. Explain different methods of payment of incentives in brief.

3. Describe Halsey premium plan

4. What is a Rowan plan.

5. What are the merits and demerits of Taylor's differential piece rate system.

6. Explain co partneship and profit sharing schemes

7. From the following information calculate wages under Halsey plan and Rowan plan.

Standard time - 24 hours

Time taken - 20 hours

Rate per hour - Rs. 10

8. From the following information calculate a worker's earnings under the following scheme's

a. Piece rate

b. Halsey premium plan

c. Rowan premium plan

d. Taylor differential piece rate

Working hours in a week = 48

Wage rate per hour = Rs. 3.75

Time per piece = 20 minutes

Standard production per week = 120 pieces

Actual production per week = 150 pieces

Differential piece rates

    1. Lower pieces rate 80%

    2. Higher pieces rate 120%

Ans - a) Rs 225, b) Rs 183.75 , c) Rs 187.20, d) Rs 270.

9. From the following information calculate wages of swetha, swathi, sruthi, Sravanthi under merrick differential piece rate system

    Standard production - 12 units per hour

    Rate per hour - 60 paise

    working hour per week = 8

    Actual production

        swetha - 64

        swathi - 96

        sruthi - 84

        Sravanthi - 100

Ans - Rs 3.20, 5.28, 6.00, 6.00

10. From the following information calculate wages of sita, geetha, neetha under merrick differential piece rate system

    Piece rate per unit - Rs. 1.20

    Standard production units per hour - 1 unit

    working hours per week = 40 hours

    Actual production

        sita - 25 units

        geetha - 40 units

        neetha - 60 units

11. Calculate the earnings of a worker from the following information as under :

    a) Time Rate method

    b) Piece Rate method

    c) Halsey plan

    d) Rowan plan.

Information -

    standand time 30 hours

    time taken 20 hours

    hourly rate of wage is Re 1 per hour plus a dearness allowance @ 50 paise per hour worked.

Ans - a) Rs 30, b) Rs 40 c) Rs 35, and d) Rs. 36.67

12. Calculate the earnings of workers A and B under straight piece rate system and Taylor's differential piece rate system from the following particulars

    Normal rate per hour Rs. 2.40

    Standard time per unit 30 seconds

Differentials to be applied -

    80% of piece rate for below standard

    120% of piece rate for above standard.

    Worker A produces 800 units per day

    Workder B produces 1000 units per day.

Ans - [A - Rs. 16 and Rs 12.80 ; B - Rs 20 and Rs 24]

9. 6. BOOKS RECOMMENDED :

1. Cost & Management Accounting - S.P. Jain & K.L. Narang

2. Cost Accounting - P.K. Bar.

3. Practivcal costing - Khanna ; Pandey ; Ahuja.

4. Practical problems in Cost Accounting - S.P. Jain & K.L. Narang

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Lesson - 10

JOB COSTING AND BATCH COSTING

10.0 OBJECTIVES

After going through this lesson, student can understand.

→ Meaning of Job Costing

→ Features of Job Costing

→ Merits and Demerits of jobCosting

→ Procedure of Job Costing System

→ Batch Costing.

Structure

10.1 Introduction

There are different methods of costing.

(i) Specific order costing (or job/ terminal costing)

(ii) Operation costing (or process/ period costing)

i. Specific order costing is the category of basic costing methods applicable where the work consists of separate jobs, batches or constracts each of which is authorised by a specific order or contract. In this category are included job costing consisting batch costing and contract costing. This is discussed in detail in this lesson.

ii. Operation costing is the category of basic costing method applicable where standarised goods or services result from a sequence of repetitive and more or less continuous operations or process to which costs are charged before being averaged over the units produced during the period. In this category we include process costing and service costing.

10.2 Job Costing

Job Costing is that form of specific order costing which applies where the work is undertaken as an identifiable unit.

Under this method each order is of comparatively short duration. The work is usually carried out within a factory or workshop and moved through processes and operations as a continuously identificable unit. The term may also be applied to work such as property repairs and the method may be used in the costing of internal capital expenditure jobs.

The main purposes of job costing are to establish the profit or loss on each job and to provide a valuation of W/P.

10.2.1 Features of Job Costing

Under the method, costs are collected and accumulated for each job, work order or project separately. Each job can be separately identified and hence it becomes essential to analyse the costs according to each job. The industries where this method of costing is applied, must posses these features i.e. : (i) The production is generally against customer's order but may be for stock. (ii) Each job has its own characteristics and needs special treatment. (iii) There is no uniformity in the flow of production from department to department. The nature of the job determines the departments through which the job has to be processed. (iv) The work-in-progress differs from period to period according to the number of jobs in hand. Thus cost is ascertained for each job separately. This method is applicable to printers, machine tools manufacturers, foundries and general engineering workshops.

10.2.2 Advantages, Disadvantages of Job Costing

A cost accounting system should be so designed that it should be able to provide the necessary information for achieving control of cost and performance. The advantages of job order cost accounting are: (i) It provides a detailed analysis of cost of materials, wages and overhead classified by functions, departments and nature of expenses which enable management to determine the operating efficiency of the different factors of production, production centres and the functional units. (ii) It enables the management to ascertain which of the jobs are more profitable than the others, which are less profitable and which are incurring losses. (iii) It provides a basis for estimating the cost of similar jobs taken up in future and thus helps in future production planning. (iv) Determination of predetermined overhead rates in job costing necessitates the application of a system of budgetary control of overheads with all its advantages. (v) Identification of spoilage and defectives with the respective production orders and departments may enable the management to take effective steps in reducing these to the minimum. (vi) The detailed records of the past years be used for statistical purposes in ther determination of the trends of cost of the different types of jobs and their relative efficiencies.

The disadvantages of weakness of job order cost accounting are: (i) It involves a great deal of clerical work in recording daily the cost of materials issued, wages expended and overheads, chargeable to each job or work order which adds to the cost of jobs and also increase the chances of errors. (ii) Determination of overhead rates may involve budgeting of overhead expenses and the bases of overhead apportionment and absorption but unless such budgeting is complete i.e., extended to material, labour and expenses, its advatanges are considerably reduced. (iii) Job costing is a historical costing which ascertain the cost of a job or product after it has been manufactured. It does not facilitate control of cost unless it is used with standard or estimated costing.

10.2.3 Procedure of Job Cost System.

Job order cost system is designed to show in detail their cost components of the total cost of executing a job which may take the form of either a special order, or a batch of orders.

1. **Production Order** : For any job, the cost involved is estimated and on the basis of this estimate price is quoted to the customers. If the job is accepted, a Production Order is made by the Planning Department. It is in the form of instructions issued to the foreman to proceed with the manufacture of the product. It forms an authority for starting the work. It contains all the information regarding production.

When an order is received, the Production Control Department allots a Production Order Number to it. Sometimes, the work may be sub-divided and sub-numbers may also be alloted to various works constituting it, in addition to one master number.

2. **Recording of Costs** : The costs are collected and recorded for each job under separate Production Order Number. Generally, Job Cost Sheet is maintained for each job. This is a document which is used to record direct material, direct wages and overheads applicable to respective jobs. The basis of collection costs are:

(a) **Materials**. Materials Requisition, Bill of Materials or Materials Issue Analysis Sheet.

(b) **Wages**. Operation Schedule, Job Card or Wages Analysis Sheet.

(c) **Direct Expenses**. Direct expenses vouchers.

(d) **Overheads**. Standing Order Numbers or Cost Account Numbers.

All the basic documents will contain cross reference to respective production order numbers for convenience in collection of costs.

3. **Completion of Job** : On completion of a job, a completion report is sent to costing department. The expenditure under each element of cost is totalled and the total job cost is ascertained. The actual cost is compared with the estimated cost so as to reveal efficiency or inefficiency in operation.

4. **Profit or Loss on Job** : It is determined by comparing the actual expenditure of cost with the price obtained.

10.2.4 Examples

Example 1: A factory uses job costing. The following cost data is obtained from its books for the year ended 31 December, 2004.

	Rs.		Rs.
Direct Materials	90,000	Direct Wages	75,000
Selling & Distribution	52,500	Administrative Overheads	42,000
Factory Overheads	45,000	Profit	60,900

Prepare Job cost sheet showing prime cost, works cost, cost of production, cost of sales and sale price.

In 2005, Factory got new job orders.

Direct Materials Rs.1,20,000

Direct Wages   Rs. 75,000

Selling & Distribution Overheads increases 15%   on the basis of previous rates factory overheads are charged as percentage on direct wages administrative overheads on factory cost and selling and distribution overheads as percentage on Factory Cost.

Cost Sheet as on 31st December, 2004

	Rs.
Direct Materials	90,000
Direct Wages	75,000
Prime Cost	1,65,000
Factory Overheads	45,000
Factory Cost	2,10,000
Administrative Overheads	42,000
Cost of Production	2,52,000
Selling & Distribution Overheads	52,500
Total Cost	3,04,500
Profit	60,900
Selling Price	**3,65,400**

Estimated Job Cost Sheet as on 31st December, 2005

	Rs.
Direct Materials	1,20,000
Direct Wages	75,000
Prime Cost	1,75,000
Factory Overheads- 60% on Direct Wages	45,000
Factory Cost	2,40,000
Administrative Overheads-20% on Factory Cost	48,000
Cost of Production	2,88,000
Selling & Distribution Overheads- 25% on FActory Cost and 15% increase (2,40,000 x 25/100 = 60,000 x 15/100 = 9000)	69,000
Total Cost	3,57,000
1/6 of Cost of Sales or 1/5 of Selling Price	71,400
Selling Price	**4,28,400**

Example 2 : A shop floor supervisor of a small factory presented the following cost for a job to determine the selling price.

	per unit Rs.
Materials	70
Direct wages 18 hrs at 2.50	45
(Dept X - X - 8hrs, Y - 6 hrs, Z - 4hrs)	
Chargeable expenses	
(Special stores items)	5
	120
Add: 33 1/3% for expenses	40
Cost	160

	Rs.		Rs.
Materials	1,50,000	Seles less Returns	2,50,000
Direct Wages :			
Dept. X 10,000			
Dept. Y 12,000			
Dept. Z 8,000	30,000		
Special Stores item	4,000		
Overheads :			
Dept. X 5000			
Dept. Y 9000			
Dept. Z 2000	16,000		
Works Cost	2,00,000		
Gross Profit C/d	50,000		
	2,50,000		2,50,000
Selling expenses	20,000	Gross Profit b/d	50,000
Net Profit	30,000		
	50,000		50,000

       It is also noted that average hourly rates for 3 departments are similar.

(1) Draw up a job cost sheet.

(2) Draw up the entire revised cost sheet.

(3) Add 20% to otal cost to determine selling price.

Solution :

Job Cost Sheet

	Rs.	Rs.
Direct Materials		70.00
Direct Wages:		
Dept. X - 2.50 x 8 hrs = 20.00		
Dept. Y - 2.50 x 6 hrs = 15.00		
Dept. Z - 2.50 x 4 hrs = 10.00		45.00
Chargeable Expenses		5.00
Prime Cost		120.00
Overheads		
Dept. X - 5000/ 1000 = 50% of Rs.20	10.00	
Dept. Y - 9000/ 12000 = 75% of Rs.15	11.25	
Dept. Z - 9000/ 8000 = 25% of Rs.10	2.50	23.75
Works Cost		143.75
Selling Cost = 20000/ 2,00,000 = 10% on Works Cost		14.38
Total Cost		158.13
Profit 20% of total cost		31.63
Selling Price		**189.76**

Example 3

Following information is obtained from the books of a factory for the year ended 31st Dec., 2004.

	Completed jobs (Rs.)	Work-in-Progress (Rs.)
Raw material from stores	90,000	30,000
Wages	1,00,000	40,000
Chargeable Expenses	10,000	4,000
Materials transfered to WIP	2,000	
Materials transferred to stores	1,000	

Factory overheads and office overheads are charged at 80% of wages and 25% of factory cost respectively. The value of completed job during 2004 was Rs. 4,10,000.

Prepare consolidated completed job account and consolidated work-in-progress account.

Consolidated Job Account

	Rs.		Rs.
To Materials 90,000		By Contractee Account	
Less: Transferred to WIP 2,000			
80,000			
Less: Returned to Stores 1,000	87,000		
Wages	1,00,000		
Chargeable expenses	10,000		
Factory overheads (80% of wages)	80,000		
Factory Cost	2,77,000		
Administrative Overheads	69,500		
(25% of Factory Cost)			
Net Profit transferred to	63,750		
Profit & Loss Account			
	4,10,000		4,10,000

Consolidated Work-in-Progress

	Rs.		Rs.
To Materials 30,000		By Balance c/d	1,35,000
Less: Transferred from			
Completed jo 2,000	32,000		
Wages	40,000		
Chargeable expenses	4,000		
Factory overheads (80% of wages)	32,000		
Factory Cost	1,08,000		
Administrative Overheads	27,000		
(25% of Factory Cost)			
	1,35,000		1,35,000

10.3 Batch Costing

Batch Costing is a form of specific order costing. Job costing refers to costing of jobs that are executed against specific orders whereas in batch costing items are manufactured for stock of continuing of production during lean season or production should be based on sales order. A finished product may require different components for assembly and may be manufactured in economical batch lots. When orders are received from different customers, there are common products among orders, then production orders may be issued for batches, consisting a pre-determined quantity of each type of product.

Determination of the economic lot size is important in industries where batch costing is employed. The need for determining economic lot size arises as

1. Every time a product is to be made, setting up of the tool is involved. Because of this some loss in product time will be there. Therefore maximum number of units are produced once the machine is set in order to reduce the cost per unit.

2. Such large product at one run will lead to accumulation of inventory and the costs related thereto.

3. Thus there is a quantity for which reduced cost of production is just offset by costs carring the quantity inventory.

The determination of most economical batch quantity requries consideration of many related factors of costs and economies. The factors that influence the decision in this respect are

(1) Set up

(2) Manufacturing Cost

(3) Interest on Capital

(4) Storage Cost

(5) Rate of Consumption

The formula to be used to calculate economic lot size

$$Q = \sqrt{\frac{2US}{C}}$$

Where Q = Quantity or units of products in the economic batch.

U = Total number of units to the produced in the year.

S = Set up cost per batch.

C = Carrying cost per unit of production.

10.3.1 Examples

Eample 1: The demand of an item is uniform at a rate of 25 units p.m. The fixed or set up cost is Rs.30 each time a production is made. The production cost is Rs.3 per item and inventory carrying cost is 50 paise per unit p.m. If the shortage cost is Rs.3 per item p.m. Determine how often to make a production run and of what size and also calculate Re-order level.

Solution : Economic batch quanity or $EBQ = \sqrt{\frac{2US}{C}}$

$$= \sqrt{\frac{2 \times 300 \times 30}{50 \times 12}}$$

$$= \quad 55 \text{ Units}$$

Duration = $\dfrac{\text{Production run size}}{\text{Monthly demand}}$ x 30

= $\dfrac{55}{25}$ x 30 = 66 days

= $\dfrac{55}{25}$ x 25 = 55 working days

Re-order level = $\left[\text{EBQ x} \dfrac{\text{Shortage Cost}}{\text{Carrying Cost per unit + Shortage Cost}}\right]$ – Monthly demand

= $\left[55 \text{ x} \dfrac{3}{50+3}\right]$ – 25

= 47 - 25

= 22 Units

Example 2 : The annual demand of a product is 24,000 units. It is produced in batches and largest size of single batch is 6000 units. After each batch is complete the set up cost is Rs.750. The annual carrying cost is Rs.2.25 per unit.

Assume average inventory as one-half of the number of units made in each batch. Selecting 4,6,8,12 and 24 batches per annum, detemine annual costs of each and state the optimum number of batches minimize the total costs.

Solution :

No. of batches	4	6	8	12	24
Size of batch units	6000	4000	3000	2000	1000
Average Stock	3000	2000	1500	1000	500
Setup Cost	Rs.3000	Rs.4500	6000	9000	18000
Carrying Cost	Rs.6750	Rs.4500	3375	2250	1125
Total Cost	9750	9000	9375	11250	19125

Optimum number is 6 batches per annum.

$$Q = \sqrt{\frac{2US}{C}}$$

$$Q = \sqrt{\frac{2 \times 24000 \times 750}{2.25}}\ 4000\ Units$$

10.4 SUMMARY

Job costing is a method of costing where work is undertaken on customer's specific requirement. This method of costing is useful for detailed analysis of overhead classification and ascertainment of more profitable jobs, determining the trends of cost of different types of jobs, estimating the cost of future jobs etc.

Batch Costing is a form of specific order costing. Determination of economic lot size is important in industries where batch costing is employed.

10.5 TERMINOLOGY

Job Costing　　: Specific order costing applies to manufacture of products to customers requirements.

Job Cost Sheet : A statement for the ascertainment of the cost of each job.

Batch Costing　: Costing of items manufactured for stock or production in economic batch lots.

10.6 SELF ASSESSMENT QUESTIONS

Five Marks Questions

1. Explain the features of Job Costing.

2. What is meant by Economic Lot size.

3. Explain $Q = \sqrt{\frac{2US}{C}}$

Ten Marks Questions

1. Draw the model Job Cost Sheet.

2. What is Batch Costing.

3. Explain the merits and demerits of Job Costing.

Twenty Marks Questions

1. Explain the procedure of Job Cost System.

10.7 REFERENCE BOOKS

Advanced Cost Accounting & Cost Control Techniques   S.P. Jain & K.L.Narang.

Cost Accounting   S.P.Iyenger.

Cost Accounting   N.K.Prasad

- Ch. Neela Krishnaveni

LESSON - 11

FINANCIAL STATEMENTS

11.0 Objective : After going through this lesson the student can know what are financial statements ? What are their features ? What is the need for preparation for the financial statements ? And different types of financial statements.

Structure :

11.1 **Introduction.**
11.2 **Definition.**
11.3 **Nature of Financial statements.**
11.4 **Characteristics of Financial statements.**
11.5 **Different types of Financial statements.**
11.6 **Form and content of Balance Sheet.**
11.7 **Form and content of Income statement.**
11.8 **Importance of Financial statements.**
11.9 **Limitations of Financial statements.**
11.10 **Summary.**
11.11 **Self Assessment questions.**
11.12 **Recommended books.**

11.1 Introduction :

Accounting is the process of recording, classifying and summarising various business transactions. These business transactions are summarised in the form of financial statements i.e. Profit & Loss account and Balance sheet. These statements are the sources of information on the basis of which conclusions are drawn about the profitability and the financial position of a concern. Financial statements are the basis for decision making by the management as well as all other outsiders who are interested in the affairs of the firm such as investors, creditors, customers, suppliers, financial institutions, employees, government and the general public.

11.2 Definition:

John N. Myer defined financial statements as "The financial statements provide summery of the accounts of a business enterprise, the balance sheet reflecting the assets, liabilities and capital as on a certain date and the income statement showing the results of operations during a certain period".

Smith and Asburne define financial statements as "The end product of financial accounting is a set of financial statements prepared by the accountant of a business enterprise - that purport to reveal the financial position of the enterprise, the result of its recent activities and an analysis of what has been done with earnings."

After going through the above definitions we may conclude, that financial statements are the outcome of summarising process of accounting. They are in the form of two statements i.e. 1) Profit and loss account, to know the operating results, 2) Balance sheet, to know the financial position of a firm by management and other interested out-siders.

11.3 Nature of Financial statements :

The financial statements are prepared on the basis of recorded facts. These recorded facts are those which can be expressed in monetary terms. These statements are prepared periodically, generally for the accounting period.

The American Institute of certified public Accountants states the nature of financial statements as "Financial statements are prepared for the purpose of presenting a periodical review of report on progress by the management and deal with the status of investment in the business and the results achieved during the period under review. They reflect a combination of recorded facts, accounting principles and personal judgements".

Acccording to John N.Myer" The financial statements are composed of data which are the result of a combinations of 1) recorded facts concerning the business transactions 2) conventions adopted to facilitate the accounting technique, 3) Postulates or assumptions made to and 4) Personal judgements used in the application of the conventions and postulates".

For the better understanding of the above definitions and nature of financial statements, the following points will help us.

1. Recorded Facts : The term 'recorded facts' refers to the data taken out from the accounting records. The records are maintained on the basis of actual cost data. The figures of various accounts such as cash in hand and at bank, Bills receivable, sundry debtors, fixed assets etc. are taken as per the figures recorded in the accounting books. The assets purchased at different times and at different prices are put together and shown at cost prices. As financial statement are not based on replacement costs they do not show current financial condition of the concern.

2. Accounting conventions : Certain accounting conventions are followed while preparing financial statements. Such as cost less depreciation principle, for valuation of fixed assets, cost or market price whichever is lower, for valuation of stock, convention of materiality in case of small items like pencils, pens, postage stamps etc. The use of accounting conventions makes financial statements comparable, simple and realistic.

3. Assumptions : The accountant makes certain assumptions while making accounting records. For example the concern is treated as a going concern. Another important assumption is to presume that the value of money will remain the same in different periods. Though there is drastic change in purchasing power of money.

4. Personal judgements : Personal judgements of the accountant plays an important role in the preparation of financial statements. For example : there are a number of methods for valuing stock viz; LIFO, FIFO, Average cost method, standard cost, base stock method etc, the accountant will use one of these methods for valuing materials. The selection of depreciation method, determination of period for writing off the intangible assets are some of the examples where judgement of the accoutant will play an important role in choosing the most appropriate course of action.

11.4 Characteristics of Financial statements:

The financial statements are prepared with a view to show financial position of the concern. A proper analysis and interpretation of these statements enables a person to judge the profitability and financial position. The financial statements should be prepared in such a way that they are able to give a clear and true picture of the concern. The ideal financial statements have the following characteristics.

1) Show true financial position : The information contained in the financial statements should be such that a true and correct idea is taken about the financial position of the concern. No material information should be withheld while preparing these statements.

2) Easy and effective presentation : The financial statements should be presented in a single way so as to make them easily understandable. A person who is not well versed with accounting terminology should also be able to understandable. A person who is not well versed with accounting terminology should also be able to understand the statements without much difficulty. This characteristic will enhance the utility of these statements.

3) Relevance : Financial statements should be relevant to the objectives of the enterprise. This will be possible when the person preparing these statements is able to properly utilise the accounting information. The information which is not relevant to the statements should be avoided.

4) Attractive : The financial statements should be prepared in such a way that important information is underlined to attract the reader.

5) Concise : Financial statements should be prepared in a concise form. The calculation work should be minimum possible, while preparing these statements. The size of the statements should not be very large. The columns to be used for giving the information should also be less.

6) Comparability : The comparable figures will make the statements more useful. The financial statements should be prepared in such a way to compare the current year figures with previous year. The statement can also be compared with the figures of other concerns of the same nature.

7) Analytical Representation : The information should be analysed in such a way that similar data is presented at the same place. This will be helpful in analysis and interpretation of data.
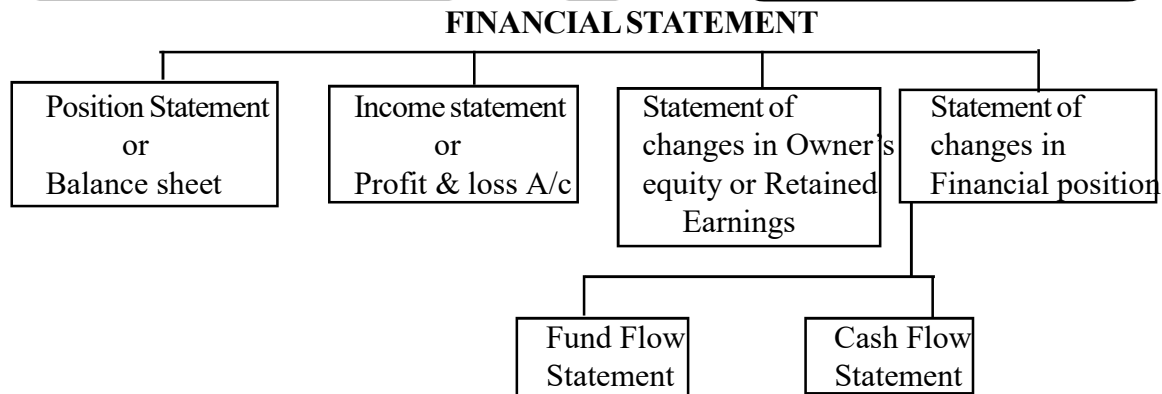
8) Brief : The financial statement should be presented in Brief. So the reader will form an idea about the figures.

9) Promptness : The financial statements should be prepared and presented at the earliest possible i.e. immediately at the end of the financial year.

11.5 Different types of Financial statements :

Financial statements primarily comprise two basic statements 1) position statement or balance sheet 2) Income statement or the profit and loss account. However, generally accepted accounting principles specify that a complete set of financial statements must include.

1) A balance sheet.

2) An income statement.

3) A statement of changes in owner's account.

4) A statement of changes in financial position.

FINANCIAL STATEMENT

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                          FINANCIAL STATEMENT
     ┌──────────────┬──────────────┬──────────────┬──────────────┐
┌──────────────┐ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│  Position    │ │   Income     │ │ Statement of │ │ Statement of │
│ Statement    │ │  statement   │ │ changes in   │ │ changes in   │
│    or        │ │    or        │ │ Owner's      │ │ Financial    │
│ Balance sheet│ │Profit & loss │ │ equity or    │ │ position     │
│              │ │   A/c        │ │ Retained     │ │              │
│              │ │              │ │ Earnings     │ │              │
└──────────────┘ └──────────────┘ └──────────────┘ └──────────────┘
                              ┌───────────────┬───────────────┐
                        ┌──────────────┐ ┌──────────────┐
                        │  Fund Flow   │ │  Cash Flow   │
                        │  Statement   │ │  Statement   │
                        └──────────────┘ └──────────────┘
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Let us now briefly explain the meaning and significance of each of these statements.

A) Balance Sheet : The American Institute of certified Public Accountants defines Balance sheet as "A tabular statement of summary of balances carried forward after an actual and constructive closing of books of account and kept according to principles of accounting". The purpose of balance sheet is to show the resources that the company has i.e. is assets, and from where those resources come from i.e. its liabilities.

The balance sheet is prepared on a particular date. The right hand side shows assets and the left hand side shows the liabilities. The companies Act, 1956 has prescribed a particular form for showing assets and liabilities in the balance sheet for companies registered under this Act. These companies are also required to give figures for the previous year along with the current year's figures.

2. Profit and Loss Account :

Income statement or profit and loss Account is prepared to know the operating results of the concern for an year, whether it earned a profit or suffered a loss. It is a statement of revenues earned and the expenses incurred for earning that revenue. If there is excess of revenues over expenditure it will show a profit and if the expenditures are more than the income then there will be a loss.

The income statement may be prepared in the form of manufacturing account to find out the cost of production, in the form of Trading Account to determine gross profit or gross loss, in the form of a profit and loss account to determine net profit or net loss. A statement of Retained Earnings may also be prepared to show the distribution of profits.

3. Statement of changes in owner's Equity :

The term 'owner's Equity' refers to the claims of the owners of the business i.e. shareholders against the assets of the firm. It consists of two elements 1) paid-up share capital i.e. the initial amount of funds invested by the shareholders; and 2) retained earnings, reserves and surplus representing undistributed profits.

A statement of retained earnings is also known as profit and loss Appropriation Account or Income Disposal statement. As the name suggests it shows appropriations of earnings. The previous year's balance is first brought forward. The net profit during the current year is added to this balance. On the debit side, appropriations like interim dividend paid, proposed dividend, amounts transferred to various reserve accounts are shown The balance in this account. Will show the amount of profit retained in hand and carried forward.

4) Statement of changes in Financial position : The basic financial statements i.e., the balance sheet and the profit and loss account or income statement of a business reveal the net effect of the various transactions on the operational and financial position of the company. The balance sheet gives a static view of the resources of a business and the uses to which these resources have been put. The profit and loss account indicates the resources provided by operations. But there are many transactions that do not operate through profit and loss account. Thus, for a better understanding another statement called statement of changes in financial position has to be prepared to show the changes in assets and liabilities from the end of one period to the end of another period of time. The objective of this statement is to show the movement of funds (working capital) during a particular period. The statement of changes in financial position may take any of the following two forms.

a) Funds Flow statement : The funds flow statement is designed to analyse the changes in the financial condition of a business enterprise between two periods. The word 'Fund' is used to denote working capital. This statement will show the sources from which the funds are received and the uses to which these have been put. This statement enables the management to have an idea about the sources of funds and their uses for various purposes. This statement helps the management in policy formulation and performance appraisal.

Cash Flow statement : A statement of changes in the financial position of a firm on cash basis is called Cash Flow statement. It summarises the causes of changes in cash position of a business enterprise between dates of two balance sheets. This statement is very much similar to the statement of changes in working capital i.e. Funds Flow statement. A cash flow statement focuses attention on cash changes only. It describes the sources of cash and its uses.

11.6 Form and contents of Balance Sheet :

There is no specific form for the preparation of balance sheet in the case of proprietory concerns and partnership firms. The balance sheet can be prepared either on the basis of liquidity or on the basis of permanency.

When the balance sheet is prepared on the basis of liquidity, on the assets side, more liquid assets like cash in hand, cash at bank, investments etc., are shown first and the least liquid assets will be shown at last. On the liabilities side, the liabilities to be paid in the short period are shown first, long-term liabilities next and capital on the last. It is suitable to financial companies.

When the balance sheet is prepared on permanency basis, on asset side fixed assets are shown first and liquid assets are shown at last. On liabilities side the capital is shown first, long-term liabilities next, short term and current liabilities in the last.

The companies Act, 1956 has prescribed a form for the preparation of Balance sheet. This form is setout in part I of schedule VI. The balance sheet of a company may be either in A/. in Horizontal or B/. vertical form.

Schedule VI - PART - I
Part (A) : Horizontal Form of Balance Sheet
Balance Sheet of ....(name of the company)
As at .... *(date onwhich balance sheet is prepared)*

(1) *Figures for the previous year (Rs.)*	*(2)* *Liabilties*	*(3)* *Figures for the current year (Rs.)*	*(4)* *Figures previous year (Rs.)*	*(5)* *Assets*	*(1)* *Figures current year (Rs.)*
	Share capital Authorised : Shares of Rs... each Issued : Preference Share of Rs.... each Equity Shares of Rs....each Subscribed : Preference Shares of Rs..... each Equity Shares of Rs.... each Less Calls Unpaid **Reserves and Surplus** Capital Reserve Capital Redemption Reserve Share Premium Other Reserves Profit and Loss Account **Secured Loans** Debentures Loan and Advances from Banks Loans and Advancesfrom Subsidiary Other Loans and Advances Unecured Loans Fixed Deposits Short term Loans and Advances Other Loan and Advances **Current Liabilities and** Provisions **A Current Liabilities** Acceptances Sundry Creditors			**Fixed Assets** Good will Land Building Households Railway Sidings Plantand Machinery Furniture Patents & Trade Marks Livestock Vehicles **Investments** Govt. or Trust Securities Shares, Debentures, Bonds **Current Assets** **Loans and Advances** **A. Current Assets** Interest Accrued Stores and Spare parts Loose Tools Stock in Trade Work in Progress Sundry Debtors Cash and Bank Balances **B. Loans and Advances** Advances and Loans to Subsidiary Bills Receivables Advance Payments Miscellaneous Expenditure Preliminary Expenses Discount on issue of shares and debentures Other Deferred Expenses Profit and Loss Account (Debit Balance)	

(1) Figures for the previous year (Rs.)	(2) Liabilties	(3) Figures for the current year (Rs.)	(4) Figures previous year (Rs.)	(5) Assets	(1) Figures current year (Rs.)
	Outstanding Expenses **B. Provisions** Provision for Taxation Proposed Dividends For Contingencies For Provident Funds Scheme For insurances, pension and other benefits				

Part I (B) : Vertical Form of Balance Sheet Name of the Company .... Balance Sheet as at			
	Schedule No.	**Figures as at the end of current financial year (Rs.)**	**Figures as at the end of previous financial year (Rs.)**
I. *Source of Funds* 1. Shareholder's Funds (a) Capital (b) Reserves and Surpluses 2. Loans Funds (a) Secoured Loans (b) Unsecured Loans **Total :** II. *Application of Funds* 1. Fixed Assets (a) Gross Block (b) Less : Depreciation (c) Net Block (d) Capital Work-in-Progress 2. Investments 3. Current Assets, Loans and Advances (a) Inventories (b) Sundry Debtors (c) Cash and Bank Balances (d) Other Current Assets (e) Loans and Advances Less : Current Liabilities and Provisions (a) Liabilities (b) Provisions Net Current Assets 4. (a) Miscellaneous Expenditure to the extent not written (b) Profit and Loss Account (debit) **Total :**			

Schedules : The details of various items are shown separately in schedules. The schedules will incorporate all the information required under part 1A of schedule VI. The schedules, accounting policies and other explanatory notes will form a part of the Balance sheet. A number of schedules are prepared to supplement the information supplied in the Balance sheet.

Explanation of Balance sheet Items : *1) Share capital :* The share capital is shown as a first item on the liabilities side of the balance sheet. Authorised and issued capital is shown giving the number of shares and their amount. The number of shares for which public has applied are mentioned along with the type of capital i.e. preference share capital, Equity share capital. If the capital is issued for other than cash, the amount of such capital is mentioned. The fact of issue of bonus share is also mentioned.

2) Reserves and surplus : Under this heading all those reserves which have been created out of undistributed profits are shown. Reserves are classified as capital reserves and revenue reserves. Capital reserves are those reserves which are not free for distribution as profits whereas revenue reserves are created out of appropriations of profits. Various items included here are capital reserves, capital redemption reserve, share premium account, other reserves, surplus i.e. P & L A/c, Sinking Fund etc. The word "Fund" is used to indicate that reserve is for a specific purpose and the amount is invested outside the concern.

3) Secured loans : All those loans against which securities are given are shown under this category. Debentures are shown under this heading.

4) Unsecured loans : These are the loans and advances against which the company has not given any security.

5) Current liabilities and provisions : These are divided into A/. current liabilities and B/. provisions. In this category following items are included.

A) Current Liabilities : i) Acceptances ii) Sundry creditors iii) Subsidiary companies iv) Advance payments v) unclaimed dividends vi) other liabilities if any viii) Interest accrued but not paid on loans.

B) Provisions : Following items are included under provisions.

viii) Provisions for taxation ix) Proposed dividends x) Provision for contingencies xi) Provision for provident fund scheme xii) Provision for insurance, Pension and similar staff benefits schemes. xii) Other provisions.

Assets side : The assets are given under the following heads.

1) Fixed Assets : Fixed assets are those which are purchased for use over a long period. These assets are meant to increase production capacity of the business. Fixed assets are shown distinctly from each other e.g : goodwill, land and buildings, plant and machinery, Furniture etc. These assets are shown at their original cost. Any additions and deductions during the year are shown separately. The amount of depreciation upto the previous year and during the current year is separately deducted from the assets.

2) Investments : Investments are shown by giving their nature and mode of valuation.

3) Current Assets : Current assets are the assets which can be convertible into cash within a period of twelve months. They are cash in hand and at bank, debtors, stock. The stock is valued at cost or market price which ever is less, debtors are shown after providing provision, debtors of more than six months old should be shown separately. The amount owed by directors should also be shown separately.

4) Miscellaneous Expenditures : Deferred expenditures are shown under this heading. These are the expenses which are not debited fully to the profit and loss account of the year in which they have been incurred. These expenses are spread over a number of years and the unwritten balance is shown in the balance sheet. The items under this heading are preliminary expenses, discount allowed on issue of shares or debentures, interest paid out of capital during construction etc.

11.7 Form and content of Income statement :

In case of sole proprietory and partnership concerns there are no prescribed forms for income statement. The preparation of this statement is not compulsory but desirable. In case of joint stock companies the preparation of income statement for every financial year is compulsory. Sec 211 of the Act prescribes the contents to be disclosed in this statement. It says that profit and loss account of a company shall give a true and fair view of the profit and loss of the company for the financial year and shall comply with the requirements of part II of schedule VI.

The manufacturing, Trading and profit and loss Accounts are generally prepared in T form. The general forms of these accounts are given as follows.

Incase of joint stock companies, the heading of the account is profit and loss account and same information which is given above is given here. Some items like provision for taxation, interest on debentures etc are also shown as expenses in Profit and Loss Account. The figures of profit and loss account of the previous year are also given along with the current figures.

Jointstock companies prepare profit and loss Appropriation Account also. This account is also known as retained earnings account. This account is prepared to show how the profit of the company have been used. The form of this account is given as follows :

11.8 Importance of Financial statements :

The financial statements reflects the financial position and operating strength or weakness of the concern. These statements are useful to management, investors, creditors, bankers, workers, government and public at large. The utility of financial statements to different parties is discussed in detail as follows :

1) Management : The management is able to exercise cost control through these statements as these are useful for assessing the efficiency for different cost centres. The efficient and inefficient spots can be located and the management is able to take necessary actions.

2) Creditors : The trade creditors are interested in current solvency of the concern. The calculation of current ratio and liquid ratio will enable the creditors to assess the current financial position of the concern.

3) Bankers : The Banker is interested to see that the loan amount is secure and customer is also able to pay the interest regularly. For this purpose he analyse the balance sheet to determine the financial strength of the concern.

4) Investors : The investors include both short-term and long-term investors. They are interested in the security of the principal amount of loan and regular interest payments by the concern. The investors will study the long-term solvency of the concern with the help of financial statements.

5) Government : The financial statements are used to assess tax liability of business enterprises. These statements enable the government to find out whether business is followed various rules and regulations or not.

6) Trade Associations : These associations provide service and protection to the members. They may analyse these statements for the purpose of providing facilities to their members.

7) Stock Exchange : The stock exchanges deal in purchase and sale of securities of different companies. The financial statements enable the stock brokers to judge the financial position of different concerns.

11.9 Limitations of Financial statements :

Though financial statements are relevant and useful for the concern, they are suffering from the following limitations.

1) These statements do not give a final picture of the concern. The actual position can only be known when the business is sold or liquidated.

2) The financial statements are expressed in monetary values, so they appear to give final and accurate position. The value of fixed assets in the balance sheet neither represents the value for which fixed assets can be sold nor the amount which will be required to replace these assets. The balance sheet is prepared on the presumption of a going concern as a result of it, it is not giving the exact position.

3) The financial statement are prepared on the basis of historical costs. The value of assets decreases with the passage of time, current price changes are not taken into account.

4) The impact of Non-monetary factors such as reputation of management, co-operation of the employees etc are totally ignored because they can not expressed in monetary terms even though they influence the profits.

11.10 Summary :

All the business concerns are interested to know the operating results and their financial position at the end of the period. For the purpose of knowing the operating results in a particular year whether it is a profit or loss they prepare the profit and loss account. For the purpose of ascertaining the financial position, they prepare Balance Sheet. All the transactions or matters which can be measurable in monetary value are included in these statements. By going through these statement a reader can easily understood the strengths and weaknesses of the concern. These statements will serve to different sectors of the society.

11.11 Self Assessment5 questions :

1)   What are financial statements ? Define.

2)   Describe the features of financial statements.

3)   What are the characteristics of financial statements.

4)   Describe various financial statements.

5)   What is the importance of financial statements.

6)   Listout the limitations of financial statements.

11.12 Reference Books:

1.   **Sharma, Gupta**   –   **Management Accounting.**

2.   **I.M. Pande**   -   **Management Accounting**

3.   **Manmohan & Goyal**   –   **Principles of Management Accounting.**

4.   **Hom Green**   -   **Introduction to Management Accounting.**

- Dr. Ch. Suravinda

LESSON – 12

FINANCIAL STATEMENTS ANALYSIS

12.0 Objective : After going through this lesson the student can know what is Financial Statement analysis? What are the tools that are available to the management to Analyse Financial Statements etc.

Structure :

12.1 Introduction

Financial Statements are prepared primarily for decision making. But the information provided in the financial statements alone cannot help to draw meaningful conclusions. However, the information provided in the financial statements is of immense use in making decisions through analysis and interpretation of financial statements. Financial analysis is the process of identifying the financial strengths and weaknesses of the firm. There are various methods to analyse the financial statements, such as comparative statements, trend analysis, common size statements, schedule of changes in working capital, Funds Flow and Cash Flow analysis, cost – volume – profit analysis and ratio analysis.

12.2 Meaning and Concept of Financial Analysis:

The term 'financial analysis, also known as analysis and interpretation of financial statements.

Metcalf and Titrad defines financial analysis as "analysing financial statements is a process of evaluating the relationship between component parts of a financial statement to obtain a better understanding of a firm's position and performance".

Myers define it as "Financial Statement Analysis is largely a study of relationship among the various financial factors in a business as disclosed by a single set of statements ,and a study of the trend of these factors as shown in a series of statements".

After going through the above definitions we may conclude that the purpose of financial analysis is to diagnose the information contained in financial statements so as to judge the profitability and financial soundness of the firm. Financial statement analysis is an attempt to determine the significance and meaning of the financial statement data so that forecast may be made of the future earnings, ability to pay interest and profitability.

The term 'financial statement analysis' include both 'analysis', and 'interpretation'. A distinction should, therefore, be made between the two terms. While the term 'analysis' is used to mean the simplification of financial data by methodical classification of the data given in the financial statements , 'interpretation' means, 'explaining the meaning and significance of the data so simplified. Analysis and interpretation are interlinked and complimentary to each other. Analysis is useless without interpretation and interpretation without analysis is difficult or even impossible.

12.3 Types of Financial Analysis:

Financial Analysis can be classified on the basis of   1. Material used 2. On the basis of method of operation.
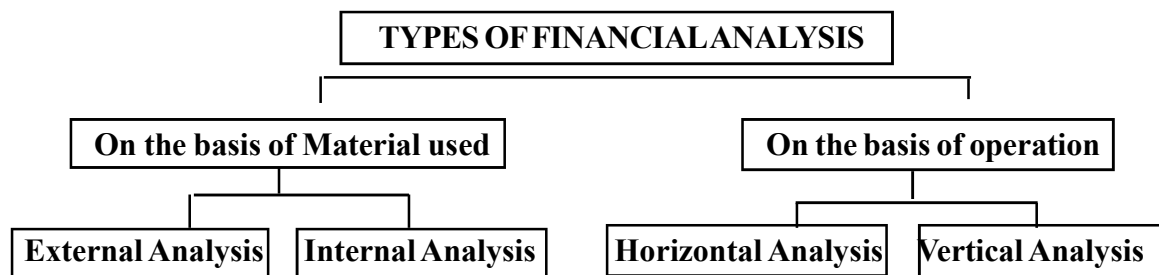
On the basis of material used financial analysis can be of two types i.e. 1) External analysis b) Internal analysis.

a) External Analysis:

This analysis is done by outsiders who do not have access to the detailed internal accounting records of the business firm. These outsiders include investors, potential investors, creditors, government agencies and the general public. For financial analysis, these parties depend on the published financial statements.

b) Internal Analysis:

The persons who have access to the internal accounting records conduct this internal analysis. These people are the executives and employees of the organisation as well as government agencies which have statutory powers vested in them.

2) On the basis of method of operation:

According to the method of operation followed in the analysis financial analysis can be of two types .a) horizontal analysis b) vertical analysis.

a) Horizontal Analysis:

Horizontal analysis refers to the comparison of financial data of a company for several years. The figures for this type of analysis are presented horizontally over a number of columns. The figures of the various years are compared with standard or base year. A base year is a year chosen as beginning point. The horizontal analysis makes it possible to focus attention on items that have changed significantly during the period under review. Comparison of an item over several periods with a base year may show a trend developing.

b) Vertical Analysis:

Vertical Analysis refers to the study of relationship of the various items in the financial statement of one accounting period. In this type of analysis the figures from financial statements of a year are compared with a base selected from the same year's statement. Common-size financial statements and financial ratios are the two tools employed in vertical analysis.

12.4 Procedure of Financial Statements Analysis:

In the analysis of financial statements three steps are involved.

They are 1) selection 2) classification and 3) interpretation.

In the first step the data or information which is relevent to analyse the financial statements is selected. In the second step this data is classified into groups and later in the third step conclusions are formed.

The following procedure is adopted for the analysis and interpretation of financial statements:

1) The analysis should be well versed with the concepts and principles of accounting. He should know the plans and policies of the management so that he may be able to find out whether these plans are properly executed or not.

2) He should know the object or aim of analysis to decide the sphere of work. If the aim is to find out the earning capacity of the enterprise then analysis of income statement will be undertaken. If financial position is to be studied then Balance Sheet analysis is required.

3) The data given in the financial statements should be re-organised and re-arranged into similar groups.

4) A relationship is established among financial statements with the help of tools and techniques of analysis such as ratios, trends, common size, Funds Flow etc.

5) The information is interpreted in a simple and understandable way.

6) The conclusion drawn from interpretation are presented to the management in the form of reports.

12.5 Methods of Financial Analysis:

The analysis and interpretation of financial statements is used to determine the financial position and results of operations as well. A number of methods are used to study the relationship between different statements. The following methods of analysis are generally used:

1. Comparative Statements ;

2. Trend Analysis;

3.   Common-size Statements;

4.   Funds Flow Analysis;

5.   Cash Flow Analysis;

6.   Ratio Analysis;

7.   Cost Volume Profit Analysis.

The first three methods i.e., comparative statements, trend analysis and common -size statements are discussed in this lesson.

12.6   Comparative Statements:

The comparative financial statements are statements of the financial position at different periods of time. The elements of financial position are shown in a comparative form so as to give an idea of financial position at two or more periods. Any statement prepared in a comparative form will be covered in comparative statements. From practical point of view, generally, two financial statements i.e., balance sheet and income statement are prepared in comparative form for financial analysis purposes. Not only the comparison of the figures of two periods but also the relationship between balance sheet and income statement enables an in depth study of financial position and operative results. The two comparative statements are 1) Balance Sheet and 2) Income Statement.

12.6.1 Comparative Balance Sheet:

The comparative balance sheet analysis is the study of the trend of the same items, group of items and computed items in two or more balance sheets of the same business enterprise on different dates. The changes in periodic balance sheet items reflect the conduct of a business. The changes can be observed by comparison of the balance sheet at the beginning and at the end of a period and these changes can help in forming an opinion about the progress of an enterprise. The comparative balance sheet has four columns, the first two columns for the data of balance sheets. Third column is used to show increases in figures. The fourth column may be added for giving percentages of increases or decreases.

Guidelines for Interpretation of Comparative Balance Sheet:

While interpretation comparative Balance Sheet the interpreting is expected to study the following aspects:

1) Current financial position and liquidity position.

2) Long-term financial position.

3) Profitability of the concern.

For studying current financial position or short-term financial position of a concern, one should see the working capital in both the years. The excess of current assets over current liabilities will give the figures of working capital. The increase in working capital will mean improvement in the current financial

position of the business. An increase in current assets accompanied by the increase in current liabilities of the same amount will not show any improvement in the short-term financial position. A student should study the increase or decrease in current asset and current liabilities and this will enable him to analyse the current financial position. The second aspect which should be studied in current financial position is the liability position of the concern. If liquid assets like cash in hand, cash at bank, bills receivables, debtors etc; show an increase in the second year over the first year, this will improve the liquidity position of the concern. The increase in inventory can be on account of accumulation of stocks for want of customers, decrease in demand or inadequate sales promotion efforts. An increase in inventory may increase working capital of the business but it will not be good for the business.

The long-term financial position of the concern can be analysed by studying the changes in fixed assets, long-term liabilities and capital. The proper financial policy of concern will be to finance fixed assets by the issue of either long-term securities such as debentures, bonds, loans from financial institutions or issue of fresh share capital. An increase in fixed assets should be compared to the increase in long-term loans and capital. If the increase in fixed assets is more than the increase in long term securities then part of fixed assets has been financed from the working capital. On the other hand, if the increase in the long-term securities is more than the increase in fixed assets then fixed assets have not only been financed from long-term sources but part of working capital has also been financed from long-term sources. A wise policy will be to finance fixed assets by raising long-term funds.

The nature of assets which have increased or decreased should also be studied to form an opinion about the future production possibilities. The increase in plant and machinery will increase production capacity of the concern. On the liabilities side, the increase in loaned funds will mean an increase in interest liability whereas and increase in share capital will not increase any liability for paying interest. An opinion about the longterm financial position should be formed after taking into consideration the above mentioned aspects.

The study of increase or decrease in retained earnings, various resources and surpluses etc will enable the interpreter to see whether the profitability has improved or not. An increase in the balance of profit and loss account and other resources created from profits will mean an increase in profitability of the concern. The decrease in such accounts may mean issue of dividend, issue of bonus shares or deterioration in profitability of the concern.

After studying various assets and liabilities an opinion should be formed about the financial position of the concern. One cannot say if short–term financial position is good then long term financial position will also be good or vice – versa. A conclusion word about the overall financial position must be given at the end.

Illustration I:

The following are the Balance sheets of a concern for the year 2007 and 2008. Prepare a comparative Balance sheet and study the financial position of the concern.

BALANCE SHEET AS ON 31ST DECEMBER

	2007 Rs.	2008 Rs.		2007 Rs.	2008 Rs.
Equity			Land & Buildings	7,40,000	5,40,000
Share Capital	12,00,000	16,00,000	Plant & Machinery	8,00,000	12,00,000
Reserves &			Furniture &		
Surpluses	6,60,000	4,44,000	Fixtures	40,000	50,000
Debentures	4,00,000	6,00,000	Other Fixed Assets	50,000	60,000
Long -term			Cash in hand		
Loans on Mortgage	3,00,000	4,00,000	and at Bank	40,000	1,60,000
Bills payable	1,00,000	90,000	Bills Receivable	3,00,000	1,80,000
Sundry Creditors	2,00,000	2,40,000	Sundry Debtors	4,00,000	5,00,000
Other Current			Stock	5,00,000	7,00,000
Liabilities	10,000	20,000	Prepaid Expenses	-	4,000
	28,70,000	**33,94,000**		**28,70,000**	**33,94,000**

Solution :

Comparative Balance Sheet of a company for the year ending December 31, 2007 and 2008.

	Year ending 31 December		Increase/ Or	Increase Or
	2007 Rs.	2008 Rs.	Decrease Amount in Rs.	Decrease (Percentage)
Assets :				
Current Assets :				
Cash in hand and at Bank	40,000	1,60,000	+ 1,20,000	+ 300
Bills Receivables	3,00,000	1,80,000	–1,20,000	–40
Sundry Debtors	4,00,000	5,00,000	+ 1,00,000	+ 25
Stock	5,00,000	7,00,000	+ 2,00,000	+ 40
Prepaid Expenses	–	4,000	+ 4,000	
Total Current Assets	**12,40,000**	**15,44,000**	**+ 3,04,000**	**+ 24.52**
Fixed Assets :				
Land & Buildings	7,40,000	5,40,000	–2,00,000	–27.03
Plant & Machinery	8,00,000	12,00,000	+ 4,00,000	+ 50.00
Furniture & Fixtures	40,000	50,000	+10,000	+25.00
Other fixed Assets	50,000	60,000	+10,000	+20.00
Total Fixed Assets	16,30,000	18,50,000	+2,20,000	+13.49
Total Assets	**28,70,000**	**33,94,000**	**+5,24,000**	**+ 18.26**

Liabilities & Capital :

Current liabilities :

Bills payable	1,00,000	90,000	–10,000	–10
Sundry Creditors	2,00,000	2,40,000	+ 40,000	+ 20
Other Current Liabilities	10,000	20,000	+10,000	+100
Total Current Liabilities	**3,10,000**	**3,50,000**	**+40,000**	**+ 12.9**
Debentures	4,00,000	6,00,000	+2,00,000	+50
Long-term loans on Mortgage	3,00,000	4,00,000	+1,00,000	+33
Total Liabilities	**7,00,000**	**10,00,000**	**+3,40,000**	**+33.66**
Equity share capital	12,00,000	16,00,000	+4,00,000	+ 33
Reserves & Surpluses	6,60,000	4,44,000	–2,16,000	–32.73
Total	**28,70,000**	**33,94,000**	**+5,24,000**	**+18.26**

Interpretation:

1. The comparative balance sheet of the company reveals that during 2008 there has been an increased in fixed assets of Rs. 2,20,000 i.e. 13.49% while long – term liabilities to outsiders have relatively increased by Rs. 3,00,000 and equity share capital has increased by Rs. 4 lakhs. This fact depicts that the policy of the company is to purchase fixed assets from the long – term sources of finance thereby not affecting working capital.

2. The current assets have increased by Rs. 3,04,000 i.e. 24.52% and cash has increased by Rs.1,20,000 on the other hand, there has been an increase in inventories amounting to Rs. 2 lakhs. The current liabilities have increased only by Rs. 40,000 i.e. 12.9%. This further confirms that the company has raised long – term finances even for the current assets resulting into an improvement in the liquidity position of the company.

3. Reserves and surpluses have decreased from Rs. 6,60,000 to Rs. 4,44,000 i.e. 32.73% which shows that the company has utilised reserves and surpluses for the payment of dividend to shareholders either in cash or by the issue of bonus shares.

4. The overall financial position of the company is satisfactory.

12.6.2 Comparative Income Statement:

The income statement gives the results of the operation of a business. The comparative income statement gives an idea of the progress of a business over a period of time. The changes in absolute data in money values and percentages can be determined to analyse the profitability of the business. Like comparative balance sheet, income statement also has four columns. First two columns give figures of various items for two years. Third and fourth columns are used to show increase or decrease in figures in absolute amounts and percentages respectively.

Guidelines for Interpretation of Income statements:

The analysis and interpretation of Income statement will involve the following steps:

1. The increase or decrease in sales should be compared with the increase or decrease in cost of goods sold. An increase in sales will not always mean an increase in profit. The profitability will improve if increase in sales is more than the increase in cost of goods sold. The amount of gross profit should be studied in the first step.

2. The second step of analysis should be the study of operational profits. The operating expenses such as office and administrative expenses, selling and distribution expenses should be deducted from gross profit to find out operating profits. An increase in operating profit will result from the increase in sale position and control of operating expenses. A decrease in operating profit may be due to an increase in operating expenses or decrease in sales. The change in individual expenses should also be studied. Some expenses may increase due to expansion of business activities while others may go up due to managerial inefficiency.

3. The increase or decrease in net profit will give an idea about the overall profitability of the concern. Non-operating expenses such as interest paid, losses from sale of assets, writing off of deferred expenses, payment of tax etc; decrease the figure of operating profit. When all non-operating expenses are deducted from operational profit, we get a figure of net profit. Some non-operating incomes may also be there which will increase net profit. An increase in net profit will give us an idea about the progress of the concern.

4. An opinion should be formed about profitability of the concern and it should be given at the end. It should be mentioned whether the overall profitability is good or not.

We will examine these things with the following illustrations.

Illustration 2:

The income statements of a concern are given for the year ending on 31st Dec 2007 and 2008. Re-arrange the figures in a comparative form and study the profitability position of the concern.

	2007	2008
	Rs.(000)	Rs.(000)
Net Sales	3140	3600
Cost of goods sold	1800	2000
Operating Expenses :		
General and administrative expenses	280	288
Selling expenses	320	360
Non-operating Expenses :		
Interest paid	100	120
Income - tax	280	320

Solution :

Comparative Income Statement for the year ended December 31, 2007 and 2008.

	Year ending 31 December		Increase/(+) Or Decrease(-)	Increase(+) Or Decrease(-)
	2007 Rs. (,000)	2008 Rs. (,000)	Amount in Rs. (,000)	(Percentage)
Net Sales	3140	3600	+ 460	+ 14.6
Less : Cost of goods sold	1800	2000	+ 200	+ 11.0
Gross Profit	1840	1600	+ 260	+ 19.40
Operating Expenses :				
General & Administrative				
Expenses	280	288	+ 8	+ 28
Selling Expenses	320	360	+ 40	+ 12.5
Total Operating Expenses	600	648	+ 48	+ 8.0
Operating Profit	740	952	+ 212	+ 28.65
Less : Other deductions interest paid	100	120	+ 20	+ 20.00
Net Profit before tax	640	832	+ 192	+ 30.00
Less : Income Tax	280	320	+ 40	+ 14.3
Net Profit After tax	360	512	+ 152	+ 42.22

Interpretation:

The comparative income statement given above reveals that there has been an increase in net sales of 14.65% while the cost of goods sold has increased nearly by 11% there by resulting in an increase in the gross profit of 19.4%. Although the operating expenses have increased by 8% the increase in gross profit is sufficient to compensate for the increase in operating expenses and hence there has been an overall increase in operational profits amounting to Rs.2,12,000 i.e.28.65% in spite of an increase in financial expenses of Rs.20,000 for interest and Rs.40,000 for Income tax. There is an increase in net profits after tax amounting to Rs1,52,000 i.e.42.22%. It may be concluded that there is a sufficient progress in the company and the overall profitability of the company is good.

Illustration 3:

Prepare comparative statements from the following data:

	2007	2008
	(Rs. In lakhs)	
Net Sales	1200	1500
Cost of goods sold	800	1200
Admn. Expenses	40	40

Selling Expenses	20	20
Net Profit	340	240

	2007	2008
Balance Sheets		(Rs. In lakhs)
Equity capital	800	800
6% preference share capital	600	600
Reserves	400	490
6% Debentures	200	300
Bill payable	100	150
Creditors	300	400
Tax Payable	200	300
	2600	3040
Land	200	200
Buildings	600	540
Plant	600	540
Furniture	200	280
Stock	400	600
Cash	?	?
	2600	3040

Solution :

Comparative Income Statement for the year ended 2007 and 2008.

	Year ending 31 December		Increase (+) Decrease (-) Rs.Lakhs	Increase Decrease (−) (Percentage)
	2007 Rs. (in lakhs)	2008 Rs. (in lakhs)		
Net Sales	1200	1500	+ 300	+ 25
Less : Cost of goods sold	800	1200	+ 400	+ 50
a/. Gross Profit	400	300	− 100	− 25
Operating Expenses :				
Administrative Expenses	40	40	–	–
Selling Expenses	20	20	–	–
Total Operating Expenses	60	60	–	–
Operating Profit (a – b)	340	240	− 100	− 29.41

Less : Other Expenses	–	–	–	–
Net Profit	340	240	– 100	– 29.41

Comparative Balance Sheet for the year ended December 31, 2007 and 2008.

	Year ending 31 December		Increase/ Or	Increase Or
	2007	**2008 Rs.**	**Decrease Amount in**	**Decrease (Percentage)**
	Rs. (in lakhs)	Rs. (in lakhs)	Rs. (in lakhs)	**Assets :**
Current Assets :				
Cash	600	880	+ 280	+ 46.67
Stock	400	600	+ 200	+ 50.00
Total Current Assets	**1,000**	**1,480**	**+ 480**	**+ 48.00**
Fixed Assets :				
Land	200	200	–	–
Buildings	600	540	– 60	– 10
Plant	600	540	– 60	– 10
Furniture	200	280	+ 80	+ 40
Total Fixed Assets	**2600**	**3040**	**+ 440**	**+ 16.92**
Liabilities and Capital				
Current Liabilities :				
Bills Payable	100	150	+ 50	+ 50.0
Creditors	300	400	+ 100	+ 33.3
Tax Payable	200	300	+ 100	+ 50.0
Total Current liabilities	**600**	**850**	**+ 250**	**+ 41.67**
Debentures	200	300	+ 100	+ 50.0
Total Liabilities	**800**	**1150**	**+ 350**	**+ 43.75**
Equity share capital	800	800	–	–
6% pref. Share capital	600	600	–	–
Reserve	400	490	+ 90	+ 22.5
Total	**2600**	**3040**	**+ 440**	**+ 16.92**

Interpretation:

a) The comparative income statement reveals that there has been increase in not sales of 25% while the cost of goods sold has increased disproportionately by 50% thereby resulting in a decrease of gross profit of 25%. Although the operating expenses have remained constant, there has been decrease in net profit of 29.41%. The company needs to took into the causes of increase in cost of goods sold and control the same.

b) The comparative balance sheet of the company reveals that during 2008 there has been decrease in fixed assets of Rs.40 lakhs, i.e.2.5% while long-term liabilities to outsiders have increased by Rs100 lakhs, i.e.50%. There has also been increase of Rs.90 lakhs, i.e 22.5% in reserves of the company. Thus, the company has used long-term resources to finance additional working capital.

The current assets have increased by Rs.480 lakhs in 2008 i.e.48%. There has been sufficient increase in balance of cash as well as stock. On the other hand current liabilities have increased by only Rs.250 lakhs i.e.41.67%. This further confirms that the company has raised long –term finances even for the current assets resulting into an improvement in the liquidity position of the company.

12.7 Trend Analysis:

The financial statements may be analysed by computing trends of series of information. This method determines the direction upwards or downwards and involves the computation of the percentage relationship that each statement item bears to same item in base year. The figures of the base year are taken as 100 and trend ratios for other years are calculated on the basis of base year.

Procedure for calculating Trends:

1. One year is taken as a base year, generally, the first year is taken as base year.
2. The figures of base year are taken as 100.
3. Trend percentages are calculated in relation to base year.

The interpretation of trend analysis involves a cautious study. The mere increase or decrease in trend percentage may give misleading results if studied in isolation. An increase of 10% in current assets may be treated favourable. If this increase in current assets is accompanied by an equivalent increase in current liabilities, then this increase will be unsatisfactory. The increase in sales may not increase profits if the cost of production has also gone up.

The base period should be carefully selected, it should always be a normal period. The accounting procedures and conventions used for collecting data and preparation of financial statements should be similar, otherwise the figures will not be comparable.

Illustration 4:

Calculate the trend percentages from the following figures of X ltd. taking 2004 as the base and interpret them:

Year	Sales	Stock	Rs. in Lakhs Profit before tax
2004	5,643	2,127	963
2005	7,020	2,343	1,305
2006	7,965	2,448	1,374
2007	9,063	2,832	1,581
2008	11,304	3,462	2,016

Solution :

Trend percentages. (Base year 2004 = 100)

Year	Sales		Stock		Profit Before tax		
	(Amount (Rs.Lakhs)	Trend Percentage	Amount Rs.Lakhs	Trend Percentage	Amount Rs.Lakhs	Trend Percentage	
2004	5,643	100	2,127	100	963	100	
2005	7,020	124	2,343	110	1,305	136	
2006	7,965	141	2,448	115	1,374	143	
2007	9,063	161	2,832	133	1,581	164	
2008	11,304	200	3,462	162	2,016	209	

Interpretation:

1. The sales have continuously increased in all the years up to 2008. The percentage in 2008 is 200 as compared to 100 in 2004. The increase in sales is quite satisfactory.

2. The figures of stock have also increased from 2004 to 2008. The increase in stocks is more in 2007 and 2008 as compared to earlier years.

3. Profit before tax has substantially increased. In five years period it has more than doubled. The comparative increase in profits is much higher in 2007 and 2008, as compared to 2006.

The expansion of the firm is good and it has doubled its sales and profits in just five years time. The profits have increased more than sales which shows that there is a proper control over cost of goods sold, the overall performance of the concern is good.

12.8 COMMON SIZE STATEMENT:

The common-size statements, balance sheet and income statement, are shown in analytical percentages. The figures are shown as percentages of total assets, total liabilities and total sales. The total assets are taken as 100 and different assets are expressed as a percentage of the total. Similarly, various liabilities are taken as a part of total liabilities. The short – comings in comparative statements and trend percentages where changes in items could not be compared with the totals have been covered up. The analyst is able to assess the figures in relation to total values. The common – size statements may be prepared in the following ways.

1. The totals of assets or liabilities are taken as 100.

2. The individual assets are expressed as a percentage of total assets, i.e., 100 and different liabilities are calculated in relation to total liabilities. For example, if total assets are Rs. 10 lakhs and venture value is Rs. 1 lakh, then it will be 10% of total assets.

$$\frac{1,00,000}{10,00,000} \times 100$$

12.8.1 COMMON SIZE-BALANCE SHEET

A statement in which balance sheet items are expressed as the ratio of each asset to total assets and the ratio of each liability is expressed as a ratio of total liabilities is called common-size balance sheet.

The common-size balance sheet can be used to compare companies of differing size. The comparison of figures in different periods is not useful because total figures may be affected by a number of factors.

Illustration 5:

The Balance Sheet of C & Co. and V & Co. or givan has follows.
Balance Sheet as on Dec 31, 2008

	C & Co Rs. ,000	V & Co Rs. ,000
Liabilities :		
Preference share capital	960	1280
Equity share capital	1200	3200
Reserves & surpluses	112	144
Long - term loans	920	1040
Bills payable	16	-
Sundry Creditors	96	32
Outstanding Expenses	120	48
Proposed dividend.	80	720
	3,504	**6,464**
Land and Buildings	640	984
Plant and Machinery	2,672	4,800
Temporary Investments	8	320
Inventories	80	200
Book- Debts	32	64
Prepaid expenses	8	16
Cash and Bank Balances	64	80
	3,504	**6,464**

Solution :

COMMON SIZE BALANCE SHEETS

	C.CO Amount (Rs.000)	%	V & Co. Amount (Rs.000)	%
Assets :				
Fixed Assets :				
Land, Buildings	640	18.26	984	15.22
Plants & Machinery	2,672	76.24	4,800	74.62
Total Fixed Assets	**3,312**	**94.52**	**5,784**	**89.48**
Current Assets :				
Temporary Investments	8	0.23	320	4.95
Inventories	80	2.28	200	3.08
Debtors	32	0.91	64	0.99
Prepaid expenses	8	0.23	16	0.25
Cash, Bank Balances	64	1.83	80	1.25
Total Assets	**3,504**	**100.00**	**6,464**	**100.00**
Capital - Reserves :				
Preference capital	960	27.39	1,280	19.80
Equity share capital	1,200	34.25	3,200	49.50
Reserves, surpluses	112	3.19	144	2.23
Total Capital & Reserves	**2,272**	**64.83**	**4,624**	**71.53**
Long-term loans	**920**	**26.25**	**1,040**	**16.09**
Current liabilities :				
Bill payable	16	0.46	–	–
Creditors	96	2.74	32	0.49
Expenses Payable	120	3.44	48	0.74
Preposed Dividend	80	2.28	720	11.15
Total Current liabilities	**312**	**8.92**	**800**	**12.38**
Total liabilities	**3,504**	**100.00**	**6,464**	**100.00**

Comments:-

1. an Analysis of pattern of financing of both the companies shows that V & Co. is more traditionally financed as compared to C & Co. The former company has depended more on its own funds

as it shown by balance sheet. Out of total investments, 71.53% of the funds are proprietor's funds and outsider's funds account only for 28.47%. In C & Co., proprietor's funds are 64.83% while outsider's share is 35.17% which shows that this company has depended more upon outsiders funds. In the present day economic world, generally, companies depend more on outsiders funds.

2. Both the companies are suffering from in adequacy of working capital. The percentage of current liabilities is more than the percentage of current assets in both the companies.

3. A close look at the balance sheets shows that investments in fixed assets have been financed from working capital in both the companies.

In C & Co., fixed assets accounts for 94.52% of total assets while long – term funds account for 91.08% of total funds. In V & Co. fixed assets account for 94.52% of total funds. In V & Co., fixed assets account for 89.48% whereas long term funds account for 87.62% of total funds instead of using long term funds for working capital purposes the companies have used working capital for purchasing fixed assets.

4. Both the companies face working capital problem and immediate steps should be taken to issue more capital or raise long-term loans to raise working capital position.

12.8.2 COMMON SIZE INCOME STATEMENT:-

The items in income statement can be shown as percentages of sales to show the relation of each item to sales. A significant relationship can be established between items of income statement and volume of sales. The increase in sales will certainly increase selling expenses and not administrative or financial expenses. In case the volume of sales increases to a considerable extent, administrative and financial expenses may go up. In case the sales are declining, the selling expenses should be reduced at once. So, a relationship is established between sales and other items in income statement and this relationship is helpful in evaluating operational activities of the enterprise.

Illustration 6:

Following are the Income statements of a company for the year ending

Dec.31-2007, and 2008.

	2007 (Rs.000)	2008 (Rs.000)
Sales	3,000	4,200
Other Incomes	120	90
	3,120	4,290
Expenses		
Cost of goods sold	1950	3060
Office expenses	120	150
Selling expenses	180	270
Interest	150	180
Net Profit	2,400	3,660
	720	630

Solution :

Common size Income Statement
for the year ending Dec.2007 and 2008.

		2007		2008	
		Rs.000	**%**	**Rs.100**	**%**
Net Sales		3,000	100.00	4,200	100.00
Less :	Cost of goods sold	1,950	65.00	3,060	72.86
	Gross Profit	**2,050**	**35.00**	**1,140**	**27.14**
Less :	Operating expenses				
	Office expenses	120	4.00	150	3.58
	Selling expenses	180	6.00	270	6.42
Total operating expenses		**300**	**10.00**	**420**	**10.00**
Operating profit		1,750	25.00	720	17.14
Add :	Other Incomes	120	4.00	90	2.14
	Total Income	1,870	29.00	810	19.28
Less :	Non operating expenses				
	Interest	150	5.00	180	4.28
	Net profit	**720**	**24.00**	**630**	**15.00**

Interpretation:

1. In 2008, sales and gross profit has increased in absolute figures when compared to 2007 but the percentage of gross profit to sales has gone down in 2008.

2. The increase in cost of sales as a percentage of sales has brought the profitability from 35 to 27.14%.

3. Operating expenses have remained the same in both the years but non-operating expenses have decreased as a percentage in 2008. A slight decrease in non-operating expenses in the latter year could not help to improve profits.

4. Net profits have decreased both in absolute figures and as a percentage in 2008 as compared to 2007.

5. The overall profitability has decreased in 2008 and the reason is a rise in cost of sales. The company should take immediate steps to control its cost of sales, otherwise the company will be in trouble.

12.9 Limitations of Financial Analysis:-

Financial analysis is a powerful mechanism of determining financial strengths and weaknesses of a

firm. The financial analyst has also to be careful about the impact of price level changes, window – dressing of financial statements, changes in accounting policies of a firm, accounting concepts and conventions and personal judgement etc. some of the important limitations of financial analysis are:

1. It is only a study of interim reports.

2. Financial analysis is based upon only monetary information and non-monetary factors are ignored.

3. It does not consider changes in price levels.

4. As the financial statements are prepared on the basis of a going concern, it does not give exact position. Thus this has become as serious limitation to financial analysis.

5. Changes in accounting procedure by a firm may often make financial analysis misleading.

6. Analysis is only a means and not an end in itself. The analyst has to make interpretation and draw his own conclusions. Different people may interpret the same analysis in different ways.

12.10 Summary:

Financial statements are prepared primarily for decision-making. By analysing these financial statements one can know the financial strengths and weaknesses of the firm. It is the interpretation of financial statements. On the basis of material used it may be an external and internal. On the basis of operation it may be horizontal and vertical. A number of methods are used to study financial statements. The general methods are

1. Comparative statements 2. Trend Analysis and 3. Common-size statements.

12.11 Self Assessment Questions:

1. What is financial analysis ?

2. What are the types of financial analysis?

3. What is the procedure of analysis and interpretation of financial statements ?

4. Write a brief note on comparative statements.

5. What is trend analysis?

6. Explain common-size statements.

7. What are the limitations of financial statement analysis?

8. What do you understand by the analysis and interpretation of financial statements ? Discuss their utility and significance to the management ?

9. What are the different methods used for the analysis and interpretation of financial statements ?

10. What is common-size balance sheet and income statement ? Explain the technique of preparing the common-size balance sheet ?

11. Explain the usefulness of trend percentages in interpretation of financial performance of a company.

12.12 Exercises :

1. The following are the Income statements of Achut Ltd for the years 2007 and 2008. Prepare a comparative income statement and interpret it.

(Rs.000)	2007 (Rs. 000)	2008 (Rs.000)			2007	2008 (Rs. 000)
To Opening Stock	170	400	By	Sales	2,000	2,400
To Purchases	1,000	1,100	By	Closing Stock	400	450
To Wages	120	160	By	Income		
To Salaries	84	128		from Investments	24	30
To Rent, Rates &						
Insurance	70	80	By	Dividend	10	15
To Depreciation	80	120				
To Selling expenses	24	24				
To Discount	10	14				
To Profit on sale						
of plant	–	16				
To Interest paid	24	48				
To Net Profit	852	825				
	2,434	**2,894**			**2,434**	**2,894**

2. In the basis of the balance sheets of a company, prepare a comparative Balance sheet and anlyse the changes in Assets and liabilities.

	Mar.31, 2007 (Rs.000)	Mar 31, 2008 (Rs.000)
Equity share capital	1,500	3,000
Preference share capital	300	600
General Reserve	300	750
Expenses Payable	150	150
Bills Payable	300	600
Profit & Loss Account	600	900
	3,150	**6,000**
Fixed Assets	1,200	3,000
Investments	900	300
Receivables	600	1,200

Stock	300	1,200
Cash	150	300
	3,150	**6,000**

3.　From the following income statements for the years, march 31, 2007 and 2008. Prepare a comparitive Income Statement and write your interpretation.

Income Statements

Liabilities	2007 (Rs.)	2008 (Rs.)	Assets	2007 (Rs.)	2008 (Rs.)
To　Cost of goods sold	18,00,000	19,00,000	By　Sales	30,50,000	34,00,000
To　Administrative Expenses	1,86,500	1,91,980	By　Interest & Dividend	15,000	12,400
To　Selling expenses	3,80,000	4,18,000	By　Profit on sale of		
To　Interest paid	16,000	14,000	fixed Assets	12,000	16,000
To　Loss on sale of machinery	5,000	1,600			
To　Income tax	1,70,000	3,36,000			
To　Net Profit	5,19,500	5,66,840			
	30,77,000	**34,28,400**		**30,77,000**	**34,28,400**

4.　From the Balance sheets of the company for the years 2007 and 2008. Prepare a comparative balance sheet and make a comment.

Balance Sheet

	Mar.31, 2007 (Rs.000)	Mar 31, 2008 (Rs.000)
Liabilities :		
Preference share capital	1,500	2,700
Equity share capital	1,800	3,600
General Reserves	1,200	1,500
Profit & Loss Account	600	675
Long - term loans	600	3,000
Bills Payable	240	300
Creditors	60	75
	6,000	**11,850**
Assets :		
Fixed Assets	3,000	7,500
Investments	900	600

Current Assets :		
Bills Receivables	600	1,050
Stock	1,200	1,800
Cash	300	900
	6,000	**11,850**

5. Convert the following Balance Sheets into common size Balance Sheet and comment for the years 2007 and 2008.

Balance Sheet

Liabilities	2007 (Rs. 000)	2008 (Rs.000)	Assets	2007 (Rs. 000)	2008 (Rs.000)
Equity Share capital	10,000	12,000	Fixed Assets :		
Capital Reserve	900	1,850	Buildings	8,000	14,000
General Reserve	5,000	4,500	Land	1,980	3,450
Sinking Fund	900	1,000	Furniture	770	1050
Debentures	4,500	6,500	Current Assets :		
Creditors	2,000	1,500	Debtors	4,500	3,900
Expenses Payable	150	200	Cash	2,000	150
			Stock	3,200	2,500
			Investments	3,000	2,500
	23,450	**27,550**		**23,450**	**27,550**

6. The Balance Sheets of a company for the years 2007 and 2008 were as follows. Prepare a common size Balance Sheet and make your comments.

Balance Sheet

Liabilities	2007 (Rs. 000)	2008 (Rs.000)	Assets	2007 (Rs. 000)	2008 (Rs.000)
Share Capital	21,00,000	23,00,000	Goodwill	3,40,000	20,000
Reserves	10,08,000	10,08,000	Plant	17,04,000	16,52,000
Surplus	7,02,140	2,32,280	Patents	1,20,000	96,000
9% Debentures	5,00,000	4,00,000	Investments	4,20,000	1,00,000
Interest Payable	15,000	12,000	Cash	6,82,600	11,51,200
Creditors	4,48,000	5,72,000	Debtors	5,55,040	6,12,000
Dividends			Stock	9,43,200	11,50,680
Payable	–	1,00,000	Prepaid expenses	12,800	18,400
Provision for tax	32,000	1,92,000	Discount on Debentures	27,500	20,000
	48,05,140	**48,20,280**		**48,05,140**	**48,20,280**

12.13 Reference Books :

1. Sharma, Gupta – Management Accounting.

2. I.M. Pande - Management Accounting

3. Manmohan & Goyal – Principles of Management Accounting.

4. Hom Green - Introduction to Management Accounting.

- Dr. Ch. Suravinda

Chapter – 13

MARGINAL COSTING

Objectives :

After studying this unit you should be able to :

- know the meaning and importance of marginal costing
- distinguish between absorption costing and marginal costing
- determine the margin of safety
- understand the benefits and limitations of marginal costing

Structure :

13.1 INTRODUCTION

Marginal Costing is a useful technique which guides management in pricing, decision making and assessment of profitability. It classifies costs into fixed and variable ones. The expenses which vary directly in proportion to the volume of production are termed as 'variable expenses'. The expenses which remain constant or unaffected by the change in output are called 'fixed expenses'. This distinction forms the basis of marginal costing.

Profit is influenced by the changes infixed expenses and these expenses will remain static and do not affect decision – making. More over they are largely uncontrollable. The theory of marginal costing, therefore, argues that only variable expenses should be taken into account for purposes of product pricing, inventory valuation and other important management decisions.

13.1.1 Marginal Cost:

The Institute of Cost and Works Accountants, London, defined marginal costs as "the amount at any given volume of output by which aggregate costs are changed, if the volume of

output is increased or decreased by one unit of output". It is the additional cost of producing one additional unit. It arises from the production of additional increments of output.

Illu.1: A factory produces plastic cans. The variable cost of the can is Rs.5. The fixed costs are Rs.5,000 per annum. Presently 200 cans are produced annually. The cost sheet of 200 cans would be:

	Rs.
Variable cost (200 × Rs.5)	1,000
Fixed cost	5,000
Total cost	6,000

If production is increased by one plastic can, the cost sheet of 201 can would be:

	Rs.
Variable Cost (201 × 5)	1,005
Fixed Cost	5,000
Total Cost	6,005

Marginal cost per unit is Rs.5 (i.e., the cost of producing one additional unit). Marginal cost, thus consists of prime cost plus total variable overheads. It should also be remembered that marginal cost takes into account only variable cost and excludes the fixed cost. With in the capacity of an organisation, an increase of one unit in production, obviously, will cause an increase in variable costs only. The following illustration will make this clear.

Illu.2: Following information relates to a factory, manufacturing good quality fountain pens:

Total cost Rs.	Production (units)	Direct material Rs.	Labour Rs.	Other variable costs Rs.	Fixed costs Rs.
3,250	500	1,000	750	500	1,000
5,500	1,000	2,000	1,500	1,000	1,000
7,750	1,500	3,000	2,250	1,500	1,000
10,000	2,000	4,000	3,000	2,000	1,000
12,250	2,500	5,000	3,750	2,500	1,000

Calculate marginal cost of production.

Solution:

Marginal Cost of Production

Production Units	Total Costs (a)		Fixed Costs (b)		Marginal Cost (c) = (a) − (b)	
	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.
500	3,250	6.50	1,000	2.00	2,250	4.50
1,000	5,500	5.50	1,000	1.00	4,450	4.50
1,500	7,750	5.17	1,000	0.67	6,750	4.50
2,000	10,000	5.00	1,000	0.50	9,000	4.50
2,500	12,250	4.90	1,000	0.40	11,250	4.50

The above table shows that with an increase in production the total cost per unit is decreasing. This happens because the fixed overheads which are constant at all levels of output are apportioned over larger outputs. Hence, cost of output per unit goes on declining with every increase in volume of output. It will be seen that while the marginal cost of production per unit remains constant (at Rs.4.50), the fixed cost per unit decreases from Rs.2 to Rs.0.40. Marginal cost has been calculated thus:

Marginal Cost = Direct Material Cost + Direct Labour Cost +
Direct expenses + Variable overheads
OR
Marginal Cost = Total Cost − Fixed Cost

13.2 MARGINAL COSTING

Marginal Costing is a technique where only the variable costs are taken into account while calculating the cost of product. The fixed costs are met against the total fund arising out of excess of selling price over total variable cost. This fund is called **Contribution.** Let us know go through various definitions given for Marginal Costing.

1. **ICMA London:** According to ICMA London, Marginal Costing is a technique where only the variable costs are charged to cost units, the fixed cost attributable being written off in full against the contribution for the period.

2. **D. Joseph:** Marginal Costing is a technique of determining the amount of change in the aggregate cost due to an increase of one unit over the existing level of production.

3. **Horold J. Wheldon:** Other things being equal, the fixed overhead will, in total remain fixed during changes in production achieved and the rate per unit will

consequently vary, where as that variable overhead will remain constant per unit of production and vary in total.

13.2.1 Characteristics of Marginal Costing:

1. It is a technique of analysis and presentation of cost rather than an independent method of costing. It can be applied with any method of costing.
2. Basically it involves differentiation of variable costs from fixed costs. It considers only variable costs in its analysis.
3. It guides pricing and other managerial decisions on the basis of contribution.
4. The stock of finished goods and work-in-progress are valued at marginal cost.
5. Fixed costs are charged against the contribution earned during a period. No portion of fixed cost is carried forward to next period.
6. The difference between the contribution and fixed cost represents either profit or loss, excess of contribution and fixed cost is the profit and the deficiency of contribution to fixed cost is the loss.

13.3 ABSORPTION COSTING AND MARGINAL COSTING

Absorption Costing technique is also known as Traditional or Full Cost Method. In this method, both fixed and variable costs are recovered from production. The variable costs, such as those of direct materials, direct labour etc., are directly charged to the products, while fixed costs are apportioned on a suitable basis over various products manufactured during a period. All costs are, thus, identified with manufactured products.

Illu.3: A Company is manufacturing 3 products A, B and C. The costs of their manufacture are as follows:

	A Rs.	B Rs.	C Rs.
Direct material pre Unit	3	4	5
Direct labour	2	3	4
Selling price	10	15	20
Output (Units)	1,000	1,000	1,000

The total overheads are Rs.12,000 out of which Rs.9,000 are fixed and rest are variable. It is decided to apportion these costs over different products in the ratio of output. You are required to prepare:

(a) **A statement showing cost of each product and profit according to absorption costing and**

(b) **A statement of cost and profit according to the Marginal costing technique.**

Solution: (A)

Statement Showing Cost and Profit
(According to Absorption Costing Technique)

Particulars	A = 1,000		B = 1,000		C = 1,000	
	Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Direct Material	3	3,000	4	4,000	5	5,000
Direct labour	2	2,000	3	3,000	4	4,000
Prime Cost	5	5,000	7	7,000	9	9,000
Add: Overheads:						
Fixed	3	3,000	3	3,000	3	3,000
Variable	1	1,000	1	1,000	1	1,000
Total Cost	9	9,000	11	11,000	13	13,000
Profit	1	1,000	4	4,000	7	7,000
Sales	10	10,000	15	15,000	20	20,000

Total Profit = Rs.1,000 + Rs.4,000 + Rs.7,000 = Rs.12,000

The system of absorption costing has a number of limitations. It assumes that prices are simply a function of costs. The demand side of the product is throughly discounted. Only past costs are considered which arriving at pricing decisions. Further, it does not offer information which helps decision making in a changing environment.

More importantly charging of fixed costs to different products on a suitable basis poses innumerable problems. These costs have to be incurred whether there is production or not. In other words, the cost of a product not only depends on expenses which have been incurred directly but also on the volume of output. For example, if the cost of direct material and direct labour for a product is Rs.2 and Rs.4 respectively and the volume of output is 500 units the total cost of production will be as under:

	Rs.
Costs of Direct material and labour	3,000
Fixed Overheads	1,000
Total Cost	4,000

The cost per unit comes to Rs.8. In case the output is only 400 units the cost of production (400 × 6 + 10,000) would be Rs.3,400 and cost per unit would increases not because prices of materials or labour have gone up, but because lower level of production. Obviously, the whole exercise seems to be illogical. The technique of marginal costing is employed to overcome this deficiency, by charging, fixed costs against the total fund arising out of excess of selling price over variable cost.

(b) Marginal Cost Statement

Particulars		A = 1,000		B = 1,000		C = 1,000	
		Per Unit	Total Rs.	Per Unit	Total Rs.	Per Unit	Total Rs.
Sales	(S)	10	10,000	15	15,000	20	20,000
Less: Marginal Cost:							
Direct Material		3	3,000	4	4,000	5	5,000
Direct Labour		2	2,000	3	3,000	4	4,000
Prime Cost		5	5,000	7	7,000	9	9,000
Variable Overheads		1	1,000	1	1,000	1	1,000
Total Marginal Cost	(V)	6	6,000	8	8,000	10	10,000
Contribution (S-V)	(C)	4	4,000	7	7,000	10	10,000
Selling Price		10	10,000	15	15,000	20	20,000

Thus, the total contribution from the three products, A, B and C is Rs.21,000. The profit will now be computed as follows:

	Rs.
Total Contribution	21,000
Fixed costs	9,000
Profit	12,000

13.3.3 Differences between Marginal Costing and Absorption Costing:

The difference between absorption costing and marginal costing, as the above illustrations show, is based on the recovery to fixed overheads. In absorption costing both fixed and variable overheads are charged to production. As a result, work in progress and finished goods are valued at 'works cost' and 'total cost of production' respectively, giving effect to fixed overheads. In marginal costing only variable overheads are charged to production, thereby leading to under-recovery of overheads. This obviously leads to undervaluation of closing stock. But this does not result in carrying over of fixed overheads of one period to another, as it happens in absorption costing. The main points of difference between absorption costing and marginal costing are given below:

Differences between Marginal and Absorption Costing

Basis of Difference	Absorption Costing	Marginal Costing
1. Fixed Costs	Fixed overheads are charged to the product to be subsequently released as a part of cost of goods sold i.e., it is included in cost per unit.	Fixed costs are not included while computing cost per unit.

Basis of Difference	Absorption Costing	Marginal Costing
2. Profit	Profit is the difference between sales and cost of goods sold.	Profit in marginal costing is ascertained by establishing the total contribution and then deducting therefrom the total fixed expenses. Contribution is the excess of sales over variable cost.
3. Classification of Costs	Costs are rarely classified into variable and fixed. Although such a classification is possible, it fails to establish a cost – volume profit relationship.	Cost – Volume – Profit relationship is an essential part of marginal costing. Costs have to be classified into fixed costs and variable costs.
4. Valuation of Inventories	If inventories increase during a period, this method will reveal more profit than marginal costing. When inventories decrease, less profits are reported because in this method closing stock is valued at higher figures.	If inventories increase during a period, this method generally reports less income than absorption costing, but when inventories decrease this method reports more net income.
5. Recovery of Overheads	Apportionment of fixed costs is arbitrary and this may result in under recovery of overheads.	There is no arbitrary apportionment of fixed overheads, as fixed costs are excluded.

13.3.4 Contribution:

Contribution represents the difference between sales and variable costs. It may be considered as some sort of fund from out of which all fixed costs are to be met. The difference between contribution and fixed costs represents either profit or loss, as the case may be. Contribution is also called 'Gross Margin'. Contribution can be expressed thus:

Contribution	=	Selling Price – Variable cost
		Or
		Fixed Cost + Profit or Loss
Profit/Los	=	Contribution – Fixed Cost

13.3.5 Marginal Cost Equation:

The algebraic expression of contribution is known as Marginal Cost Equation. It can be expressed as follows:

$$S - V = F + P$$

Where
      S = Selling Price
      V = Variable Cost
      F = Fixed Cost
      P = Profit

Illu.4: From the following information find out the amount of profit earned during the year using marginal cost technique.
      Fixed cost Rs.5,00,000
      Variable cost Rs.10 per unit
      Selling price Rs.15 per unit
      Output level 1,50,000 units.

Solution:
      Sales = 1,50,000 units $\times$ 15 = Rs.22, 50,000
      Variable cost = Rs.1,50,000 $\times$ 10 = Rs.15,00,000
      Fixed cost = Rs.5,00,000
      S − V = F + P
      Rs.22,50,000 − Rs.15,00,000 = 5,00,000 + P
      Rs.7,50,000 − 5,00,000 = P
      Rs.2, 50,000 = P
      P = Rs.2, 50,000

13.4 BENEFITS OF MARGINAL COSTING

The technique of marginal costing is of immense use to the management in taking various decisions. It helps the management in taking the following decisions:

1. **Helps in determining level of output:** Marginal costing helps in finding out the output which is most profitable for running a concern. This, in turn, helps in utilising plant capacity in full, and realise maximum profits. By determining the most profitable relationships between cost, price and volume, marginal costing helps a business to determine most competitive prices for its product.

2. **Help in selection of most suitable product mix:** By applying marginal costing techniques, the most suitable production line could be determined. The profitability

of various products can be compared and the most products which languish behind and which do not seem to be feasible (in view of their inability to recover marginal cost) may be eliminated from the production line by keeping the capacity and resources constrains in mind. It will also serve as a guide in arriving at the price for new products.

3. **Helps in determining Make or Buy decisions:** The marginal cost of producing an article inside the factory serves as a useful guide while arriving at make or buy decisions. The costs of manufacturing can be compared with the costs of buying outside and a suitable decision can be arrived at easily.

4. **Helps in the selection of method of production – Manual or Machine Based:** In case a particular product can be produced by two or more methods, ascertaining the marginal cost of producing the product by each method will help in deciding as to which method should be followed. The same is true in case of decisions to use machine power in place of manual labour.

5. **Helps in decision making during Recessionary period:** In periods of trade depression, marginal costing helps in deciding whether production in the plant should be suspended temporarily or continued in spite of low demand for the firm's product.

6. **Help in product planning:** Marginal costing helps in determining the no-profit no-loss point. The efficiency and economy of various products, plants, departments can also be determined. This helps in profit planning as well as cost control.

13.5   LIMITATIONS OF MARGINAL COSTING

Marginal costing has the following limitations:

1. **Difficulty in Classifications:** In marginal costing, costs are segregated into fixed and variable. In actual practice, this classification scheme proves to be superfluous in that certain costs may be partly fixed and partly variable and certain other costs may have no relation to volume of output or even with the time. In short, the categorization of costs into fixed and variable elements is a difficult and tedious job.

2. **Difficulty in Application:** The marginal costing technique cannot be applied in industries where large stocks in the form of work in progress (job and contracting firms)

3. **Defective Inventory Valuation:** Under marginal costing, fixed costs are not included in the value of stock of finished goods and work in progress. As fixed costs are also incurred, these should form part of the cost of the product. By eliminating fixed costs from

finished stock and work in progress, marginal cost is objectionable because of other reasons also:

      i. In case of loss by fire, full loss cannot be recovered from the insurance company.
     ii. Profits will be lower, than that shown under absorption costing and hence may be objected by taxation authorities.
    iii. Circulating assets will be estimated in the balance sheet.

4.   Objectionable basis of Pricing: In marginal costing, sale prices are arrived at on the basis of contribution alone. This is an objectionable practice. For example, in the long run, the selling price should not be fixed on the basis of contribution alone as it may result in losses or low profits. Other important factors such as fixed costs, capital employed should also be taken into account while fixing selling prices. Further, it is also not correct to lay more stress in selling function, as is done in marginal costing and relegate production function to the background.

5.   Limited scope: The utility of marginal costing is limited to short run profit planning and decision making. For decisions of far reaching importance, one is interested in special purpose cost rather than variable cost. Important decisions on several occasions, depend on non-cost considerations also, which are thoroughly discounted in marginal costing.

In view of these limitations marginal costing needs to be applied with necessary care and caution. Fruitful results will emerge only when management tries to apply the technique in combination with other useful techniques such as budgetary control and standard costing.

13.6 QUESTIONS

I. Short Questions:

1.   Defined the term 'marginal costing'.
2.   How can the cost be classified on the basis of variability?
3.   What is contribution?

II. Essay type questions:

1.   Explain the advantages and disadvantages of marginal costing.
2.   Discuss the applications of the marginal costing technique.
3.   Define Marginal Costing. Explain the advantages and limitations of Marginal Costing.
4.   Define Marginal Costing. Explain the differences between Marginal Costing and absorption costing.
5.   What is marginal costing? Explain the advantages and disadvantages of marginal costing.

13.7 EXERCISES

1. What is the amount of Fixed Costs when sales in Rs.2,40,000; Direct Material is Rs.80,000; Direct Labour is Rs.50,000, Variable overheads are Rs.20,000 and profit is Rs.50,000?

   [Ans.: Fixed Costs: Rs.40,000]

2. From the following information, calculate margin of safety.

	Rs.
Sales (4,000 units @ Rs.25 each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

   [Ans.: Margin of Safety Rs.40,000]

3. Given, fixed cost of Rs.5,00,000; variable cost as Rs.10 per unit; selling price of Rs.15 per unit and output as 1,50,000 units, find the profit earned.

   [Ans.: Profit Rs.2,50,000]

4. Using the information given below, prepare operating statements for the months of June and July, 2007 using.

   (i) Marginal costing technique and (ii) Absorption costing

	Per unit Rs.
Selling price	50
Direct material cost	18
Direct labour cost	4
Variable production overhead	3

   Monthly costs:

Fixed production overheads	99,000
Fixed selling expenses	15,000
Fixed administration expenses	25,000

Variable selling costs are 10% of sales revenue and normal production capacity is 11,000 units per month. The other details are:

	Sales (units)	Production (units)
June	10,000	12,000
July	12,000	10,000

[Ans.: Profits: (i) Rs.61,000; Rs.1,01,000; (ii) Rs.81,670; 80,330]

5. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

[Ans.: Units sold: (a) 14,000 units; Extra units to be sold: 14,000   4,000 = 10,000 units]

6. On the basis of the following data prepare a Marginal cost statement:

Variable Cost	Rs.	Rs.
Direct Material	4,500	
Direct Wages	2,500	
Factory overhead	1,050	
Administration, selling and distribution overhead	1,600	9,650
Fixed Cost		
Factory overhead	400	
Administration, selling and distribution overhead	670	1,070
Total Cost		10,720
Profit		4,280
Sales		15,000

[Ans.: Profit Rs.4,280]

7. Takur Ltd., produces 1 standard type of article. The results of last 4 months of 2007 are as follows.

	September	October	November	December
Output in Units	200	300	400	600

Prime Cost is Rs.10 per unit
Variable expenses are Rs.2 per unit
Fixed expenses are Rs.36,000 p.a.
Find out cost per unit of each month.
   [Ans.: Cost per unit: Oct. Rs.10; Nov. Rs.7.50; Dec. Rs.5]

8. Calculate the fixed cost from the following information:

	2006	2007
Sales (Rs.)	4,00,000	6,00,000
Profit (Rs.)	80,000	2,00,000

   [Ans.: Rs.1,60,000]

13.8 REFERENCE BOOKS

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Chapter – 14

MARGINAL COSTING – CVP ANALYSIS

Objectives :

After reading this lesson you should be able to :
- understand the break even analysis and profit/volume ratio
- know the meaning and importance of margin of safety
- prepare break even chart of an organization

Structure :

14.1 BREAK-EVEN ANALYSIS

Break even analysis is a specific method of presenting and studying the inter relationship between costs, volume and profits. (Hence, it also known as Cost – volume – Profit Analysis – C.V.P Analysis). It is an important tool of financial analysis whereby the impact on profit of the changes in volume, price, costs and mix can be found out with a certain amount of accuracy. A business is said to break even when its total sales are equal to its total costs. Break even point is a point of no profit or no loss. At this point contribution is just sufficient to recover the fixed costs. Break even point can be calculated in units or sales. It can be calculated with the help of any of the following formulae.

1.   B.E.P. (in Units) = $\dfrac{\text{Fixed cost}}{\text{Contribution per unit}}$

      = $\dfrac{\text{Fixed cost}}{\text{Selling price per unit - Variable cost per unit}}$

2.   B.E.P. (Sales) = $\dfrac{\text{Fixed cost}}{\text{Contribution per unit}} \times$ Selling price per unit

3. $\dfrac{\text{Fixed cost}}{\text{Total contribution}} \times$ Total sales (Or) $\dfrac{F \times S}{S\text{-}V}$

4. $$\frac{\text{Fixed cost}}{1 - \dfrac{\text{Variable Cost per unit}}{\text{Selling Price per unit}}} = \frac{\text{Fixed cost}}{\text{P/V Ratio}}$$

5. B.E.P. = $\dfrac{\text{Fixed cost}}{\text{Fixed costs} + \text{net profit}} \times$ Sales

At break-even point the desired profit will be zero. Where the volume of output sales is to be calculated so as to earn a desired amount of profit, the amount of desired profit has to be added to the fixed cost.

Units to earn a desired profit: = $\dfrac{\text{Fixed cost} + \text{Desired Profit}}{\text{Contribution Per Unit}}$

Sales to earn a desired profit: = $\dfrac{\text{Fixed cost} + \text{Desired Profit}}{\text{P/V Ratio}}$

Illu.1: From the following particulars calculate the Break-even point in terms of both quantity and value:

Production in units	**10,000**
Sales price	**Rs.5.00 per unit**
Variable costs	**Rs.20,000**
Fixed costs	**Rs.12,000**

Solution: Calculation of Break-even Point

Break-even Point (in terms of quantity):

$$= \frac{\text{Fixed Expenses}}{\text{Selling Price pr unit} - \text{Variable Cost Per Unit}} = \frac{Rs.12,000}{5.00 - 2.00} = 4,000 \text{ Units.}$$

Break-even Point in quantity = 4,000 Units

Break-even Point in Value = Break-even Point in Quantity × Selling price per unit

= 4,000 Units × Rs.5.00 = Rs.20,000.

Note: Variable Cost per unit = $\dfrac{Rs.20,000}{10,000 \text{ units}}$ = Rs.2.00

14.2 PROFIT/VOLUME RATIO

The profitability of business operations could be found out by calculating the profit – volume ratio (P/V Ratio). It is the ratio of contribution to sales. It is also known as **marginal – income ratio, contribution – Sales ratio or variable – profit ratio**. The ratio can be shown in the form of a percentage also.

$$P/V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \text{ or } \frac{\text{Sales - Variable Costs}}{\text{Sales}}$$

$$= \frac{C}{S} \text{ or } \frac{S-V}{S} \text{ or } \frac{F+P}{S}$$

$$= 1 - \frac{\text{Variable Costs}}{\text{Sales}}$$

The ratio can also be shown by comparing the change in contribution to change in sales, or change in profit to change in sales. Any increase in contribution, obviously, would mean increase in profit, as fixed expenses are assumed to be constant at all levels of production.

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

The importance of P/V Ratio lies in its use for evaluating the profitability of alternative products or proposals. A higher ratio shows grater profitability. Management should, thereforce, try to increase P/V Ratio by widening the gap between the selling price and the variable costs. This can be achieved by increasing sale price, reducing variable costs or switching over to more profitable products.

Illu.2: A Company producing a single article sells at Rs.20 each. The marginal costs of production is Rs.12 each and fixed cost is Rs.8,000 p.a. calculate I) the P/V ratio, ii) sales required to break – even.

Solution:

(i)   Calculation of P/V. Ratio:

	Rs.
Fixed Cost	8,000
Selling price per unit	20
Margin cost per unit	12

P/V. Ratio	=	$\frac{\text{Sales - Margin Cost}}{\text{Sales}} \times 100$
	=	$\frac{20-12}{20} \times 100 = 40\%$
P/V. Ratio	=	40%

(ii) Sales Required to Break-even: $\frac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \frac{8,000}{40\%} = 8,000 \times \frac{100}{40} = \text{Rs.20,000}$

Sales Required to Break-even = Rs.20,000.

Illu.3: Calculate margin of safety and the amount of actual sales from the following:

		Rs.
(i)	**Profit**	**10,000**
(ii)	**PV Ratio**	**50%**
(iii)	**BEP Sales**	**20,000**

Solution:

(i) Calculation of Margin of safety and the amount of actual Sales:

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{10{,}000}{50\%} = 10{,}000 \times \frac{100}{50} = \text{Rs.}20{,}000$$

Margin of Safety = Rs.20,000

(ii) The amount of actual sales:

Margin of Safety	=	Actual Sales – Break-even-Point sales
Rs.20,000	=	Actual Sales – Rs.20,000
Actual Sales	=	Rs.20,000 + 20,000
Actual Sales	=	Rs.40,000

Illu.4: The following figures relating to Sales and profits of a company are of two periods.

	Sales (Rs.)	Profit(Rs.)
Year ending 31-12-2001	**1,00,000**	**15,000**
Year ending 31-12-2002	**1,20,000**	**23,000**

Calculate (a) P.V. ratio (b) Fixed cost, (c) Break-even point.

Solution:

i.   P.V. Ratio $= \dfrac{\text{Change in profit}}{\text{Change in Sales}} \times 100$

      $= \dfrac{8{,}000}{20{,}000} \times 40\%$

ii.   S(P.V.Ratio) = F+P; $1{,}00{,}000\left(\dfrac{40}{100}\right)$ = F + 15,000;

      40,000 = F + 15,000; 40,000 – 15,000 = F; 25,000 = F, F = Rs.25,000

iii.   BEP Sales $= \dfrac{F}{P.V.Ratio} = \dfrac{25{,}000}{40\%} = \dfrac{25{,}000 \times 100}{40}$ = Rs.62,500

iv.   S (P.V. Ratio) = F + P; $1{,}25{,}000\left(\dfrac{40}{100}\right)$ = 25,000 + P;

50,000 = 25,000 + P = 50,000 – 25,000 = P; 25,000 = P

    P = Rs.25,000

S(P.V Ratio) = F + P, S ($\frac{40}{100}$) = 25,000 + 20,000

S ($\frac{40}{100}$)= 45,000; S = 45,000 × $\frac{100}{40}$ = Rs.1,12,500

14.3 MARGIN OF SAFETY

Total sales minus the sales at break even point is known as the margin of safety. Lower break – even point means a higher margin of safety. Margin of safety can also be expressed as a percentage of total sales. The formula is:

Margin of Safety = Total Sales – Sales at BEP

$$Or$$

$$\frac{Profit}{P/V\ ratio}$$

Margin of Safety (as a percentage) = $\frac{Margin\ of\ safety}{Total\ sales} \times 100$

Higher margin on safety shows that the business is sound. Even when sales substantially come down the business may earn profit. Lower margin of safety, means that when sales come down slightly profit position may affect adversely. Thus, margin of safety can be used to test the soundness of a business. In order to improve the margin of safety, a business can increase selling prices (without affecting demand, of course) reducing fixed or variable costs and replacing unprofitable products with profitable ones.

Illu.5: From the following information calculate:

(a) P/V Ratio.

(b) Break Even Point

(c) Margin of Safety.

	Rs.
Total Sales	**3,60,000**
Selling price per unit	**100**
Variable Cost per unit	**50**
Fixed Costs	**1,00,000**

(d) If selling prices is reduced to Rs.90, by how much is the margin of safety is reduced?

Solution:

(a)   Calculation of Break-even-point:

$$\text{Break-even point} = \frac{\text{Fixed Costs}}{\text{Selling price per unit - Variable cost per unit}}$$

Break-even-Point $= \dfrac{1,00,000}{100 - 50} = \dfrac{1,00,000}{50} = 2,000$ units

Break even Sales $=$ 2,000 units @ Rs.100 per unit

                            $=$ Rs.2,00,000

(b) P.V. Ratio $= \dfrac{S - V}{S} \times 100$

                            $= \dfrac{3,60,000 - (3,600 \times 50)}{3,60,000} \times 100$

                            $= \dfrac{1,80,000}{3,60,000} \times 100$

P.V. Ratio $=$ 50%

(c) Margin of Safety $=$ Actual Sales – Break even sales

                            $=$ Rs.3,60,000 – 2,00,000 = Rs.1,60,000

(d) If Selling price is reduced to Rs.90, the Margin of safety is reduced by:

Margin of Safety $=$ Actual Sales – Break even sales

                            $=$ Rs.3,60,000 – (2,500 Units × 90)

                            $=$ Rs.3,60,000 – 2,25,000 = Rs.1,35,000

Illu.6: A manufacture has supplied the following information relating to one of his product.

Total variable costs	**Rs.30,000**
Total sales	**Rs.60,000**
Units sold	**20,000**
Total Fixed Costs	**Rs.18,000**

Calculate:

    a.   **Contribution per unit**

    b.   **Break-even point**

    c.   **Margin of Safety**

    d.   **Profit**

    e.   **Volume of sales to earn a profit of Rs.24,000**

Solution:

a.   **Contribution = S-V; C = 60,000 – 30,000 = Rs.30,000**

Contribution per unit = $\dfrac{30,000}{20,000 \text{ units}}$ = 1.50 p.

b.   **BEP Sales =** $\dfrac{F \times S}{S - V}$; $\dfrac{18,000 \times 60,000}{60,000 - 30,000}$ = **Rs.36,000**

c.   **Margin of Safety =** Actual Sales – BEP Sales.

= 60,000 – 36,000 = Rs.24,000

d.   **Profit = S-V = F+P; 60,000 – 30,000 = 18,000+P;**

= 30,000 = 18,000 + P; 30,000 – 18,000 =P.

= 12,000 = P; P = Rs.12,000

e.   **Volume of Sales to earn a profit of Rs.24,000**

P.V. Ratio = $\dfrac{C}{S} \times 100$; $\dfrac{30,000}{60,000} \times 100 = 50\%$.

S $\left(\dfrac{50}{100}\right)$ = 18,000 + 24,000

S $\left(\dfrac{50}{100}\right)$ = 42,000; S = 42,000 $\times \dfrac{100}{50}$ = Rs.84,000

Units = $\dfrac{\text{Sales Amount}}{\text{Selling Price}} = \dfrac{84,000}{\text{Rs.3}}$ = 28,000 units.

Illu.7: In 2006, Srikanth Ltd., sold its products worth Rs.40 lakhs and made a profit of Rs.4 lakhs. But in 2002, the sales dipped to Rs.30 lakhs due to competition in the market and the profit is reduced to 3 lakhs. Calculate Break – even points and profit volume rations in 2006 and 2007.

Solution:

Profit/Volume Ratio = $\dfrac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

Change in Profit = Rs.1,00,000

Change in Sales = Rs.10,00,000

P.V. Ratio = $\dfrac{1,00,000}{10,00,000} \times 100$ = 10%

Fixed Expenses: Sales (P/V ratio) = F + P

2001: When profit and sales of 2001 are taken:

40,00,000 $\times \dfrac{10}{100}$ = F + 4,00,000

4,00,000 = F + 4,00,000

4,00,000 – 4,00,000 = F

F = 0

$$\text{Break-even Point} = \frac{F}{\text{P.V. Ratio}} = \frac{0}{\frac{10}{100}} = \frac{0}{10} = 0$$

2002: When Profit and sale of 2002 are taken.

S(P/V Ratio) = F + P

$$30,00,000 \times \frac{10}{100} = F + 3,00,000$$

3,00,000 = F + 3,00,000

3,00,000 − 3,00,000 = F

F = 0

$$\text{B.E. Point} = \frac{F}{\text{P.V. Ratio}} = \frac{0}{10\%} = 0 \times \frac{100}{10} = 0$$

Illu.8: The sales and profits during two periods are as under:

Period I : Sales Rs.20 lakhs; profit Rs.2 lakhs
Period II: Sales Rs.30 lakhs; Profit Rs.4 lakhs.

Calculate: (a) P/V Ratio (b) Break even point (c) Sales required to earn a profit of Rs.5 lakhs (d) Profit when sales are Rs.50 lakhs, and (e) Margin of safety at a profit of Rs.2.5 lakhs.

Solution:

a.   P/V Ratio $= \dfrac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$

$$= \frac{2,00,000}{10,00,000} \times 100 = 20\%$$

Fixed Expenses = S × P.V. Ratio = F + P

Rs.20,00,000 × 20% = F + Rs.2,00,000

Rs.4,00,000 = F + Rs.2,00,000

Rs.4,00,000 − Rs.2,00,000 = F

F = Rs.2,00,000

b.   Break-even Point $= \dfrac{F}{\text{P.V. Ratio}}$

$$= \frac{2,00,000}{20\%} = \text{Rs.10,00,000}$$

c.   Sales (P/V Ratio) = F + P

$$S \times \frac{20}{100} = \text{Rs.2,00,000} + \text{Rs.5,00,000}$$

$$S \times \frac{20}{100} = \text{Rs.7,00,000}$$

$$S = \text{Rs.7,00,000} \times \frac{100}{20} = \text{Rs.35,00,000}$$

d.   Sales $\times$ P.V. Ratio = F + P

$$S \times \frac{20}{100} = Rs.2,00,000 + P$$

$$Rs.50,00,000 \times \frac{20}{100} = Rs.2,00,000 + P$$

Rs.10,00,000 = Rs.2,00,000 + P

Rs.10,00,000 – Rs.2,00,000 = P

P = Rs.8,00,000

e.   Margin of Safety = $\dfrac{Profit}{P.V.\,Ratio}$

$$= \frac{2,50,000}{20\%} = Rs.2,50,000 \times \frac{100}{20} = Rs.12,50,000$$

Illu.9: The following information was extracted from the books of Giridhar Mft. Co. Ltd.

	Rs.
Sales	**1,80,000**
Less: Variable Costs	**1,44,000**
Contribution	**36,000**
Less: Fixed costs	**24,000**
Net Profit	**12,000**

Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

Solution:

(a)   **P.V. Ratio =** $\dfrac{C}{S} \times 100 = \dfrac{36,000}{1,80,000} \times 100 =$ **20%**

(b)   **B.E.P =** $\dfrac{F}{P.V.\,Ratio} = \dfrac{24,000}{20\%} = \dfrac{24,000}{20} \times 100 =$ **1,20,000**

(c)   **S $\times$ P/V Ratio = F + P**

$$Rs.2,70,000 \times \frac{20}{100} = Rs.24,000 + P$$

Rs.54,000 = Rs.24,000 + P

Rs.54,000 = Rs.24,000 + P

P = Rs.30,000

(d)   **S $\times$ P/V. Ratio = F + P**

$$S \times \frac{20}{100} = Rs.24,000 + Rs.24,000$$

$$S \times \frac{20}{100} = Rs.48,000$$

$$S = Rs.48,000 \times \frac{100}{20} = Rs.2,40,000$$

Illu.10: The price structure of a cycle made by the Cycle Company Ltd., is as follows.

	Per Cycle Rs.
Materials	60
Labour	20
Variable Overhead	20
	100
Fixed Overheads	50
Profit	50
Selling Price	200

This is based on the manufacture of one lakh cycles per annum.

The company excepts that due to competition they will have to reduce selling prices, but they want to keep the total profits intact. What level of production will have to be reduced i.e., how many cycles will have to be made to get the same amount of profit if:

a. **The Selling price is reduced by 10%**
b. **The selling price is reduced by 20%**

Solution:

(a)	**If Selling price is reduced by 10%**	**Rs.**
	Selling Price	200
	Less: Price	20
	Present Selling Price	180

V = 100 (60+20+20); P = 50;

P.V. Ratio = $\frac{C}{S} \times 100 = \frac{80}{180} \times 100 = 44.44\%$

Sales to get the same level of profit Rs.50,00,000.

S (P.V. Ratio) = E + P

$$S(\frac{44.44}{100}) = 50,00,000 + 50,00,000$$

$$S(\frac{44.44}{100}) = 1,00,00,000$$

$$S = 1,00,00,000 \times \frac{100}{44.44} = 22502250$$

Selling Units = $\dfrac{\text{Sales Amount}}{\text{Selling Price Per unit}}$ = $\dfrac{22502250}{180}$ = 1,25,013 units

If Selling Price is reduced by 20%	Rs.
Selling Price	200
Less: 20% reduction	40
Present Selling Price	160

V = Rs.100; P = Rs.50;

P.V. Ratio = $\dfrac{C}{S} \times 100 = \dfrac{60}{160} \times 100 =$ 37.5%

Sales to get the same level of profit Rs.50,00,000.

S(P.V.Ratio) = E + P

$S(\dfrac{37.5}{100})$ = Rs.50,00,000 + 50,00,000

$S(\dfrac{37.5}{100})$ = Rs.1,00,00,000

$S = 1,00,00,000 \times \dfrac{100}{37.5}$ = 26666666

Selling Units = $\dfrac{\text{Sales Amount}}{\text{Selling Price Per unit}}$ = $\dfrac{26666666}{160}$ = 1,66,667 units.

Ilu.11: Find P/V Ratio and Margin of Safety – when sales, variable cost, fixed costs are Rs.Ten lakhs, Four lakhs, Four lakhs respectively.

Solution:

(i)	P.V. Ratio	=	$\dfrac{S - V}{S} \times 100$
		=	$\dfrac{10\,\text{lakhs - 4 lakhs}}{10\,\text{lakhs}} \times 100$
		=	$\dfrac{10 - 4}{10} \times 100 = \dfrac{6}{10} \times 100 = 60\%$
	P.V. Ratio	=	60%
(ii)	Margin of Safety	=	$\dfrac{\text{Profit}}{\text{P.V. Ration}} = \dfrac{?}{60\%}$
	Profit	=	Contribution – Fixed cost
	Profit	=	(Sales – Variable Cost) – Fixed Cost
		=	(Rs.10 lakhs – Rs.4. lakhs) – Rs.4 lakhs
		=	Rs.2 lakhs
	Margin of Safety	=	$\dfrac{2\,\text{Lakhs}}{60\%}$ = **Rs.3,33,333.33**

Illu.12: Fixed expenses Rs.1,50,000 percentage of variable expenses on sales is 66 $\frac{2}{3}$ %. Normal sales at 100% capacity is Rs.9,00,000.

Calculate,
     a.   **P/V Ratio**
     b.   **Break even point at what percentage of sales**
     c.   **Profit at 80% of sales capacity.**

Solution:

     a.   P/V Ratio $= \dfrac{S - V}{S} \times 100 = \dfrac{Rs.9,00,000 - Rs.6,00,000}{Rs.9,00,000} \times 100 = 33\frac{1}{3}$ or $\frac{1}{3}$

     b.   B.E. Point $= \dfrac{\text{Fixed Expenses}}{\text{Sales - Variable Costs}} = \dfrac{1,50,000}{9,00,000 - 6,00,000} = 50\%$

     c.   Profit at 80% sales capacity:

             Profit   =   Contribution – Fixed Expenses
                               =   (Sales – Variable cost) – Fixed Expenses
                               =   (Rs.7,20,000 – Rs.4,80,000) – Rs.1,50,000 = Rs.90,000

Note: Sales $= 9,00,000 \times \dfrac{80}{100} = $ Rs.7,20,000; Variable Costs $= 7,20,000 \times \dfrac{2}{3} = $ Rs.4,80,000

Illu.13: Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30th June 1996:

	Rs.
Fixed expenses	45,000
Sales value	1,50,000
Profit	30,000

During the second half of the year, the company has projected a loss of Rs.10,000.

Calculate:
     (a)   **The Break-even point and Margin of safety for six months ending 30th June 1996.**
     (b)   **Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.**
     (c)   **The Break-even point and Margin of safety for the whole year 1996.**

Solution:

(a)   P.V. Ratio $= \dfrac{\text{Fixed Expenses + Profit}}{\text{Sales}} \times 100$

$= \dfrac{Rs.45,000 + Rs.30,000}{1,50,000} \times 100 = 50\%$

Break-Even Point $= \dfrac{\text{Fixed Cost}}{\text{P.V. Ratio}} = \dfrac{Rs.45,000}{50\%} = Rs.90,000$

Margin of Safety   =   Actual Sales – Break-Even sales

Rs.1,50,000 – Rs.90,000 =

Rs.60,000

Alternatively

Margin of Safety $= \dfrac{\text{Profit}}{\text{P.V. Ratio}}$

$= \dfrac{Rs.30,000}{50\%} = Rs.60,000$

(b) Expected Sales volume for second half year:

Expected Sales Volume $= \dfrac{\text{Contribution}}{\text{P.V. Ratio}} = \dfrac{\text{Fixed Cost + Profit}}{\text{P.V. Ratio}}$ or

$= \dfrac{\text{Fixed Cost - Loss}}{\text{P.V. Ratio}} = \dfrac{Rs.45,000 - 10,000}{50\%}$

=   Rs.70,000

(c) Break-even Point and Margin of Safety for the whole year 1996:

Break-even Point $= \dfrac{\text{Fixed Expenses}}{\text{P.V. Ratio}} = \dfrac{Rs.45,000 + Rs.45,000}{50\%} = Rs.1,80,000$

Margin of Safety $= \dfrac{\text{Profit}}{\text{P.V. Ratio}} = \dfrac{Rs.30,000 - 10,000}{50\%} = Rs.40,000$

Alternatively:

Margin of Safety   =   Actual Sales – Break Even Sales

=   (Rs.1,50,000 + 70,000) Rs.1,80,000 = Rs.40,000

Illu.14: The following figures relate to a company manufacturing a varied range of products.

	Total Sales Rs.	Total Cost Rs.
Year ended 31ˢᵗ March, 2001	22,23,000	19,83,600
Year ended 31ˢᵗ March, 2002	24,51,000	21,43,200

Assuming stability in prices, with variable costs carefully controlled to reflect predetermined relationships, and an unvarying figure for fixed costs, calculate:

    a.   **the profit/volume ratio, to reflect the rates of growth for profit and sales; and**
    b.   **any other cost figures to be deduced from the data.**

Solution:

	Sales Rs.	Cost Rs.
2001	22,23,000	19,83,600
2002	24,51,000	21,43,200
Difference	2,28,000	1,59,600

Variable cost (% of sales) = $\frac{1,59,600}{2,28,000} \times 100$ = 70%

(or in other words, variable cost is 70 paise per Re.1.00 of sales

Variable cost for the year 2001 = $22,23,000 \times \frac{70}{100}$ = Rs.15,56,100

Variable cost for the year 2002 = $24,51,000 \times \frac{70}{100}$ = Rs.17,15,700

a.   **P/V ratio =** $\left(\frac{S-V}{S}\right) \times$ **100**

        2001 = $\frac{6,66,900}{22,23,000} \times 100$ = 30%

        2002 = $\frac{7,35,300}{24,51,000} \times 100$ = 30%

b.   **Other cost figures:**
       i)   Fixed Cost (Total Cost – Variable cost):
            2001 = Rs.19,83,600 – 15,56,100 = Rs.4,27,500
            2002 = Rs.21,43,200 – 17,15,700 = Rs.4,27,500
       ii)   Fixed cost % of sales:
            2001 = $\frac{4,27,500}{22,23,000} \times 100$ = 19% (approx.)

            2002 = $\frac{4,27,500}{24,51,000} \times 100$ = 17% (approx.)

       iii)   Break-even point = $\frac{F}{P.V.\,Ratio}$ = Rs. $\frac{4,27,500}{30\%}$ = Rs.14,25,000

       iv)   Margin of safety:
            2001 = 22,23,000 – 14,25,000 = Rs.7,98,000
            2002 = 24,51,000 – 14,25,000 = Rs.10,26,000

Illu.15: From the following data calcualte:

i)   **P/V ratio**
ii)   **Profit when sale are Rs.20,000**
iii) **New Break-even point if selling price is reduced by 20%.**
      Fixed expenses   Rs.4,000
      Break-even point   Rs.10,000

Solution:

i.   Break-even sales = $\dfrac{\text{Fixed expenses}}{\text{P/V Ratio}}$

      P/V Ratio = $\dfrac{\text{Fixed expenses}}{\text{Break - even sales}} = \dfrac{4,000}{10,000}$ = 40%

ii.   Profit when sales are Rs.20,000
      Profit = Sales × P/V ratio – Fixed expenses
              = Rs.20,000 × 40% - Rs.4,000
              = Rs.8,000 – Rs.4,000 = Rs.4,000

iii. New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e., 100 – 40% old P/V ratio)

      New P/V Ratio = $\dfrac{80\text{-}60}{80}$ = 25%

      Break-even point will be = $\dfrac{4,000}{25\%}$ = Rs.16,000

14.4 BREAK-EVEN CHART

The break even point can also be shown graphically through the break even chart. The break even chart shows the profitability or otherwise of an undertaking at various levels of activity and as a result indicate the point at which neither profit nor loss is made. It shows the relation ship, through a graph between cost, volume and profit. The break even point lies at the point of intersection between the total cost line and the total sales line in the chart.

In a nut shell break – even charts are often used to depict the following.

1.   Cost volume profit relationships and break-even point.
2.   Profit volume ratio and margin of safety
3.   The impact of change in the level of sales on likely costs and profit.
4.   Profit appropriations and expense analysis.
5.   For controlling profits and level of activity by comparing the budgeted with actual sales and profit.
6.   For deriving the figures of optimum output.

14.4.1 Preparation of break – even Charts:

These charts are shown on the graph paper by drawing lines at the point which are to be plotted. The sales in units are depicted on the horizontal line i.e., X-X' and costs and revenue on the vertical line i.e., Y-Y'. Both are expressed in monetary values.

First of all a line is drawn parallel to X-axis showing the fixed costs. Then the total cost line is drawn and inserted upon the fixe cost line. Thereafter the sales line is drawn diagonally touching the zero at the orgin point and the highest point on the vertical scale. The point at which this sales line interests the total cost line, is the break even point. The right sector of this point shows the profits and the left sector shows the loss. This is a simple break even chart. Suitable description regarding variable costs, fixed costs, profit or loss and break-even point are usually written on this chart.

14.4.2 Angle of Incidence:

It is an angle at which sales line cuts the total costs line. A high angle denotes high rate of profit while a low angle reflects poor rate of return. Obviously management must plan for high angle of incidence which can only be when variable costs bear a low proportion of cost of sales.

Break Even chart
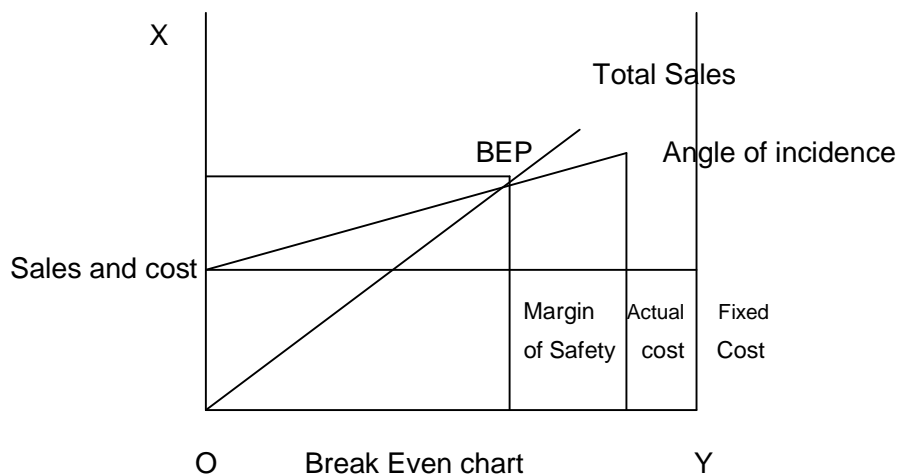
If the angle is large, the firm is said to be making profits at a high rate or vice versa. A large angle of incidence together with a high margin of safety indicate sound business conditions. Therefore, the management's aim will be to have as large an angle as possible; because this shows a high rate of profit once the fixed costs are met. A narrow angle, on the other hand would show that even after absorbing the fixed costs the rate of profit is comparatively low. In other words, it indicates that the variable costs form a large part of the total costs.

Illu.16 : From the following information draw up a chart to show break-even points.

	Rs.
Fixed costs (Total)	**40,000**
Variable costs (per unit)	**2**
Selling price (per unit)	**3**

Solution:

Contribution = Selling price – Variable cost per unit

Rs.3 – 2 = Rs.1

$$BEP = \frac{Fixed\ costs}{Contribution} = \frac{40,000}{1} = 40,000 \text{ units.}$$

40,000 units × selling price per unit i.e., Rs.3 = Rs.1,20,000 when output is 40,000 units. Total cost and Total sales will be Rs.1,20,000.

In the graph given below the horizontal scale OX shows volume of production expressed in units. The vertical scale OY shows sales and cost in Rs.10,000. In the chart three lines are drawn. The first line shows fixed cost which is parallel to the base scale and has not relation with the output.

Output in Units
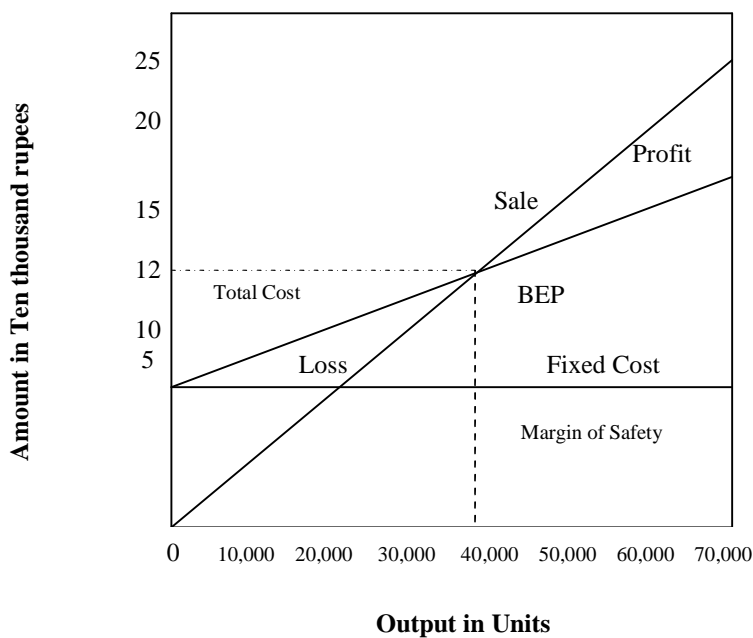
The sales line (total sales) is drawn from the point where there are no sales (zero intersection of horizontal and vertical scales).

The total cost line (variable costs + fixed costs) is drawn from the point of fixed costs. The total costs and total sales lines intersect each other at point "P" which is a B.E.P. from this point perpendicular is drawn which touches out put at R (40,000 units) and Revenue at Q (Rs.1,20,000). If the output is below 40,000 units there will be a loss. If output exceeds 40,000 units there will be a profit. Output in excess of 40,000 units i.e., RX shows margin of safety.

Illu.17: The following figures relate to one year's working at 100% capacity level in a manufacturing business.

	Rs.
Fixed Overheads	**30,000**
Variable Overheads	**50,000**
Direct Wages	**40,000**
Direct Materials	**1,00,000**
Sales	**2,50,000**

Represent that above figures on a break-even chart and determine from the chart the break-even point. Verify your result by calculations.

Solution:
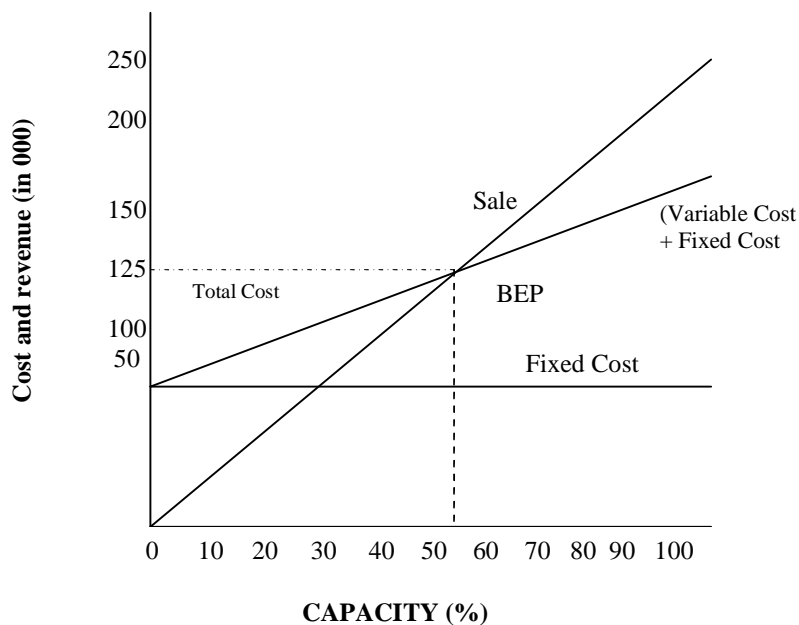
Verification:

$$BEP = \frac{F}{P/V \text{ Ratio}}$$

F = Rs.30,000

$$P/V \text{ Ratio} = \frac{C}{S} = \frac{S-V}{S} = \frac{2,50,000 - 1,90,000}{2,50,000}$$

$$= \frac{60,000}{2,50,000} = \frac{6}{25}$$

$$BEP\ Sales = \frac{30,000}{6} \times 25 = Rs.1,25,000$$

Cash Break-Even Chart:

This chart is prepared to show the cash needs of a concern. Fixed expenses are to be classified as those involving cash payments and those not involving cash payments like depreciation. As the cash break even chart is designed to include only actual payments and not expenses incurred, any time lag in the payment of items included under variable cost must be taken into account. Equal care must be shown on the period of credit allowed to the debtor for the purpose of calculating the amount of cash to be received from them, during a particular period. Cash break-even point is used to assess the liquidity position of the firm. It can be calculated as under:

$$\textbf{Cash Break-even Point =} \frac{\text{Cash Fixed Costs}}{\text{Cash contribution per unit}}$$

14.4.3 Assumptions of Break even Analysis:

Break even analysis is based on the following assumptions.

i   Fixed cost remains constant at all levels of output.
ii   Variable costs fluctuate in direct proportion to volume of output.
iii   Selling prices do not change as volume changes.
iv   There is only one product and in the case of multiple products, the sales mix remains constant.
v   There will be no change in general price level.
vi   Productivity per worker will remain unchanged.
vii   There is synchronization between productions and sales, i.e.,   whatever is produced is sold out.

14.5 ADVANTAGES OF BREAK EVEN ANALYSIS

The break even analysis is a simple tool employed to graphically represent accounting data. The data revealed by financial statements and reports are difficult to understand and intepret. But when the same are presented through break even charts, it becomes easy to understand them. Break even charts help in:

1.   Determining total cost, variable cost and fixed cost at a given level of activity;
2.   Finding out break even output or sales;

3.   Understanding the cost, volume, profit relationship;

4.   Making inter-firm comparisons;

5.   Forecasting profits;

6.   Selecting the best product mix; and

7.   Enforcing cost control.

Thus, the break even analysis can be used to find out the effect of all these changes which influence total revenue and total cost and thereby the profitability of a business. The marginal cost approach, which is better termed as relevant cost approach, is vital for making a choice out of various alternatives. But to make all decision on the basis of marginal cost would be wrong. Normal prices for example are based on full costs and not marginal cost.

14.6 LIMITATIONS OF BREAK EVEN ANALYSIS

On the negative side, break even analysis suffers from the following limitations.

1.   **Difficulty in segregation of Costs:** It is very difficult, if not impossible, to segregate costs into fixed and variable components. Further, fixed costs to not always remain constant. They have a tendency to rise to some extent after production reaches certain level. Like wise, variable costs do not always vary proportionately.

2.   **Complicated Calculations:** The application of break even analysis to a multi-product firm is very difficult. A lot of complications are involved.

3.   **Limited Importance:** The break even point has limited importance. At best it would help management to indulge in cost reduction in times of dull business. Normally, it is not the objective of business to break even, because no business is carried on in order to break even. Thus, the BEP 'Provides neither a standard of performance nor a guide for executive decisions.

4.   **Limitations application in long-range planning:** Break even analysis is a short run concept, and it has a limited application in the long range planning.

Despite these limitations, break even analysis has some practical utility in that it helps management in profit planning. According to Wheldon, "if the limitations are accepted, and the chart is considered as being an instantaneous photograph of the present position and possible trends, there are some very importance conclusions to be drawn from such a chart".

Illu.18: A factory engaged in manufacturing plastic buckets is working at 40% capacity and produces 10,000 buckets for annum.

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

	Rs.
Material	**10**
Labour Cost	**3**
Overheads	**5(60% fixed)**
The selling price is Rs.20 per bucket.	

If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by a similar fall in the prices of material.

You are required to calculate the profit at 50% and 90% capacities and also the break-even points for the same capacity productions.

Solution:

Statement showing profit and break-even point at different capacity levels

		50%		90%	
	Capacity level Production (Units)	12,500		22,500	
		Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.
a)	Sales	19.40	2,42,500	19.00	4,27,500
	Variable cost material	10.00	1,25,000	9.50	2,13,750
	Wages	3.00	37,500	3.00	67,500
	Variable overhead	2.00	25,000	2.00	45,000
b)	Total varibale cost	15.00	1,87,500	14.50	3,26,250
c)	Contribution (S-V)				
	Or (a-b)	4.40	55,000	4.50	1,01,250
	Less: Fixed cost		30,000		30,000
	Net profit		25,000		71,250
	Break-even point at		50%		90%

$$\text{Units} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} \quad \frac{30,000}{4.40} = 6,818 \text{ units} \quad \frac{30,000}{4.50} = 6,667 \text{ units}$$

Sales value   Rs.1,32,269   Rs.1,26,673

Illu.19 : From the following data calculate:
i)   P/V ratio
ii) Profit when sales are Rs.20,000
iii) New Break-even point if selling price is reduced by 20%.

Fixed expenses   **Rs.4,000**
Break-even point   **Rs.10,000**

Solution:

i. **Break-even sales =** $\dfrac{\text{Fixed expenses}}{\text{P/V Ratio}}$

    P/V Ratio = $\dfrac{\text{Fixed expenses}}{\text{Break - even sales}} = \dfrac{4{,}000}{10{,}000} \times 100 = 40\%$

ii. Profit when sales are Rs.20,000
    Profit = Sales × P/V ratio – Fixed expenses.
         = Rs.20,000 × 40% - Rs.4,000
         = Rs.8,000 – Rs.4,000 = Rs.4,000

iii. New break-even point if selling price is reduced by 20%. If the selling price Rs.100, now it will be Rs.80. Variable cost per unit Rs.60 (i.e. 100-40% old P/V ratio)

    New P/V Ratio = $\dfrac{80 - 60}{80} = 25\%$

    Break-even point will be = $\dfrac{4{,}000}{25\%} = $ Rs.16,000

Illu.20: The sales and profit during the years were as follows.

	Sales Rs.	Profit Rs.
2001	1,50,000	20,000
2002	1,70,000	25,000

You are required to calculate
a. **P/V Ratio**
b. **Break even level**
c. **Sales required to earn a profit of Rs.40,000**
d. **Margin of Safety at a profit of Rs.2,50,000**
e. **Profit made when sales are Rs.50,000**
f. **Variable Cost in the two periods.**

Solution:

a)   P.V. Ratio = $\dfrac{\text{Change in Profit in 2 periods}}{\text{Change in Sales in 2 periods}} \times 100$

        = $\dfrac{\text{Rs.25,000 - 20,000}}{\text{Rs.1,70,000 -1,50,000}} \times 100 = \dfrac{5{,}000}{20{,}000} \times 100 = 25\%$

b)   **Break Even Level**   = $\dfrac{\text{Fixed Cost}}{\text{P.V. Ratio}}$

Fixed Cost	=	Contribution – Profit
Fixed Cost	=	(Sales × P.V. Ratio) – Profit
	=	$(1,50,000 \times \frac{25}{100})$-20,000 = Rs.17,500
Break Even Level	=	$\frac{Rs.17,500}{25\%}$ = Rs.70,000

c) **Sales required to earn a profit of Rs.40,000**

$$= \frac{\text{Fixed expenses + Required Profit}}{\text{P.V. Ratio}} = \frac{Rs.17,500 + 40,000}{25\%}$$

$$= Rs.57,500 \times \frac{100}{25} = Rs.2,30,000$$

d) **Margin of Safety at a profit of Rs.2,50,000**

Margin of Safety = $\frac{\text{Profit}}{\text{P.V. Ratio}} = \frac{2,50,000}{25\%}$ = Rs.10,00,000

e) **Profit when sales are Rs.2,50,000**

Profit	=	Contribution – Fixed Cost
	=	(Sales × P.V. Ratio) – Fixed Cost
	=	$(Rs.2,50,000 \times \frac{25}{100})$ – Rs.17,500 = Rs.45,000

f) **Variable Cost in the two periods:**

Variable Cost = Sales – Profit – Fixed Cost

2001 = Rs.1,50,000 – 20,000 – 17,500 = Rs.1,12,500

2002 = Rs.1,70,000 – 25,000 – 17,500 = Rs.1,27,500

Illu.21: Assuming that the cost structure and selling prices remain the same in periods I and II find out:

(a) Profit volume ratio, (b) Profit when sales are Rs.1,00,000.

Periods	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

Solution:

a. P/V Ratio = $\dfrac{\text{Change in Profit}}{\text{Change in sales}} \times 100$; $\dfrac{4,000}{20,000} \times 100 = 20\%$

Calculation of Fixed Expenses:

S (P/V Ratio) = F + P; 1,20,000 $\left(\dfrac{20}{100}\right)$ = F + 9,000; 24,000 = F + 9,000; 24,000 − 9,000 = F; 15,000 = F; F = Rs.15,000

b. S (P/V Ratio) = F + P; 1,00,000 $\left(\dfrac{20}{100}\right)$ = 15,000 + P; 20,000 = 15,000 + P; 20,000 − 15,000 = P; 5,000 = P; P = Rs.5,000

14.7 SELF ASSESSMENT QUESTIONS

I. Short Questions:

1. What is break-even point?
2. What is margin of safety?
3. What is profit-volume ratio?
4. What is contribution?
5. What is angle of incidence?
6. What is Cash break-even point?

II. Essay type questions:

1. Explain cost-volume profit analysis.
2. Explain the ways by which profit-volume ratio can be improved.
3. Explain the uses of break-even analysis in profit planning.
4. What assumption are made to construct a simple Break-even Chart?
5. Explain the utility of Break-even Analysis in Managerial Decisions
6. What do you meant by Break-even level of output?
7. What are the limitations of the break-even charts?
8. What are the managerial uses of break-even analysis?
9. What is Profit volume ratio and Profit Volume graph? How is Profit-volume graph technique helpful to management.
10. What is C.V.P.? Analyse and state its uses and applications.
11. Explain 'Break-Even Analysis'. Discuss the assumptions that underline the technique and the practical usefulness of Break-even analysis.
12. Define Break-even-Point and explain its advantage and limitations.
13. What do you mean by P/V Ratio? What are its uses?
14. What are the assumptions of Break-even-Analysis?
15. *Explain the concepts of marginal costing and Break-even analysis.*
16. *Explain about Break-even Analysis. What are its applications?*

14.8 EXERCISES

1. From the following particulars calculate the Break-even point interms of both quantity and value:

Production in units	10,000
Sales price	Rs.5,00 per unit
Variable costs	Rs.20,000
Fixed costs	Rs.12,000

[Ans.: (a) 4,000 units; (b) Rs.20,000]

3. What is the break-even-point when sales is Rs.6.0 lakhs; Fixed expenses are Rs.1.5 lakhs and Variable costs are Rs.4.0 lakhs?

[Ans.: Rs.4.5 lakhs]

4. Find P/V Ratio and Margin of Safety – when sales, variable cost, fixed costs are Rs. Ten lakhs, Four lakhs, Four lakhs respectively.

[Ans.: P.V. Ratio = 60%; MOS = Rs.3,33,333]

5. The following information is extracted from the books of Harish Ltd.

Year	Sales Rs.	Cost Rs.
2006	2,00,000	1,40,000
2007	2,40,000	1,60,000
Calculate B.E.P.		

[Ans.: BEP Rs.80,000; P.V. Ratio = 50%; Fixed Cost Rs.40,000]

6. A company estimates that next year it will earn a profit of Rs.50,000. The budgeted fixed costs and sales are Rs.2,50,000 and Rs.9,93,000 respectively. Find out Break-Even point.

[Ans.: Rs.8,27,500]

7. From the following information, calculate margin of safety.

	Rs.
Sales (4,000 units @ Rs.25 each)	1,00,000
Variable cost	72,000
Fixed expenses	16,800

    [Ans.: Margin of Safety Rs.40,000]

8. From the following details calculate BEP, Margin of safety:

	Rs.
Sales	4,20,000
Fixed cost	90,000
Variable cost ratio	55% of sales

    [Ans.: BEP Rs.2,00,000; Margin of Safety Rs.2,20,000]

9. From the following particulars calculate the margin of safety Sales units: 15,000; Fixed costs Rs.34,000; Selling price per unit Rs.10; Variable cost per unit Rs.6.

    [Ans.: Margin of Safety Rs.65,000]

10. From the following information calculate:
    (a) Break-even point
    (b) Turnover required to earn a profit of Rs.36,000.
    (c) Margin of safety for Rs.36,000 profit. Fixed overhead Rs.1,80,000 Variable cost per unit Rs.2 Selling price per unit Rs.20.

    [Ans.: (a) Rs.10,000 units; Value Rs.2,00,000; (b) 12,000 units; Value Rs.2,40,000; (c) Rs.40,000]

11. Sri Sai Ram Limited furnishes you the following information relating to the half year ended 30th June 2007:

	Rs.
Fixed expenses	45,000
Sales value	1,50,000
Profit	30,000

    During the second half of the year, the company has projected a loss of Rs.10,000.
    Calculate:

(a)   The Break-even point and Margin of safety for six months ending 30th June 2007.
(b)   Expected sales volume for second half of the year assuming that P/V ratio and fixed expenses remain constant in the second half year also.
(c)   The Break-even point and Margin of safety for the whole year 2007.

[Ans.: (a) BEP Rs.90,000; MOS Rs.60,000; (c) BEP Rs.1,80,000; MOS Rs.40,000]

12.   You are given the following data for the year of a company.

	Rs.	%
Variable costs	6,00,000	60
Fixed costs	3,00,000	30
Net profit	1,00,000	10
	10,00,000	100

Find out
(a)   Break even point
(b)   P/V Ratio.
(c)   Margin of safety.

[Ans.: (a) Rs.7,50,000; (b) 40%; (c) Rs.2,50,000]

13.   The following information relates to an article produced by EM EM Ltd:

	Rs.
Total fixed costs	18,000
Total variable costs	30,000
Total sales	60,000
Units sold	20,000

From the above information find out (a) Per unit contribution (b) Break-even-point (c) Safety margin and (d) Sales required to earn a profit of Rs.24,000.

[Ans.: (a) Rs.1.50 (b) 12,000 units Rs.36,000; (c) 8,000 units – Rs.24,000; (d) 28,000 units value Rs.84,000]

14.   From the following figures, calculate P/V ratio, BEP, profit on estimated sales of Rs.1,25,000 and sales required to earn a profit of Rs.20,000:

	Sales Rs.	Profit Rs.
Period I	1,00,000	15,000
Period II	1,20,000	23,000

[Ans.: P.V. Ratio = 40%; BEP Rs.62,500; Profit Rs.25,000; Sales required Rs.1,12,500]

15. The following data are obtained from the records of a factory:

	Rs.	Rs.
Sales 4,000 units at Rs.25 each		1,00,000
Materials consumed	40,000	
Labour charges	20,000	
Variable overheads	12,000	
	72,000	
Fixed overheads	18,000	90,000
Profit		10,000

It is proposed to reduce the selling price by 20%. What extra units should be sold to obtain the same amount of profit as above?

[Ans.: Units sold: (a) 14,000 units; Extra units to be sold: 14,000 4,000 = 10,000 units]

16. From the following particulars calculate:
   (a) Contribution
   (b) P/V Ratio
   (c) Break-even in units and in Rupees
   (d) What will be the selling price per unit if the break-even is brought down to 25,000 units?

	Rs.
Fixed Expenses:	1,50,000
Variable cost per unit	10
Selling price per unit	15

[Ans.: (a) Rs.5; (b) 33$\frac{1}{3}$ or $\frac{1}{3}$ (c) 30,000 units; Rs.4,50,000; and (d) Rs.16]

17. Bhargavi Ltd. incurred a total cost of Rs.40,000 on a sales of Rs.45,000 in the 1st half year and Rs.43,000 cost on sales of Rs.50,000 in the 2nd half year.
   Assuming that costs and prices remained the same, calculate for the entire year:

(i)   P.V. Ratio (ii) Fixed Expenses

(iii)   Break-even sales (iv) % of margin of safety.

[Ans.: (i) 40%; (ii) Rs.26,000; (iii) Rs.65,000; (iv) Rs.30,000 and 31.58%]

18.   The sales and profit during two years are as follows:

Year	Sales Rs.	Profit Rs.
2006	3,00,000	30,000
2007	4,00,000	50,000

You are required to calculate (i) p/v ratio (ii) Break even sales (iii) Margin of Safety at a Profits of Rs.40,000.

[Ans.: (i) 20% or $\dfrac{1}{5}$; (ii) Rs.1,50,000 (iii) Rs.2,00,000]

19.   From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even volume:

Selling Price per unit	:	Rs.10
Trade discount	:	5%
Fixed overheads	:	Rs.10,000
Variable cost per unit	:	Rs.7

[Ans.: B.E.P = 4,000 Units; Net Profit = Rs.1,000; Rs.1,500]

20.   The following figures are available from the records of Sindhu enterprises as at 31st December:

	2006 Rs. in lakhs	2007 Rs. in lakhs
Sales	150	200
Profit	30	50

Calculate:

(a)   The p/v ratio and total fixed expenses.

(b)   The break-even level of sales.

(c)   Sales required to earn a profit of Rs.90 lakhs.

(d)   Profit or loss that would arise if the sales were Rs.280 lakhs.

[Ans.: (a) 40% & Rs.30,00,000; (b) Rs.75,00,000 (c) Rs.3,00,00,000 (d) 82,00,000]

21. Calculate the Break-even point from the following particulars:

    Budgeted output 70,000 units
    Fixed cost (Rs.) 4,00,000
    Variable cost per unit (Rs.) 12
    Selling price per unit (Rs.) 22

    If the selling price is reduced to (Rs.) 20 per unit what will be the revised Break-even point?

    [Ans.: BEP = 40,000 units Value Rs.8,80,000; Revised BEP = 50,000 units Value Rs.10,00,000]

22. From the following data, determine the net profits, if actual sales are 10% and 15% above the Break-Even Volume:-

Selling price per unit:	Rs.10
Trade discount:	5%
Fixed overheads:	Rs.10,000
Variable cost per unit	Rs.7

    [Ans.: BEP = 400 Units: Profits Rs.(i) Rs.1,000; (ii) Rs.1,500]

23. Sales of a product amount to 200 units per month at Rs.10 per unit. Fixed overhead is Rs.400 per month and variable cost Rs.6 per unit. There is a proposal to reduce prices by 10%. Calculate present and future P/V ratio, how many units must be sold to maintain total profit.

    [Ans.: Present and future P/V ratios 40% and $33\frac{1}{3}$%, Units to maintain total Profit = 267]

24. From the following particulars calculate the P/V ratio Break-even sales and Fixed Costs. Profit Rs.2,000 which represents 10% of sales Margin of safety = Rs.10,000.

    [Ans.: P/V ratio = $\frac{1}{5}$; Break-even sales Rs.10,000; Fixed cost Rs.2,000]

25. From the following particulars calculate (a) Fixed costs (b) Break Eve Sales (c) Total Sales and (d) Profit.
    Margin of Safety = Rs.10,000 (which represents 40% of sales) P/V Ratio = 50%.

    [Ans.: (a) Rs.7,500; (b) 15,000; (c) Rs.25,000; (d) Rs.5,000.]

26. Given:

         Sales 10,000 units
         Variable cost Rs.1,00,000
         Sales value Rs.2,00,000
         Fixed cost Rs.40,000
         Selling Price per unit Rs.20

You are required to calculate:
(a) P/V Ratio (b) Break-even point (c) Margin of safety (d) Sales to earn a profit of Rs.30,000.

[Ans.: (a) 50% (b) Rs.80,000 (c) Rs.1,20,000 (d) Rs.1,40,000]

27. Assuming that the cost structure and selling prices remain the same in Periods I and II, find out:
(a)   Profit Volume Ratio;
(b)   Fixed Cost;
(c)   Break Even Point for Sales;
(d)   Profit when Sales are of Rs.1,00,000;
(e)   Sales required to earn a Profit of Rs.20,000; and
(f)   Margin of Safety at a profit of Rs.15,000;
(g)   Variable cost in Period II

Period	Sales Rs.	Profit Rs.
I	1,20,000	9,000
II	1,40,000	13,000

[Ans.: (a) 20% (b) Rs.15,000 (c) Rs.75,000 (d) Rs.5,000 (e) Rs.1,75,000 (f) Rs.75,000 (g) Rs.1,12,000]

28. The sales turnover and profit of M/s Sreenivasa & Co. Ltd. during the two years 2006 and 2007 were as follows:

	Sales (Rs.)	Profit (Rs.)
2006	4,50,000	60,000
2007	5,10,000	75,000

You are required to calculate:
1.   Profit-volume ratio.
2.   Break-even point.
3.   The sales required to earn a profit of Rs.1,20,000.

4.   The profit made when sales are Rs.7,50,000.
5.   Margin of safety at a profit of Rs.1,50,000.
6.   Variable costs of the two periods.

[Ans.: (1) 25% (2) Rs.2,10,000 (3) Rs.6,90,000 (4) Rs.1,35,000 (5) Rs.6,00,000 (6) 1989 = Rs.3,37,500; 1990 = Rs.3,82,500]

29.   Following are the particulars of Pennar Tubes Ltd:
Sales Rs.30,00,000; Fixed costs Rs.9,00,000; Variable costs Rs.15,00,000. Calculate (a) P/V ratio, (b) Break-even point (c) Margins of safety and (d) Margin of safety ratio.

[Ans.: (a) 50% (b) Rs.18,00,000 (c) Rs.12,00,000 (d) 40%]

30.   M Ltd., manufacturing and selling industrial boxes. It is proposed to decrease the prices due to heavy competition. By decreasing the selling prices by 10% and 15%, how many units to be sold to maintain the current level of profit. The additional information is given:

Current sales 30,000 units		Rs.3,00,000
Variable cost 30,000 units	1,80,000	
Fixed cost	70,000	2,50,000
Net profit		50,000

[Ans.: Sale of Units at 10% reduction in selling price 40,000; Sale of Units at 15% reduction in selling price 48,000]

31.   From the following details calculate:
    (a)   P/V Ratio
    (b)   BE Point
    (c)   Margin of safety
    (d)   Effect of 10% increase in SP on BEP.
    (e)   Effect of 10% decrease in SP on BEP.

	Rs.
Sales	60,000
Variable Cost	30,000
Fixed Cost	15,000

[Ans.: (a) 50, (b) Rs.30,000; (c) Rs.30,000; (d) BEP Rs.27,500; (e) Rs.33,750

32.   From the following particulars find

(i) Contribution, (ii) P/V Ratio:

Variable cost per unit Rs.20; Selling price per unit Rs.40; Fixed expenses Rs.1,00,000; Output 5,000 units.

[Ans.: Contribution per unit Rs.20; P.V. Ratio: 50%]

33. Ramachandra sells a line of Men's footwears for Rs.18 a pair. Each pair that is sold contributes Rs.6 to the recovery of fixed costs and to profits. His fixed costs amounts to Rs.84,000 a year.

You are asked to (a) show   how many pairs must be sold in a year to Break Even. (b) Break Even sales revenue at the Break Even Point. (c) Desired sales to earn a profit of Rs.54,000.

[Ans.: (a) 14,000 units (b) Rs.2,52,000 (c) Rs.4,14,000]

34. From the following details, compute: (i) P.V. Ratio (ii) Profit

Fixed Costs Rs.50,000

Sales Rs.3,00,000

Variable costs $66\frac{2}{3}$ % of sales.

[Ans.: (i) $33\frac{1}{3}$ % (ii) Rs.50,000]

35. From the following details compute: (a) Variable Costs; (b) P/V Ratio.

	Rs.
Sales	3,00,000
Fixed Costs	70,000
Profit	80,000

[Ans.: (a) Rs.1,50,000 (b) Rs.50%]

36. From the following data, you are required to calculate
   a. P/V Ratio
   b. Break even sales with the help of P/V ratio
   c. Sales required to earn a profit of Rs.4,50,000
       Fixed expenses Rs.90,000
       Variable cost per unit:
       Direct material = Rs.5
       Direct Labour = Rs.2
       Direct overheads = 100 per cent of direct labour
       Selling price per unit = Rs.12
       [Ans.: (a) 25% (b) 3,60,000 (c) Rs.21,60,000]

37. From the following information pertaining to the years, calculate:
     a.   P/V ratio
     b.   Amount of sales to earn profit of Rs.40,000
     c.   Profit on sales Rs.1,20,000

Years	Sales Rs.	Profit Rs.
2006	1,40,000	15,000
2007	1,60,000	20,000

[Ans.: (a) 25% (b) Rs.2,40,000 (c) Rs.10,000]

38. From the following data relating to a company, calculate:
     i.   The break-even sales; and
     ii. Sales required to earn a profit of Rs.6,000 per period.

Period Rs.	Total Sales Rs.	Total Cost
1.	42,500	38,700
2.	39,200	36,852

[Ans.: (i) Rs.33,863.64 (ii) Rs.47,500]

39. The following information was extracted from the books of Giridhar Mft. Co. Ltd.

	Rs.
Sales	1,80,000
Less: Variable Costs	1,44,000
Contribution	36,000
Less: Fixed costs	24,000
Net Profit	12,000

     Calculate the following (a) P/V ratio (b) Break-even point (c) Net profit earned at sales of Rs.2,70,000 (d) Sales required to earn a profit of Rs.24,000.

[Ans.: (a) 20% (b) Rs.1,20,000 (c) Rs.30,000 (d) Rs.2,40,000]

40. By making and selling 7,000 units of its product, a company would lose Rs.10,000; whereas in the case of 9,000 units it would make a profit of Rs.10,000 instead. Calculate:

     (a)   The amount of fixed expenses.

(b)   Number of units of Break-Even.

(c)   Profit or Loss for 10,000 units.

(d)   Number of units to earn a profit of Rs.40,000.

[Ans.: P.V. Ratio = 10%; (a) 80,000 (b) 8,000 units (c) Rs.20,000 (d) 12,000 units]

41.   M/s Haripriya Ltd., sold its products worth Rs.180 lakhs and made a profit of rS.18 lakhs in 2006. But in 2007, the sales cam down to Rs.140 lakhs due to serve competition in the market. The fall in profit was Rs.4 lakhs. Calculate break-even points and profit volume ratios in 2006 and 2007.

)

[Ans.: BEP = 0; P.V. Ratio : 2001 – 10%; 2002 – 10%]

42.   Two competing companies P Ltd. and Q Ltd. produce and sell the same type of product in the same market. For the year ended March 2008, their forecasted profit and loss accounts are as follows:

	Rs.	P. Ltd. Rs.	Rs.	Q. Ltd. Rs.
Sales		3,00,000		3,00,000
Selling Price Expenses	2,00,000		2,25,000	
Fixed Cost	50,000	2,50,000	25,000	2,50,000
		50,000		50,000

You are required to calculate the following:

(a)   Profit volume ratio, Break-even Point and Margin of Safety of each business.

(b)   Sales volume at which each business will earn a profit of Rs.30,000.

(c)   Explain, giving reasons which business is likely to earn greater profits in conditions of (i) heavy demand for the product, (ii) low demand for the product.
[Ans.: (a) P.V. Ratio : P Ltd. 33.33%; Q Ltd. 25%; BEP Sales : P Ltd., Rs.1,50,015; Q Ltd., Rs.1,00,000; Margin of safety : P Ltd. Rs.1,50,015; Q Ltd., Rs.2,00,000; (b) P Ltd. Rs.2,40, 024; Q Ltd. Rs.3,00,000 (c) (i) In case of heavy demand the product of P Ltd., is more profitable, because P.V. ratio of P Ltd., is greater than Q Ltd. (ii) In case of low demand, the product Q Ltd., is more preferable since it provides more profit. It is because BEP of Q Ltd., is lower than the BEP of P Ltd.]

43.   Following information has been obtained from the revenue account of Balaji Ltd. for the year ended 31st December, 2007:

	Rs.	Rs.

Sales		6,00,000
Direct materials	1,80,000	
Direct wages	1,20,000	
Variable overheads	48,000	
Fixed overheads	1,72,000	5,20,000
Profit		80,000

It is proposed to reduce the selling price by 5%. What would be the sales volume if the present level of Profit is to be maintained. Assume no change in cost structure.

[Ans.: Old P.V. Ratio : 42%; New P.V. Ratio : 38.95%; Sales Volume at present level of profit Rs.6,46,938]

14.9 REFERENCE BOOKS :

1. R.S.N. Pillai, & Bagavathi, Management Accounting, S. Chand & Company Ltd., New Delhi
2. M.A. Sahaf, Management Accounting – Principles & Practice, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Shashi K. Gupta & R.K. Sharma, Management Accounting, Kalyani Publishers,
4. Charles thorn Gaxy Sundem, Introduction to Management Accounting –
5. N. Vinayakam, Tools & Techniques of Management Accounting
6. SP Gupta, Management Accounting
7. Manmohan & Goyal, Management Accounting
8. V. Krishna Kumar, Management Accounting
9. Dr.Kulsreshtha and Gupta, Practical Problems in Management Accounting
10. SP. Jain & KL Narang, Advanced Cost and Management Accounting

Chapter – 15

MARGINAL COSTING - MANAGERIAL DECISIONS

Objectives

After studying this chapter you should be able to
- understand the uses of marginal costing and taking various managerial decisions
- explain the problems relating to profit planning, introduction of new product, planning the level of activity. Key factor, suitable product mix, pricing decisions etc.

Structure :

15.1 **Marginal Costing and Decision making**
15.2 **Buy or Make Decisions**
15.3 **Self Assessment Questions**
15.4 **Exercises**
15.5 **Reference Books**

15.1 MARGINAL COSTING AND DECISION MAKING

Marginal costing techniques may be applied in various fields to aid management in arriving at many important policy decisions. These include:

1. Profit planning
2. Introduction of new product
3. Planning of level of activity
4. Key factor
5. Determination of suitable product – mix
6. Pricing Decisions
7. Foreign Market offer
8. Make or buy decisions

15.1.1 Profit Planning:

Profit planning is the planning of future operations so as to attain maximum profit. The contribution ratio shows the relative profitability of various sectors of the business whenever there is a change in selling price, variable costs or product mix. There are four important ways to improve the profit performance of a business.

(i) By increasing volume
(ii) By increasing selling price
(iii) By reducing variable costs, and
(iv) By reducing fixed costs.

Illu.1: The following are the budgeted data relating to AB Ltd., and CD Ltd., producing identical products.

	Rs.	Rs.	Rs.	Rs.
Sales		**1,50,000**		**1,50,000**
Less: Variable cost	**1,20,000**		**1,00,000**	
Fixed Cost	**15,000**	**1,35,000**	**35,000**	**1,35,000**
Net Profit		**15,000**		**15,000**

a. Calculate break-even points, P/V ratio and margin of safety of each company:
b. State which company is likely to earn greater profits in conditions of (i) heavy demand and (ii) low demand of the product.

Solution:

a.(i)	**B.E.P. Sales**	=	$\dfrac{F \times S}{S - V}$		
	AB Ltd.	=	$\dfrac{15,000 \times 1,50,000}{1,50,000 - 1,20,000}$	**=**	Rs.75,000
	CD Ltd.	=	$\dfrac{35,000 \times 1,50,000}{1,50,000 - 1,00,000}$	**=**	Rs.1,05,000
ii.	**P.V. Ratio**	=	$\dfrac{S - V}{S} \times 100$		
	AB Ltd.	=	$\dfrac{1,50,000 - 1,20,000}{1,50,000} \times 100$	**=**	20%
	CD Ltd.	=	$\dfrac{1,50,000 - 1,00,000}{1,50,000} \times 100$	**=**	33.33%
iii.	**Margin of Safety**	=	Actual Sales - BEP Sales		
	AB Ltd.	=	Rs.1,50,000 - 75,000	**=**	Rs.75,000
	CD Ltd.	=	Rs.1,50,000 - 1,05,000	**=**	Rs.45,000

(b) In case of heavy demand, CD Ltd., will earn higher profit since the P/V Ratio is higher for the company. In case of low demand, AB Ltd., may earn higher profit since its break even point is low and margin of safety is higher.

15.1.2 Introduction of New Product:

Sometime, a product may be added to the existing lines of products with a view to utilise idle facilities to capture new market or for any other purpose. The profitability of this new product has to be found out initially. Usually, the new product will be manufactured if it is capable of contributing something towards fixed costs and profit after meeting its variable costs.

Illu.2: A firm manufacturing Product X has provided the following information.

	Rs.
Sales	**75,000**
Direct materials	**30,000**
Direct labour	**10,000**
Variable overhead	**10,000**
Fixed overhead	**15,000**

In order to increase its sales by Rs.25,000, the firm wants to introduce the Product Y, and estimates the costs in connection therewith as under:

	Rs.
Direct materials	**10,000**
Direct labour	**8,000**
Variable overhead	**5,000**
Fixed overhead	**Nil**

Advise whether the Product Y will be profitable or not.

Solution:

Marginal Cost Statement

	X Rs.	Y Rs.	Total Rs.
Sales	75,000	25,000	1,00,000
Less: Material cost:			
Direct materials	30,000	10,000	40,000
Direct labour	10,000	8,000	18,000
Variable overhead	10,000	5,000	15,000
	50,000	23,000	73,000
Contribution	25,000	2,000	27,000
Fixed Costs			15,000
Profit			12,000

Commentary: If product Y is introduced, the profitability of product X is not affected in any manner. On the other hand, product Y provides a contribution of Rs.2,000 towards fixed cost and profit. Therefore, Product Y should be introduced.

15.1.3 Planning the Level of Activity:

Marginal costing is of great help while planning the level of activity. Maximum contribution at a particular the level of activity will show the position of maximum profitability.

Illu.3: Excellent company is currently working at 50% capacity and produces 10,000 units.
At 60% capacity, raw material cost increases by 2% and selling price falls by 2%. At 80% working, raw material cost increase by 5% and selling price falls by 5%. At 50% capacity working, the product costs Rs.180 per unit and is sold at Rs.2.00 per unit.
The unit cost of Rs.180 is made up as follows.

Materials	**Rs.100**
Wages	**Rs.30**
Factory overheads	**Rs.30(40% fixed)**
Administrative overheads	**Rs.20 (50% fixed)**

You are required to work out the material cost, fixed cost, total cost and profit for three capacity levels.

Solution:

Statement Showing Material Cost, Fixed Cost, Total cost and Profit at three Capacity Levels

Output Capacity		50%	60%	70%
Sales	(A)	20,00,000	23,52,000	30,40,000
Marginal Cost:				
Material Cost		10,00,000	12,24,000	16,80,000
Wages		3,00,000	3,60,000	4,80,000
Factory Overheads		1,80,000	2,16,000	2,88,000
Administrative Overheads		1,00,000	1,20,000	1,60,000
Total Marginal Cost	(B)	15,80,000	19,20,000	26,08,000
Contribution (A-B)	(C)	4,20,000	4,32,000	4,32,000
Less: Fixed Expenses:				
Factory Overheads		1,20,000	1,20,000	1,20,000
Administrative Overheads		1,00,000	1,00,000	1,00,000
Total Fixed Expenses	(D)	2,20,000	2,20,000	2,20,000
Total Cost (B+D)	(E)	18,00,000	21,40,000	28,28,000
Profit/Loss (C-D)	(F)	2,00,000	2,12,000	2,12,000

Note: Statement showing material cost, fixed cost, total cost; and profit per unit at three capacity levels.

		50%	60%	70%
Output Capacity		50%	60%	70%
Selling Price	(A)	200	196	190
Marginal Cost:				
Materials		100	102	105
Wages		30	30	30
Factory Overheads		18	18	18
Administrative Overheads		10	10	10
Total Marginal Cost	(B)	158	160	163
Contribution (A-B)	(C)	42	36	27
Less: Fixed Expenses:				
Factory Overheads		12	10	7.50
Administrative Overheads		10	8.33	6.25
Total Fixed Expenses	(D)	22	18.33	13.75
Profit/Loss (C-D)	(E)	20	17.67	13.25

Illu.4: Two companies which have the following operating details decide to merge:

	Company I	Company II
Capacity utilisation	90%	60%
Sales (Rs.Lakhs)	540	300
Variables cost (Rs.Lakhs)	396	225
Fixed cost (Rs.Lakhs)	80	50

    Assuming proposal is implemented, calculate:
(a)   **Break-even sales of the merged plant and the capacity utilisation at that stage.**
(b)   **Profitability of the merged plant at 80% capacity utilisation.**
(c)   **Sales turnover of the merged plant to earn a profit of Rs.75 lakhs.**

Solution:

        Statement of the merged company at 100% and 80% Capacity

Capacity	Company A		Company B		Merged Company	
	90%	100%	90%	100%	100%	80%
Sales	540	600	300	500	1,100	880
Variable Cost	396	440	225	375	815	652
Contribution (S-V)	144	160	75	125	285	228
Fixed Cost	80	80	50	50	130	130
Profit	64	80	25	75	155	98

a. **BEP of merged Plant:**

P.V. Ratio = $\dfrac{C}{S} \times 100;\ \dfrac{285}{1,100} \times 100 = 25.91\%$

BEP Sales = $\dfrac{F}{\text{P.V.Ratio}} = \dfrac{130}{25.91\%} = $ Rs.501.75 lakhs.

Capacity Utilisation = $\dfrac{100}{1,100} \times$ Rs.501.75 lakhs = 45.6%

b. **Profitability of the merged company at 80% capacity utilisation.**

$= \dfrac{\text{Profit}}{\text{Sales}} \times 100;\ = \dfrac{98}{880} \times 100 = 11.14\%$

c. **Sales required to earn a profit of Rs.75 lakhs.**

Desired Profit = Rs.75 lakhs. Fixed Cost of merged Co. = Rs.130 lakhs

Desired Contribution = 75 + 130 = Rs.205 lakhs.

Sales to earn Rs.205 lakhs contribution = $\dfrac{205}{25.91\%} = $ Rs.791.23 lakhs.

15.1.4 Key Factor:

A concern would produce and sell only those products which offer maximum profit. This is based on the assumption that it is possible to produce any quantity without any difficulty and sell like wise. However, in actual practice, this seems to be unrealistic as several constraints come in the way of manufacturing as well as selling. Such constraints that come in the way of management's efforts to produce and sell in unlimited quantities are called 'Key factors' or 'limiting factors'.

The limiting factors may be materials, labour, plant capacity, or demand. Management must as certain the extent of influence of the key factor for ensuring maximisation of profit. Normally, when contribution and key factors are known, the relative profitability of different products or processes can be measured with the help of the following formula.

$$\text{Profitability} = \frac{\text{Contribution}}{\text{Key factor}}$$

Illu.5: From the following data, which product would you recommend to be manufactured in a factory, time being the key factor?

	Per unit of product X Rs.	Per unit of product Y Rs.
Direct material	24	14
Direct labour at Re.1 per hour	2	3
Variable overhead at Rs.2 per hour	4	6
Selling price	100	110
Standard time to produce	2 hours	3 hours

Solution:

		Product X Per unit		Product Y Per unit
	Rs.	Rs.	Rs.	Rs.
Selling price		100		110
Less: Marginal cost:				
Direct materials	24		14	
Direct labour	2		3	
Variable overhead	4	30	6	23
Contribution		70		87
Standard time to produce		2 hours		3 hours
Contribution per hour		$\frac{70}{2} =$ **Rs.35**		$\frac{87}{3} =$ **Rs.29**

Contribution per hour of product X is more than that of product Y by Rs.6. Therefore, product X is more profitable and is recommended for manufacturing.

15.1.5 Suitable Product Mix:

Normally, a business concern will select the product mix which gives maximum profit. Product mix is the ratio in which various products are produced and sold. The marginal costing technique helps management in taking appropriate decisions regarding the produce mix, i.e., in changing the ratio of product mix so as to maximise profits. The technique not only helps in dropping unprofitable products from the mix but also helps in dropping unprofitable departments, activities etc.,

Illu.6: Present the following information to show to the management: a) the marginal product cost and the contribution per unit; b) the total contribution and profits resulting from each of the following sales mixtures:

	Product	Per Unit
		Rs.
Direct materials	A	10
	B	9
Direct wages	A	3
	B	2
Fixed expenses Rs.800		

Variable expenses are allocated to products as 100% of direct wages.

		Rs.
Sales Price	A	20
	B	15

Sales mixtures:
   i)   **1000 units of product A and 2000 units of B**
   ii) **1500 units of product A and 1500 units of B**
   iii) **2000 units of product A and 1000 units of B**

Solution:

a) Marginal Cost Statement	A	B
	Rs.	Rs.
Direct materials	10	9
Direct wages	3	2
Variable overheads (100%)	3	2
Marginal Cost	16	13
Sales Price	20	15
Contribution	4	2

(b) Product mix choice	1000 A + 2000 B (i)	1500 A + 1500 B (ii)	2000 A + 1000 B (iii)
	Rs.	Rs.	Rs.
Total Sales	(1000 × 20 + 2000 × 15) = 50,000	(1500 × 20 + 1500 × 15) = 52,500	(2000 × 20 + 1000 × 15) = 55,000
	(1000 × 16 + 2000 × 13) = 42,000	(1500 × 16 + 1500 × 13) = 43,500	(2000 × 16 + 1000 × 13) = 45,000
Less: Marginal Cost			
Contribution	8,000	9,000	10,000
Less: Fixed Costs	800	800	800
Profit	7,200	8,200	9,200

Therefore, sales mixture (iii) will give the highest profit; and as such mixture (iii) can be adopted.

15.1.6 Pricing Decisions:

Marginal costing techniques helps a firm to decide about the prices of various products in a fairly easy manner. Let's examine the following cases.

(i) Fixation of Selling Price.

Illu.7: P/V ratio is 60% and the marginal cost of the product is Rs.50. What will be the selling price?

Solution: P/V Ratio = $\dfrac{S-V}{S} = 1 - \dfrac{V}{S} = \dfrac{C}{S}$

$\dfrac{\text{Variable cost}}{\text{Sales}}$ = 40% or $\dfrac{40}{100}$

Selling price = $\dfrac{50}{40\%} = \dfrac{50 \times 100}{40}$ = Rs.125

ii. Pricing during Recession:

Illu.8: Hindustan Engineering Company is working well below normal capacity due to recession. The directors of the company have been approached with an enquiry for special job. The costing department estimated the following in respect of the job.

Direct materials – Rs.10,000
Direct labour – 500 Hours @ Rs.2 per hour.
Overhead costs : Normal recovery rates.
Variable – Re. 0.50 per hour
Fixed – Rs.1.00 per hour.
The directors ask you to adise them on the minimum price to be charged. Assume that there are no production difficulties regarding the job.

Solution:
Calculation of Marginal Cost:

	Rs.
Direct materials	10,000
Direct labour	1,000
Variable overhead @ Re.0.50 per hour	250
Marginal cost	Rs.11,250

Commentary: Here the minimum price to be quoted is Rs.11,250, which is the marginal cost. By quoting so, the company is sacrificing the recovery of the profit and the fixed costs. The fixed costs will continue to be incurred even if the company does not accept the offer. So any price above Rs.11,250 is welcome.

(iii) Selling below marginal cost:

Selling below marginal cost, normally, is not feasible. However, under the following circumstances this can be practised.

1. when a new product is introduced.
2. when competitors have to be edged out of the market.
3. when company deals with perishable products.,
4. when the product is used as a loss leader.
5. when labour engaged cannot be retrenched.
6. when foreign market is to be explored to earn foreign exchange.
7. when there is cut-throat competition.
8. when the plant has to be kept in a running condition.

15.1.7 Foreign Market Offer:

The acceptance or rejection of an offer from a foreign market depends upon the incremental cost and incremental revenue.

Illu.9: Chola Pen Co. Ltd. produces and markets Micro tipped pens. The selling price per pen is Rs.5.50 made up as follows:

	Rs.
Direct materials	2.00
Direct labour	1.50
Variable overheads	0.50
Fixed overheads (Rs.90,000 ÷1,20,000)	0.75
Total cost	4.75
Profit	0.75
Selling price	5.50

The installed capacity is 1,50,000 pens per month. At present, it is producing and selling, on an average, 1,20,000 pens per month. The company has received an export order for 30,000 pens per month for two years but at a price of Rs.4.50. the management is hesitant to accept this order because it does not cover the total cost. There are no government subsidies to meet the deficit. It is unlikely that the domestic market will expand in the next two years. Advise them with necessary supporting data.

Solution:

Marginal Cost per unit:

	Rs.
Direct material	2.00
Direct labour	1.50
Variable overheads	0.50
Total Variable Cost	4.00

Selling price of the export order Rs.4.50

If the foreign order is accepted for each unit the firm gets a profit. of Rs.0.50 (Rs.4.50 – 4.00). The total profit if the foreign order is accepted = Rs.15,000 (30,000 × 0.50). So it is better to accept foreign order.

15.2 MAKE OR BUY DECISIONS

A company might be having unused capacity which may be utilised for making component parts or similar items instead of buying them from the market. In arriving at such a 'make or buy' decision, the cost of manufacturing component parts should be compared with price quoted in the market. If the variable costs are lower than the purchase price, the component parts should be manufactured in the factory itself.

Fixed costs are excluded on the assumption that they have been already incurred, and the manufacturing of components involves only variable cost. However, I there is an increase in fixed costs and any limiting factor is operating they should also be taken into account. Consider the following illustration, throwing light on these aspects.

Illu.10: A manufacturing company finds that while the cost of making a component part is Rs.10, the same is available in the market at Rs.9 with an assurance of continuous supply. Give your suggestion whether to make or buy this part. Give also your views in case the supplier reduces price from Rs.9 to Rs.8.

The cost information is as follows:

Particulars		Rs.
1.	Material	3.50
2.	Direct Labour	4.00
3.	Other Variable expenses	1.00
4.	Fixed expenses	1.50
		10.00

Solution:

Make or Buy Decision Statement

Purchasing Price	(A)	9
Manufacturing Cost:		
Material		3.50
Direct Labour		4.00
Variable Expenses		1.00
Total Manufacturing Cost	(B)	8.50
Saving in Manufacturing (A-B)	(C)	0.50

Advise:

1. It is better to manufacture rather than buying from outside Market.
2. If the component is supplied at Rs.8 it is better to purchase it rather than manufacturing it. By purchasing, the profit will increase by Rs.0.50 (Rs.8.50 – 8.00) per unit.

Illu.11: A company engaged in the manufacturing radios incurs Rs.6.25 per piece for producing part A. But the same part is available for at Rs.5.75 only per piece in the market. Its supply will also be alright. Particulars of expenses are as follows:

	Rs.
Material per piece	2.75
Labour per piece	1.75
Other variable expenses per piece	0.50
Depreciation and fixed overheads per piece	1.25
	6.25

(a) Do you manufacture that part or purchase it in the market?
(b) In case the supplier offers the same at Rs.4.85 only per piece, what is your decision?

Solution:

Make or Buy Statement for Part A

		Rs.
Buying Price	(A)	5.75
Manufacturing Cost:		
Material		2.75
Labour		1.75
Variable Expenses		0.50
Total Manufacturing Cost	(B)	5.00
Saving in Manufacture (A-B)	(C)	0.75

Advise:

a.   It is better to manufacture rather than buying this. It is because the buying price per unit is Rs.5.75 and manufacturing price is Rs.5.00. In manufacturing the product the firm has a saving of Rs.0.75 per product.

b.   If the computer supply price is Rs.4.85 then it is better to purchase it rather than manufacturing it due to a saving of Rs.0.15 per unit.

Illu.12: ABC company has just been formed. A company has a special process which will enable it to produce a unique product, the demand for which is uncertain. Their estimated costs are:

Material per unit Rs.2
Labour per unit Rs.6
Variable manufacturing expenses per unit Rs.3
Variable selling expenses per unit Re.1
Fixed manufacturing expenses Rs.24,000
Fixed Administrative and selling expenses Rs.72,000.

(a)   If the selling price is Rs.20, how many units they have to sell to (i) break even (ii) make a profit of Rs.32,000 (iii) make a profit of 20 per cent of sale?

(b) If the demand for the product is 10,000 units, what price must they charge in order to (i) break-even (ii) make a profit of Rs.24,000 (iii) make a profit of 20 per cent of sales?

Solution:

Total variable Expenses = 2 + 3 + 6 + 1 = Rs.12
Total Fixed Expenses = Rs.24,000 + Rs.72,000 = Rs.96,000
Sales Price Rs.20

(a) (i) B.E.P. $= \dfrac{F}{S-V} = \dfrac{96,000}{20 - 12} = \dfrac{96,000}{8} = 12,000$ units.

(ii)   Sales required to get a profit of Rs.32,000

$\dfrac{F+P}{S-V} = \dfrac{96,000 + 32,000}{20 - 12} = \dfrac{1,28,000}{8} = 16,000$ units

(iii)   Required sales amount to get a profit of 20% on Sales. Sales units is assumed as S.

Total Sales = 20S; Estimated profit 20% S; $20S \times \dfrac{20}{100} = 4S$

$S = \dfrac{F+P}{S-V} = \dfrac{96,000 + 4S}{20 - 12} = 8S = 96,000 + 4S = 8S\text{-}4S = 96,000$

$$4S = 96,000 \quad S = \frac{96,000}{4} = 24,000 \text{ Units}$$

(b) (i) B.E.P. 10,000 units. Selling Price is assumed as S.

$$10,000 = \frac{96,000}{S - 12} = 10,000\,S - 1,20,000 = 96,000;$$

$$10,000S = 96,000 + 1,20,000 \; ; \; 10,000S = 2,16,000;$$

$$S = \frac{2,16,000}{10,000} = 21.60; \; S = \text{Rs.}21.60.$$

(ii)   Selling price to get a profit of Rs.24,000

$$10,000 = \frac{96,000 + 24,000}{S - 12} = 10,000S - 1,20,000 = 1,20,000$$

$$10,000S = 1,20,000 + 1,20,000 = 10,000S = 2,40,000; \; S = \frac{2,40,000}{10,000} = S = \text{Rs.}24$$

(iii)   Selling Price to get profit of 20% on Sales.

         Total Sales amount for 10,000 Units = 10,000S

         On 10,000S; 20% Profit = $10,000S \times \dfrac{20}{100} = 2,000S$

$$10,000 = \frac{96,000 + 2,000S}{S - 12} = 10,000S - 1,20,000 = 96,000 + 2,000S \text{ or}$$

$$8,000S = 2,16,000; \; S = \text{Rs.}27.$$

Illu.13: A firm is selling X product, whose variable cost per unit is Rs.10 and fixed cost is Rs.6,000. It has sold 1,000 articles during one month at Rs.20 per unit. Market research shows that there is a great demand for the product if the price can be reduced. If the price can be reduced to Rs.12.50 per unit, it is expected that 5,000 articles can be sold in the expanded market. The firm has to take a decision whether to produce and sell 1,000 units at the rate of Rs.20 or to produce and sell for the growing demand of 5,000 units at the rate of Rs.12.50. Give your advice to the management in taking the decision.

Solution:

		1,000 units	5,000 units
Selling Price	(A)	20	12.50
Less: Variable cost	(B)	10	10.00
Contribution per unit (A-B)	(C)	10	2.50
Total Contribution		10,000	12,500
Less: Fixed Cost		6,000	6,000
Profit		4,000	6,500

The management may be advised to reduce the selling price to Rs.12.50. It is also advised

to produce and sell, 5,000 units because it gives an additional profit of Rs.2,500 (Rs.6,500 - 4,000)

Illu.14: A Toy manufacturer earns an average net profit of Rs.3 per piece in a selling price of Rs.15 by producing and selling 60,000 pieces at 60% of the potential capacity. Composition of cost of sales is as follows:

	Rs.
Direct Materials	**4.00**
Direct Wages	**1.00**
Factory overhead	**6.00**
	(50% Fixed)
Sales overhead	**1.00**
	(25% varying)

During the current year, he intends to produce the same number of toys but anticipates that:

(a) His fixed charges will go up by 10%.
(b) Rates of Direct labour will increase by 20%
(c) Rates of Direct Material will increase by 5%
(d) Selling price cannot be increased.

Under these circumstances, he obtains an order for a further 20% of his capacity. What minimum price will you recommend for accepting the order to ensure the manufacturer an overall profit of Rs.1,80,500.

Solution:
Calculation of Current year Marginal Cost Statement:

		Rs.
Selling Price	(A)	15.00
Less: Marginal Cost:		
Direct Material $[4 + (4\times \frac{5}{100})]$		4.20
Direct Wages $[1 + (1\times \frac{20}{100})]$		1.20
Factory Overheads $(6\times \frac{50}{100})$		3.00
Sales Overheads $(1\times \frac{25}{100})$		0.25
Total Marginal Cost	(B)	8.65
Contribution per unit (A-B)	(C)	6.35

Total Contribution for 60,000 units = 60,000 × 6.35 = Rs.3,81,000

Calculation of Total Fixed Cost:

	Rs.
Fixed factory overheads per unit	3.00
Fixed sales overheads per unit	0.75
Total fixed cost per unit	3.75

Total fixed cost for 60,000 units = 60,000 units × 3.75 = Rs.2,25,000

Current year total fixed cost = $2,25,000 \times \frac{10}{100} + 2,25,000$ = Rs.2,47,500

Current year profit for 60,000 units = Total contribution – Fixed expenses
= 3,81,000 – 2,47,500 = Rs.1,33,500

Calculation of New Selling Price for 20% Capacity:

	Rs.
Given required Profit	1,80,500
Less: Profit earned for 60,000 units	1,33,500
Profit to be acquired for 20% capacity	47,000

When the firm is at 60% capacity the output is 60,000 units.

For additional 20% capacity the required units 20,000

New Selling Price is assumed at 'S' per unit.

For 20,000 units sales amount = 20,000 units × S = 20,000 S

Variable Cost per unit = 8 – 65

Total Variable Cost = 20,000 units × Rs.8-65 = Rs.1,73,000

$S - V = F + P$

20,000S – 1,73,000 = Nil + 47,000

20,000S – 1,73,000 + 47,000

20,000S = 2,20,000

$S = \frac{2,20,000}{20,000}$ = Rs.11

The minimum recommended Selling Price to the company to accept the order is Rs.11.

Illu.15: Budgeted Results to X Ltd. include the following.

Sales	Amount (Rs. Lakhs)	Variable cost as % of sales value
A	5.0	60%
B	4.0	50%
C	8.0	65%
D	3.0	80%
E	6.0	75%
	26.0	65.17%

Fixed cost for the period are Rs.9.1 lakhs. You are required to (a) Produce a statement showing the amount of loss expected and (b) Recommend a change in sales volume of each product which will eliminate the expected loss that sales of only one product can be increased at a time.

Solution:

(a)   **Statement of Profit/Loss Expected**

(Amount in lakhs)

Product	Sales	Variable Cost Ratio	Variable Cost	P.V. Ratio (or) C%	Contribution
A	5	60	3.0	40	2.0
B	4	50	2.0	50	2.0
C	8	65	5.2	35	2.8
D	3	80	2.4	20	0.6
E	6	75	4.5	25	1.5
			17.1		8.9

Calculation of Expected loss:

Total Contribution	8.9
Less: Fixed Expenses	9.1
Expected loss	0.2

b.   Assume only one product can be increased at a time. The amount of sales of each product to be increased as follows.

Sales required = $\dfrac{\text{Under recovery of fixed costs}}{\text{P.V. Ratio}}$

			Rs.
Product A	$\dfrac{20,000}{40\%}$	$20,000 \times \dfrac{100}{40}$	50,000
Product B	$\dfrac{20,000}{50\%}$	$20,000 \times \dfrac{100}{50}$	40,000
Product C	$\dfrac{20,000}{35\%}$	$20,000 \times \dfrac{100}{35}$	57,143
Product D	$\dfrac{20,000}{20\%}$	$20,000 \times \dfrac{100}{20}$	1,00,000
Product E	$\dfrac{20,000}{25\%}$	$20,000 \times \dfrac{100}{25}$	80,000

Note: For (a)

i.   Variable cost = Sales $\times \dfrac{\text{Variable Cost Ratio}}{100} = 5 \times \dfrac{60}{100} = $ Rs.3

ii.   P.V. ratio = 100 – Variable Cost Ratio = 100 – 60 = 40

iii.   Contribution = Sales $\times$ P.V. Ratio = $5 \times \dfrac{40}{100} = 2$

Note: For (b)

Under recovery of fixed expenses = Expected loss = Rs.20,000

Illu.16: The following figures are extracted from the records of a company.

	Departments				
	A	**B**	**C**	**D**	**Total**
	Rs.	Rs.	Rs.	Rs.	Rs.
Sales	**200**	**400**	**600**	**800**	**2,000**
Costs:					
Direct Material	**80**	**200**	**360**	**580**	**1,220**
Direct Labour	**40**	**150**	**180**	**140**	**510**
Direct Expenses	**4**	**6**	**8**	**10**	**28**
Prime Cost	**124**	**356**	**548**	**730**	**1,758**
Overheads:					
Variable	**20**	**30**	**24**	**20**	**94**
Fixed	**10**	**20**	**10**	**8**	**48**
	30	**50**	**34**	**28**	**142**
Total cost	**154**	**406**	**582**	**758**	**1,900**
Profit/Loss	**46**	**(-) 6**	**18**	**42**	**100**

On the basis of the above information, the management is inclined to discontinue department B. What will be your advice to management?

Solution:

Comparative Statement of Profitability

	With Dept. B Total Rs.	Without Dept. B Total Rs.
Sales	2,000	1,600
Less: Variable cost	1,852	1,466
Contribution	148	134
Less: Fixed expenses	48	48
Profit	100	86

Advise: It Department B is discontinued we have a total profit of Rs.86. If it is continued the total profit is Rs.100. Hence it is better to continue will be Department B.

Note: It is assumed that the total fixed costs remains the same.

Illu.17: Hindustan Limited is engaged in manufacturing and selling industrial boxes. It is proposed to reduce the prices due to heavy competition. By decreasing the selling

price by 10% and 15%, how many units are to be sold to maintain the current level of profit?

	Rs.	Rs.
Current Sales (15,000 units)		**1,50,000**
Variable Cost (15,000 units)	**90,000**	
Fixed Costs	**35,000**	**1,25,000**
Net Profit		**25,000**

Solution:

Calculation of Selling Price per unit, Variable Cost per unit and Contribution Per unit

	Total	Per unit
Current Sales (15,000 units)	1,50,000	Rs.10
Variable Cost (15,000 units)	90,000	Rs.6
Contribution per unit	60,000	Rs.4

Calculation of required sales in units to earn a profit of Rs.25,000 when selling price is reduced by 10% and 15%.

		10% Decrease		15% Decrease
New Selling Price per unit	$(10 \times \frac{9}{100})$	Rs.9	$(10 \times \frac{15}{100})$	8.50
Variable Cost Per unit		6		6
Contribution per unit		3		2.50
Required sales to earn profit of Rs.25,000 $\frac{(F + \text{Desired Profit}}{\text{Contribution per unit}}$	$(\frac{35,000 + 25,000}{3})$	20,000 Units	$(\frac{25,000 + 30,000}{2.50})$	24,000 Units

Illu.18: Assume you are the Management Consultant of XYZ Co. Ltd. The Managing Director of the company seeks your advice on the following problem:

The XYZ Ltd., produces a variety of products each having a number of component parts. Product "B" takes 5 hours to produce on machine No.99 working at full capacity. "B" has a selling price of Rs.50 and a marginal costs of Rs.30 per unit. "A-10" a component part could be made on the same machine in 2 hrs. for marginal cost of Rs.5 per unit. The supplier's price is Rs.12.50 per unit. Should the company make or buy "A-10"?

Assume that machine hour is the limiting factor.

Solution:

In this problem the cost of new product plus contribution lost during the time for manufacturing "A-10" should be compared with the supplier's price to arrive at a decision.

	Rs.
B- Selling Price	50.00
Less: Marginal Cost	30.00
Contribution	20.00

It takes 5 hours to produce one unit of "B"

Contribution earned per hour on Machine No.99 is Rs. $\frac{20}{5}$ = Rs.4

"A-10" takes two hours to be manufactured on machine which is producing "B".

If "A-10" is produced, contribution lost will be = 2 hours × Rs.4 = Rs.8

Real cost of "A-10" to the company = Marginal cost of "A-10" plus contribution lost for using the machine for "A-10".

$$Rs.5 + Rs.8 = Rs.13$$

This is more than the seller's price of Rs.12.50 and so it is advisable for the company to buy the product from outside.

15.3 SELF ASSESSMENT QUESTIONS

1. Explain the specific decision-making areas where the principles of marginal costing could be applied.
2. What is the signification of Contribution of marginal costing? State its uses in managerial decision making.
3. What is Marginal Costing? How is it useful to the manufacturing organization?
4. Bring out the significance of imputed costs and out pocket costs for managerial decision making.

15.4 EXERCISES

1. A company is considering expansion. Fixed costs amount to Rs.4,20,000 and are expected to increase by Rs.1,25,000 when plant expansion is completed. The present plant capacity is 80,000 units a year. Capacity will increase by 50 per cent with the expansion. Variable costs are currently Rs.6.80 per unit and are expected to go down by Rs.0.40 per unit with the expansion. The current selling price is Rs.16 per unit and is expected to remain same under either alternative. What are the break-even points under either alternative? Which alternative is better and why?

[Ans.: It is better to go for expansion because the profit will double]

2. Arjun Electronic decided to effect a 10% reduction in the price of its product because it is felt that such a step may lead to a greater volume of sales.   It is anticipated that there are no prospects of a change in total fixed costs and variable cost per unit. The director wish to maintain net profits at the present level.

    The following information has been obtained from its books.
    Sales : 10,000 units Rs.2,00,000
    Variable Costs: Rs.15 per unit
    Fixed Costs Rs.40,000
    How would management proceed to implement this decision?

    [Ans.: Sales Rs.3,00,000]

3. Vimala Company produced and sold 10,000 units under the following Cost structure during the year 2006:

    (a)   Prime Cost Rs.80 per unit.
    (b)   Variable Overheads Rs.10 per unit.
    (c)   Fixed expenses Rs.1,50,000.
    (d)   Advertising Rs.25,000.
    (e)   Selling Price Rs.150 per unit.

    For the year 2007 the following changes are proposed to be made:
    (i)   Advertising to be discontinued.
    (ii)   Reduction in direct labour cost by Rs.3 per unit.
    (iii)   Reduction in variable administration expenses by Rs.3 per unit.
    (iv)   New selling price: Rs.120 per unit.
    (v)   Increase in production and sales by 100%.

        You are required to find out (1) The P/V ratio (2) The Break-even point and (3) The amount of profit for the year 2007, taking into account the proposed changes.

    [Ans.: (1) 30% (2) Rs.5,00,000 (3) Rs.5,70,000]

4. The cost of manufacturing of 8,000 units of 'X' product is given below:
    Direct materials Rs.8,000; labour Rs.64,000; Variable overheads Rs.32,000; Fixed overheads Rs.40,000; Fixed overhead is included Rs.24,000, that continues regardless of the decision. The same product is available in the market for Rs.16 per unit. Should the company make or buy the product?
    [Ans.: Manufacturing is more profitable than purchase because due to manufacture the profit is more by Rs.32,000]

5. . The management of Pioneer Products Corporation Limited requests assistance from you in arriving at a decision whether to continue manufacturing a certain part of an assembly or to buy it from an outside supplier who had been quoting a price of Rs.8 per unit.

The Corporation's annual requirements is 5,000 units and the costs accumulated for their special manufacture are:

	Rs.
Direct Materials	17,500
Direct labour	28,000
Indirect Labour	6,000
Power (Electricity)	300
Others	640

If the parts are purchased from outside, the present machinery used to make the parts could be sold and its value would be realised. This step would reduce the total machinery depreciation by Rs.2,000 and property taxes and insurance by Rs.1,000.

If the parts are purchased from the outside supplier, the following additional costs would be incurred:

Freight Rs.0.50 per unit and material received charges @ Rs.1 per unit.

From the above information you are required to prepare a statement comparing the costs of manufacturing the parts, with the costs of purchasing them from the outside supplier and guide management for a make or buy decision.

[Ans.: It is better to purchase 5,000 units instead of manufacturing it due to the saving of Rs.7,440]

6. A company produces variety of products and components. Following components with relevant manufacturing costs are under consideration for purchase outside:

Component	Direct Material Rs.	Direct Labour Rs.	Variable overheads Rs.	Fixed Costs Rs.	Bought out price Rs.
XY	600	200	100	300	800
PR	200	800	200	1,000	2,300
MN	100	300	200	500	1,200

Select the components which should be bought from outside, indicating the reasons for choice.

[Ans.: (a) It is better to purchase XY Product (b) It is better to manufacture PR product (c) It is better to manufacture MN Product.]

7. A manufacturer has planned his level of operation at 50% of his plant capacity of 30,000 units. His expenses are estimated as follows, if 50% of the plant capacity is utilised.

	Rs.
(i) Director materials	8,280
(ii) Direct wages	11,160
(iii) Variable and other manufacturing expenses	3,960
(iv) Total fixed expenses irrespective of capacity utilisation	6,000

The expected selling price in the domestic market is Rs.2 per unit. Recently the manufacturer has received a trade enquiry from an overseas organisation interested in purchasing 6,000 units at a price of Rs.1.45 per unit.

As a professional management accountant, what would be your suggestion regarding acceptance or rejection of the offer? Support your suggestion with suitable quantitative information.

[Ans.: 15,000 units: Profit Rs.600; 6,000 units : Loss Rs.660; Total 21,000 units : Loss Rs.60; It is not profitable to accept the foreign offer.]

8. A company currently operating at 80% capacity has the following particulars.

	Rs.
Sales	32,00,000
Direct materials	10,00,000
Direct labour	4,00,000
Variable overheads	2,00,000
Fixed overheads	13,00,000

An export order has received that would utilise half the capacity of the factory. The order cannot be split, i.e., it has either to be taken in full and executed at 10% below the normal domestic prices are rejected totally.
The alternative available to the management are:

1. Reject the order and continue with the domestic sales only; (at as present); or
2. Accept the order, split capacity between overseas and domestic sales and turn away excess domestic demand; or
3. Increase capacity to accept the export order and maintain the present domestic sales by:

(a) buying an equipment that will increase capacity by 10%. This will result in an crease of Rs.1,00,000 in fixed costs; and

(b) Work overtime to met balance of required capacity. In that case, labour will be paid at one and half times the normal wage rate.

Prepare a comparative statement of profitability and suggest the best alternative.
[Ans.: Profit I Rs.3,00,000; II Rs.5,00,000; III Rs.9,50,000. Alternative III is the best because it results in the highest amount of profit.]

9. Prestige company private limited, manufacturing pressure cookers has drawn up the following budget for the year 2006-07.

	Rs.
Raw materials	20,00,000
Labour, stores, power and other variable costs	6,00,000
Manufacturing overheads	7,00,000
Variable distribution costs	4,00,000
General overheads including selling	3,00,000
Total	40,00,000
Income from sales	50,00,000
Budgeted profits	10,00,000

The General Manager suggests to reduce selling price by 5% and expects to achieve an additional volume of 50%. There is sufficient manufacturing capacity. More intensive manufacturing programme will involve additional costs of Rs.50,000 for production planning. It will also be necessary to open an additional sales office at the cost of Rs.1,00,000 per annum.

The Sales Manager, on the other hand, suggests to increase selling price by 10%, which it is estimated will reduce sales volume by 10%. At the same time saving in manufacturing overheads and general overheads at Rs.50,000 and Rs.1,00,000 per annum respectively is expected on this reduced volume.
Which of these two proposals would you accept and why?

[Ans.: Proposal I : Profit Rs.14,75,000; Proposal II Rs.14,00,000; Proposal I is acceptable as it gives higher profit.]

10. The following production/sales mix are capable of achievement in a factory.

i. 2,000 units of Product A and 2,000 units of product C.
ii. 4,000 units of product B.
iii. 1,000 units of product A, 2,000 units of product B and 1,600 units of product C.

Cost per unit is as follows.

	A	B	C
	Rs.	Rs.	Rs.
Direct material	20	16	40
Direct wages	8	10	20

Fixed cost is Rs.20,000 and variable overheads per unit of A, B and C are Rs.2, Rs.4 and Rs.4 and Rs.8 respectively. Selling prices of A, B and C are Rs.36, Rs.40 and Rs.100 per unit respectively. Determine the marginal contribution per unit of A, B and C and the profits resulting from product mixed (i), (ii) and (iii).

[Ans.: Marginal Contribution per unit; A Rs.6; B Rs.10; C Rs.32; Sales mix (iii) is profitable as it is yields the highest amount of contribution and profit.]

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