

BBM III Year

COST AND MANAGEMENT ACCOUNTING CONTENTS

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Chapter – 1

Scope and Significance of Cost Accounting

Objectives :

After going through this lesson we should be able to :

- Understand the meaning, definition and objectives of cost accounting
- Understand the advantages and limitations of cost accounting
- Discuss the installation of cost accounting system

Structure :

1.1 Introduction

1.2 Objectives of Cost Accounting

1.3 Advantages of Cost Accounting

1.4 Limitations of Cost Accounting

1.5 Installation of Cost Accounting System

1.6 Ideal System of Cost Accounting

1.7 Financial Accounting Vs. Cost Accounting

1.8 Questions

1.9 Suggested Readings

1.1 INTRODUCTION :

All aspects of accountancy have arisen from practical necessity. The oldest forms of accounting developed as a result of the need of commercial firms to present the resultant annual profit or loss. The emphasis of accounting is to know the profit or loss of a firm but not on other aspects like the profitability of a particular product or department; how much capital is locked up in unremunerative projects, how to control expenditure and reduce wastage etc. The main emphasis is on their ascertainment and exhibition fo

the profits earned or losses incurred by the business rather than on aspects of planning and control and decision making.

The cost of manufacture of products or of rendering a service is, no doubt, available in financial accounts for a division or enterprise as a whole and that too at the end of the accounting period. But if the cost of individual products or services and the profit or loss from each are required concurrently as the process of manufacture or of rendering the service proceeds, recourse has to be made to cost accounting. Cost Accounting developed as an advanced phase of accounting science trying to make up the deficiencies of financial accounts and is essentially a creation of the twentieth century. Let us know the meaning of Costing, Cost Accounting and Cost Accountancy.

Costing : Costing is the technique and process of ascertaining costs. It expresses faithfully the actual cost of any particular unit of production and also disclose how such total cost is constituted.

Cost Accounting : It is a normal mechanism by means of which costs of production and services are ascertained and controlled. It embraces all accounting procedures relating to recording of all income and expenditure and the preparation of periodical statements with a view to ascertain and control costs. Thus, it includes three things : Cost Ascertainment, Cost Presentation and Cost Control.

Cost Accountancy : It is the application of costing and cost accountancy principles methods and techniques to the science, art and practice of a cost accountant ascertainment of profitability. It is the science, art and practice of a Cost accountant.

1.1.1 Definitions :

Kohler in his dictionary for Accountants defines cost accounting as ``that branch of accounting dealing with the classification, recording, allocation, summarisation and reporting of current and prospective costs.

Mr. Wheldon defines cost accounting as ``the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services, the relation of these costs to sales values, and the ascertainment of profitability.”

1.1.2 Concepts used in Cost Accounting :

Costing : Costing is defined as "the technique and process of ascertaining costs of a given thing." This term is not being used except with qualifying adjective. Ex. Marginal Costing.

According to CIMA, it is defined as "the establishment budgets, standard costs, and actual costs of operations, processes, activities, or a products; and the analysis of variances, profitability or the social use of funds.

Cost Accounting : Cost accounting is defined as the "Process of Accounting for cost from the point at which expenses is incurred or committed to the establishment of its ultimate relationship with cost centres and cost units.

Cost Accountancy : Cost Accountancy is defined as "the application of costing and cost accounting 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 therefrom for the purpose of managerial decision making.

1.2 OBJECTIVES OF COST ACCOUNTING :

Cost Accounting data provides in valuable help to the management in taking routine decisions in determining the total cost, per unit and periodic profit, valuation of inventory, in carrying out the functions of planning, budgeting, organising, formulating policies and controlling of costs and the like.

- 1. To ascertain the cost of product(s) or service(s) and to determine the selling price** : The main objective of cost accounting is to ascertain the total cost and cost per unit of different products manufactured and services rendered by an undertaking. The cost data provides the basis for the fixation of selling prices. Generally, competition determines the selling price. If the occasion demands, with the help of cost accounts, the management may quote prices even below total costs but above marginal costs, to increase sales.
- 2. To control costs** : Another important objective and advantage of cost accounting is control of costs. This may be achieved with the help of budgets and standards set up for the guidance of the management and also by elimination of all types of wastages, by efficient inventory control and by improving operative efficiency.

- 3. To provide basis for the management to formulate policies and to carry out its functions efficiently :** Cost Accounting is designed and developed primarily to guide, assist and serve the management. It assists the management in conducting the business activities with utmost efficiency. To sum up, in the words of Blocker : ``Cost Accounting is to serve management in the execution of policies and in the comparison of actual and estimated results, in order that the value of each policy may be appraised and changed to the future conditions.
- 4.** To ascertain the profitable and unprofitable lines of activities.
- 5.** To find the causes that lead to profits/losses
- 6.** To provide basis for the preparation of budgets
- 7.** To provide a reliable basis for the preparation of tenders and estimates
- 8.** To reveal losses or inefficiencies of any form (such as idle time, spoilage, under-utilisation of plant and machinery, poor planning etc.)
- 9.** To establish effective control over material, men and overhead
- 10.** To enable to check and control wastages of all types.
- 11.** To assist in improving operative efficiency, not only the overall efficiency, but efficiency at every point.
- 12.** To establish an effective system of reporting
- 13.** To help in measuring the efficiency of wage system and to guide the management in the formulation and implementation of incentive bonus schemes based on productivity and cost saving.
- 14.** To enable the management to know and plug the inefficiencies and weak points in the business activities.
- 15.** To help the management in properly defining and fixing up of responsibilities on the employees.
- 16.** To identify cost centres and to meet the needs of cost accounting system
- 17.** To implement perpetual inventory system
- 18.** To prevent manipulating, pilferage, theft, misappropriations, etc., of materials and assist in furnishing correct and reliable cost data to the management.
- 19.** To help in the valuation of inventory
- 20.** To help in regulating production
- 21.** To inculcate the habit of making calculations before taking decisions
- 22.** To provide an independent and most reliable check on the accuracy of financial accounts through reconciliation of profits as per cost accounts and financial accounts.

23. To provide ready figures relating to problems like price fixation, price control, tariff protection, wage level fixation, settlement of disputes etc. for use by the government, wage tribunals, trade unions etc.

1.3 ADVANTAGES OF COST ACCOUNTING :

Concerned primarily with provision of cost information for internal use by management, cost accounting aids management in setting objectives and programmes of operation (which is known as planning), in comparing actual performance with expected performance (known as control), in financial reporting (called income measurement), and in making tactical and strategic decisions (also known as policy). This benefits to management may be summarised as under.

1. **Basis for fixing the price** : Cost forms a basis for fixing the price for a product or service. If the price is already decided in the market, then cost becomes a challenge to meet with.
2. **Formulate policies** : Helps the management in formulating several policies.
3. **Utilisation of resources** : Helps in the optimum utilisation of resources, Labour, machine, material etc.
4. **Locate causes** : Helps to locate the exact causes for the variation in profit or loss.
5. **Areas for corrective actions** : Helps to identify the areas requiring corrective actions
6. **Information for decision making** : Provides suitable information for taking managerial decisions such as make or buy, whether to accept an order or not, continue a product or discontinue, use the capacity or not, acceptability or otherwise of a project, to export or not etc.
7. **Facilitates comparison** : Helps to compare the costs of different activities and periods
8. **Effective control** : Helps to provide an effective control over various elements of cost.
9. **Efficiency** : Helps to practice efficient ways of performance
10. **Government policy** : Provides an useful information to Government and various bodies for taking decisions and formulating policies. For example, excise policies are framed based on cost details
11. **Management by exception** : Helps management by exception rendering reports of relevant costs and significant variances only.

- 12. Cost reduction** : Helps in introducing techniques for cost reduction, value analysis, cost benefit analysis, quantitative measurement etc.
- 13. Valuation** : Provides useful information to determine the cost of closing stock – raw material, WIP and finished goods.
- 14. Fixation of responsibility centres** : Facilitate fixation of responsibility centres such as profit, revenue, cost, investment, contribution centre, in order to exercise control and measure the growth.
- 15. Perpetual inventory system** : Helps to introduce perpetual inventory system.
- 16. Cost Audit** : Facilitates cost audit and management audit programme
- 17. Quotations** : Helps to prepare quotations for job orders or work orders
- 18. Control** : Helps to have effective control over materials, labour etc. for efficient management of the same.
- 19. Budgets** : Helps in preparing budgets and exercise budgetary control
- 20. Focus** : Focuses on profit and profitability position of the organisation.

1.4 LIMITATIONS OF COST ACCOUNTING :

Cost Accounting can never be an exact science because of the inherent element of judgement. There is, often no uniformity in costs ascertained by different cost accountants using the same data. Disagreements in the cost of a product usually arise owing to different procedures of cost ascertainment, allocation and apportionment followed by cost accountants. For this reason, cost results must be accepted as reasonable approach to accuracy and not as price measurements. Accuracy in cost accounting is, therefore, relative. Unless uniform principles are followed in the collection, allocation and apportionment of expenses, results are bound to be different. Also, costs have no utility in themselves. Their usefulness, to a large extent, depends on how promptly remedial steps are taken up by top management, once certain loopholes are detected and pointed out by the cost accountant.

- 1. It is expensive** : The system of cost accounting involves additional expenditure to be incurred in installing and maintaining it. However, before installing it, care must be taken to ensure that the benefits derived is more than the investment made on this system of accounting.
- 2. The system is more complex** : As the cost accounting system involve number of steps in ascertaining cost such as collection and classification of expenses, allocation and apportionment of expenses, it is considered to be complicated system of

accounts. Moreover, the system makes use of several documents and forms in preparing the reports. This will tend to delay in the preparation of accounts.

- 3. Inapplicability of same costing method and technique :** All business enterprises cannot make use of a single method and technique of costing. It all depends upon the nature of business and type of product manufactured by it. If a wrong technique and method is used, it misleads the results of business.
- 4. Not suitable for small scale units :** A cost accounting system is applicable only to a large sized business but not a small sized business but not to a small sized one. Hence, there is limitation to its application to all types of business.
- 5. Lack of accuracy :** The accuracy of cost accounting get distorted owing to the use of notional cost such as standard cost, estimated cost etc.
- 6. In lacks social accounting :** Cost accounting fails to take into accounts the social obligations of the business. In other words, social accounting is outside the purview of cost accounts.

1.5 INSTALLATION OF COST ACCOUNTING SYSTEM :

Cost Accounting is an independent system. Many advantages are derived to the organisation from this system. In the wake of computer invasion, the scope and horizon of the system has enlarged. It has become almost a necessity for every organisation in the light of severe competition. Vital cost information generated from the system helps to have competitive edge over others. Certain expenses are incurred to install this system. The advantages from the system would outweigh the expenses to be incurred, in the long run. Not only the big firms, even the small firms can develop cost consciousness by introducing the system in a simple and small way. Care should be taken to see that the system is installed properly otherwise it may become a burden to the firm,

The extent of the requirement and complexity of the system depends on the objectives of the management. It must not only meet the internal needs but also the external needs, such as legal requirements, Government and Industry.

Factors to be considered :

1. It should be simple, practical and easy to operate and understand
2. It should give accurate, timely and adequate information
3. Cost of installation should justify the advantages.
4. It should meet the requirements for a reasonably long period
5. It should be flexible and so adaptable to changing circumstances

6. It should be conducive and welcomed by the employees
7. It should be acceptable to the management
8. It should ensure efficient performance.

Steps :

Installation of cost accounting system involves steps which are broadly divided into two :

(A) Preliminary Steps :

At the outset, the information about the organisation should be obtained. They relate to

1. Nature of business and operating scale and size.
2. Nature of products manufactured and number of products or nature of service rendered
3. Operating processes and technicians involved
4. Organisational chart and Layout of factory
5. Details of objectives – main and subsidiary, responsibilities, departments, categorisation etc.
6. Material description
7. Operational flow charts and schedules.
8. Details of labour force
9. Existing physical facilities provided
10. Details of production and service departments
11. Establishment of standard time through time and motion study and work measurement
12. Examination of existing documents and reports for internal and external purposes.
13. Interaction with various levels of management

B. Final Steps : Against such a background, actual system is introduced through the following steps.

14. Establishment of organisational chart as revised and required
15. Codifying and Classifying of various cost elements
16. Developing cost centres and determining cost units.
17. Devising methods and determining basis for cost allocation, cost apportionment and cost absorption

18. Methods of segregating fixed and variable costs
19. Developing necessary and appropriate formats for statements and reports
20. Determining the periodicity for generating information
21. Establishing Chart of Accounts and Manual detailing the various control accounts to be maintained.
22. Guidelines for the appraisal and feedback of the Cost Accounting System.

1.6 IDEAL SYSTEM OF COST ACCOUNTING:

An ideal system of cost accounting when installed and handled properly will be able to offer a number of benefits to management, employees in particular and society in general. Such a system must possess the following features :

1. **Suitable** : It must be suitable. It must be devised according to the nature, conditions, requirements and size of the organisation.
2. **Simple** : It must be simple and easy to understand and implement.
3. **Flexible** : The system must be flexible enough to take note of changes that confront an organisation from time to time.
4. **Economical** : The system must be cost – effective. The benefits must outweigh the costs.
5. **Comparable** : The management must be able to make comparison of facts with the past figures, figures of other concerns or other departments of the same unit.
6. **Timely** : it must be able to provide useful cost data when required.
7. **Uniform** : All forms and proformas etc., necessary to the system should be of uniform size and quality.
8. **Labour – saving** : The system must involve minimum clerical work. Employees should feel it easy while implementing the system.
9. **Control** : It must provide for a satisfactory system of control over materials, labour and overhead costs.
10. **Reconciliation** : The system must be so devised that the financial as well as cost records are capable of easy reconciliation.

1.7 FINANCIAL ACCOUNTING VS. COST ACCOUNTING

Basis for Difference	Financial Accounting	Cost Accounting
1. Objective	The objective is to find out the profitability of operations during a particular period for the benefit of owners and outsiders.	The objective here is to help management through the provision of prompt cost data and thereby improve managerial decision making.
2. Coverage	Here, the transactions are recorded for a definite period. It mainly deals with all commercial transactions.	Here the transactions are identified with cost units. Attention is focussed on transactions relating to manufacturing.
3. Analysis of Costs	In Financial accounting the expenditure is analysed item-wise, e.g., wages, salaries, depreciation etc., hence it is not amenable for offering a commentary.	Records expenses by departments, elements, produces or processes to study them analytically.
4. Analysis of profits	The profitability of individual products or departments is not known.	The profits or loss relating to each job, process, operation department can be found out.
5. Material control	Material control is not ensured, as figures are not available.	A systematic procedure for purchasing, storing and issuing of materials exists.
6. Labour cost control	Wage sheets under financial accounting do not reveal labour efficiency, idle time and effective hours of work. Hence, control not possible.	Labour time records and wage sheets permit management to find out effective and idle hours and ensure control accordingly.
7. Cost Classification	Distinction between fixed and variable costs not	Costs are classified into fixed and variable elements and

	maintained.	attention is focussed on controllable costs, which can be reduced by suitable steps.
8. Stock Valuation	Here, stock valued at cost price or market price, whichever is less.	Here stock is valued at cost.
9. Control means	Does not provide any means to measure the efficiency and exercise control over costs.	Techniques like standard costing employed to ensure control over operations.
10. Recording	Records actual (historical) costs. It is only a post-mortem examination of events that have taken place, leaving very little room for initiative corrective steps promptly.	Actual facts are combined with estimated ones while recording transactions. Transactions are recorded in an objective manner, according to the purpose for which costs have been incurred.
11. Comparison	Data here is not sufficient for drawing inter-period and inter-firm comparisons from time to time.	Detailed comparison of results of two periods or two firms in an industry possible in cost accounting.
12. Legal need	Statements prepared as per the legal requirements, i.e., as laid down by Companies Act, Income Tax Act.	Statements prepared internally as per the managerial requirements.
13. Approach	Data generated for external parties. Deals with external transactions.	Data generated for managerial decision-making. Deals with internal transactions.

1.8 QUESTIONS

A. Short Answer Questions :

1. What is Costing?
2. Explain the advantages of costing.
3. What are the characteristics of good system of costing?
4. Explain the objectives of cost accounting.
5. Define the concept of cost accounting.

B. Essay Questions :

1. Explain the nature and scope of cost accounting
2. Define cost accounting and explain the advantages of it
3. Explain the benefits of limitations of cost accounting
4. Describe the objectives and advantages of cost accounting.
5. Distinguish between Financial Accounting and Cost Accounting
6. What essential points should be kept in view while installing a new costing system.
7. Bring out the pre requisites for the installation of cost accounting system.

1.9 SUGGESTED READINGS

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Chapter – 2

Role and Scope of Management Accounting

Objectives :

After reading this you should be able to :

- Understand the meaning, definition and scope of management accounting
- Distinguish Management Accounting with Financial Accounting and Cost Accounting.
- Know the tools and techniques of management accounting.
- Understand the functions, advantages and limitations of management accounting.

Structure :

2.1 Introduction

2.2 Scope of Management Accounting

2.3 Financial Accounting – Management Accounting –
Cost Accounting

2.4 Tools & Techniques of Management Accounting

2.5 Role of Management Accounting

2.6 Functions of Management Accounting

2.7 Advantages of Management Accounting

2.8 Limitations of Management Accounting

2.9 Questions

2.10 Suggested Readings

2.1 INTRODUCTION :

Accounting information is becoming increasingly critical to the continuing success of a business organisation. As business organisations have begun to recognise this vital

resource and their dependence on it, they have also begun to realise that a system for managing these resources is essential. This, perhaps the basic reason for business students to possess some knowledge about accounting.

Modern accounting as a dynamic and growing field has to monitor and analyse the rapidly changing business environment. It has to serve as a vehicle for communicating the essential data about the financial activities of a business to its management for making decisions. At the same time, management must possess a fair knowledge of tools and techniques that it can use for analysing and interpreting the available information in order to accomplish managerial objectives.

The term 'management accounting' is the modern concept of accounts as a tool of management. It is a broad term and is concerned with all such accounting information that is useful to management. In simple words, the term management accounting is applied to the provision of accounting information for management activities such as planning, controlling and decision making etc. Thus, 'any form of accounting which enables a business to be conducted more efficiently' may be regarded as management accounting. Management accounting information can help managers identify problems, solve problems and evaluate performance.

2.1.1 Meaning and Definition :

According to National Association of Accountants (USA), management accounting is 'the process of identification, measurement, accumulation, analysis, preparation and communication of financial information used by management to plan, evaluate and control within the organisation and to assure appropriate use and accountability for the resources.'

In the words of R. Anthony, 'Management Accounting is concerned with accounting information that is useful to management.'

J.L. Batty : 'Management Accounting is the term used to describe the accounting methods, system and technique which, coupled with special knowledge and ability, assist management in its task of maximising profits or minimising losses.'

ICMA London : Management accounting is the application of professional knowledge and skill in the preparation of accounting information in such a way as to assist management

in the formation of policies and in the planning and control of the operations of the undertaking.

T.G. Rose : Management accounting is the adaptation and analysis of accounting information and its diagnosis and explanation in such a way as to assist management.

2.2 SCOPE OF MANAGEMENT ACCOUNTING :

Management accounting has a very wide scope. It includes not only financial accounting and cost accounting but also all types of internal financial controls, internal audit, tax accounting, office services, cost control and other methods and control procedures. Thus scope of management accounting, inter alia includes the following.

- 1. General Accounting** : The general accounting records, external transactions covering cash receipt and payments, liabilities and setting up of sales and receivables. It also covers preparation of regular financial statements which are prepared from various account balances.
- 2. Cost Accounting** : It consists of the application of double entry technique of internal transactions which means the application of costs to jobs, operations, processing and products. It helps in sharpening the internal aspects of general accounting.
- 3. Budgeting and Forecasting** : This envisages the framing of budgets in cooperation with operating and other departments preferably using standard measures for amounts included in the budgets.
- 4. Cost Control Procedure** : These provides for internal reports which will compare actual and desired performance. It also helps in converting a budget into an operating plan.
- 5. Cost and Statistics** : It is concerned with provision of statistical and analytical services to the various departments of the organisation
- 6. Taxation** : This requires the computation of income in accordance with the income in accordance with the income tax laws and regulations, filing of returns and making tax payments on or before a specific date.
- 7. Methods and Procedures** : These deal with organisation reducing the cost and improving the efficiency of accounting a also of office operations, including and

preparation and issuance of accounting and other manuals, where these will prove useful.

2.3 FINANCIAL ACCOUNTING – MANAGEMENT ACCOUNTING – COST ACCOUNTING

Financial Accounting : The purpose of Accounting is to ascertain the financial results i.e., profit and loss in the operations during a specific period. It is also aimed at knowing the financial position, i.e., assets, liabilities and equity position at the end of the period.

Cost Accounting : The purpose of cost accounting is to analyse the expenditure so as to ascertain the cost of various products manufactured by the firm and fix the prices. It also helps in controlling the costs and providing necessary costing information to management for decision making.

Management Accounting : The purpose of management accounting is to assist the management in taking rational policy decisions. This branch of accounting is primarily concerned with providing the necessary accounting information about funds, costs, profits, etc., to the management.

Now let us go through the differences between Financial Accounting and Management Accounting.

2.3.1 Differences between Financial Accounting and Management Accounting

Basis for Difference	Financial Accounting	Management Accounting
1. Objective	The primary objective of financial accounting is to ascertain profit and to find out financial status of a	The primary objective of management accounting is to provide accounting information to the

	concern. It provides financial data of the organisation to the shareholders and creditors	management in day to day operations for taking proper decisions.
2. Nature	Financial Accounting is concerned almost exclusively with historical records and past performance	Management accounting is concerned with future plans and policies.`
3. Dependency	Financial accounting is not dependent on management accounting	Management accounting depends on financial accounting for vital information
4. Application of Accounting Principles	If adheres to Generally Accepted Accounting principles	Each accounting principles are not considered.
5. Approach	Financial Accounting is historical in approach. Financial accounts are the results of the past events, only past expenses and incomes are recorded	Management accounting is predictive in approach . It is concerned more with future Thus, all information are in the form estimates and budgets for future
6. Presentation	These accounts are presented in a specific form either prescribed by law or by convention	Here no such form is prescribed. The information can be presented in any way suitable to the management needs
7. Control	It does not lay emphasis on control	Management accounting control the performance of the organisation by preparing performance reports for each responsibility centre

8. Valuation of stock	Stocks are valued on the principle of cost or market price whichever is lower.	No such principle is followed for valuation of stocks
9. Statutory obligation	Financial accounting is guided by statutes	Management accounting is not statutory
10. Audit	Audit of financial accounts is compulsory	Audit of management accounts is not compulsory

2.3.2 Differences between Cost Accounting and Management Accounting

Basis for Difference	Cost Accounting	Management Accounting
1. Objective	The primary objective of cost accounting is to set routine, budgets and standards. It is mainly aimed at knowing the per unit cost of output.	The primary objective of management accounting is to measure actual performance and report to the management for taking corrective actions by detecting the mistakes.
2. Scope	It is primarily concerned with cost allocation	Its scope is wider. It covers financial accounting and tax accounting
3. Applicability	It is generally applicable to manufacturing concerns.	Management accounting methods and techniques are applicable to all concerns
4. Data used	Here quantitative figures are used	Here both quantitative and qualitative costs are used
5. Transactions	Cost accounting embraces internal as well as external	Management account is concern with internal

	transactions	transactions
6. Future Activities	Cost accounting does not attach importance to future activities.	Future activities are primarily considered.

2.4. TOOLS & TECHNIQUES OF MANAGEMENT ACCOUNTING :

Management accounting uses a number of tools and techniques to help management in achieving business goals. Some of the important tools and techniques are as follows.

- 1. Financial Planning :** Planning is necessary not only for efficient utilisation of available resources but also for better and progressive business results. It is more significant for financial functions because finance plays a deciding role in managerial decisions. Financial planning is the process of deciding in advance the financial objectives, policies and procedures. An organisation can achieve long term as well as short term financial objectives by employing financial planning. In the short term it can help a concern in meeting its obligations by balancing the flow of funds. At the same time, its proper application can ensure efficient utilisation of available financial resources in the long period.
- 2. Analysis of financial statement :** Financial Statement analysis is a growing and ever changing set of systems and procedures designed to provide decision-makers with relevant information derived from the basic sources of data such as company financial statements and government and industry publications. Over the years number of techniques have been devised to analyse financial statements e.g., comparative financial statements, common size statements, ratio analysis, trend analysis and funds flow statement.
- 3. Cost Accounting :** Cost Accounting is a vital part of the accounting system. It includes the recording, classifying, analysis and reporting of all cost aspects of company performance. The cost accounting procedures have to be designed with great care keeping in view the nature and requirements of the firm and the data required at the different levels of management for effective cost control and cost reduction.

4. **Standard Costing** : Another major technique for operating control through management accounting is standard costing. Under this arrangement standard costs are used to control the major activities of the business. Standard costs are predetermined targets against which actual results are evaluated. This is the basis for a system of management control, for which a proper monitoring of performance is a key factor. The variances between standard and actual costs are computed and reported to management.
5. **Marginal Costing** : Marginal costing is a managerial technique that considers only variable cost in the additional output decisions. It is a reporting system that values inventory and cost of sales at its manufacturing variable cost. It is frequently used an internal management reporting system.
6. **Budgetary Control** : Budgetary control refers to a system of business control that uses budgets to control the major activities of business. The budgets for all major activities of the business are prepared in advance. Generally, the budget is prepared by updating the previous year's figures in the light of some forward projections.
7. **Funds Flow analysis** : Funds flow analysis attempts to highlight the causes of change in the financial condition of a business enterprise between two dates. Any statement prepared for this purpose refers to as funds flow statement. A funds flow statement helps management in the efficient planning and control of cash.
8. **Management reporting** : Management reporting is considered as an essential component of a well designed planning and control system. Decision makers frequently require information on various aspects of business. Thus, it is the responsibility of the management accountant to communicate right information to the management at the right time and in a right manner.
9. **Statistical analysis** : Accountants frequently confront masses of data from which they draws systematic and logical conclusions.

2.5 ROLE OF MANAGEMENT ACCOUNTING :

The person who is entrusted with management accounting function in an organisation is known as Management Accountant. The position of the management accountant varies from organisation to organisation. He may be considered as head of the accounting department or as a member of the Board of Director or Controller. Whatever may be his designation and placement, his functions and duties will be the same.

The designation of the person who is entrusted with the management accounting functions in an organisation vary from company to company. In some large concerns, he is called controller or Management Accountant. In some other concerns he is designated as Chief Accountant or Chief Accounts Officer, Controller of Accounts, Finance Controller or Finance Director.

Whatever may be organisational setup and intra-organisational relationships, the practitioner of management accounting must be so placed that he is in a position to exercise effective independent judgement on business problems. He must be involved as an active participant in the management. As remarked by Anderson and Schmidt "the Management Accountant will be specially concerned about the problems of cooperation with all other organisation units. In some organisations he may be member of the board of directors, in other he may be subordinate to the managing director.

2.6 FUNCTIONS OF MANAGEMENT ACCOUNTING :

The primary objective of a management accounting system is to supply meaningful information to the management. To achieve this goal, it has to carry out many activities which are normally referred to as functions of management accounting. The major functions summarized below.

- 1. Planning :** Information and data provided by management accounting helps management to forecast and prepare short term and long term plans for the future activities of the business and formulate corporate strategy. For this purpose management accounting techniques like budgeting, standard costing, marginal costing, probability, correlation and regression, etc., are used.
- 2. Coordinating :** Management accounting techniques of planning also help in coordinating various business activities. For examples, while preparing budgets for various departments like production, sales, purchases etc. there should be full coordination so that there is no contradiction. By proper financial reporting, management accounting helps in achieving coordination in various business activities and accomplishing the set goals.
- 3. Controlling :** Controlling is a very important function of management and management accounting helps in controlling performance by control techniques such as standard costing, budgetary control, control ratios, internal audit etc.

- 4. Communication :** Management accounting system prepares reports for presentation to various levels of management which show the performance of various sections of the business. Such communication in the form of reports to various levels of management helps to exercise effective control on various business activities and successfully running the business.
- 5. Financial analysis and interpretation :** In order to make accounting data easily understandable, the management accounting offers various techniques of analysing, interpreting and presenting this data on non-accounting language so that every one in the organisation understands it. Ratio analysis cash flow and funds flow statements, trend analysis etc. are some of the management accounting techniques which may be used for the financial analysis and interpretation.
- 6. Qualitative information :** A part from monetary and quantitative data, management accounting provides qualitative information, which helps in taking better decisions. Quality of goods, customers and employees, legal judgements, opinion polls, logic, etc. are some of the examples of qualitative information supplied and used by the management accounting system for better management.
- 7. Tax Policies :** Management accounting system is responsible for tax policies and procedures and supervises and coordinates the reports prepared by various authorities.
- 8. Decision making :** Correct decision making is crucial to the success of a business. Management accounting has certain special techniques which help management in short term and long term decisions. For example, techniques like marginal costing, differential costing, discounted cash flow, etc., help in decision such as pricing of products, make or buy, discontinuance of a product line, capital expenditure etc.

2.7 ADVANTAGES OF MANAGEMENT ACCOUNTING :

Management accounting offers the following benefits to the enterprise.

1. It increases the efficiency in the activities of the business
2. It ensures efficient regulation of business activities by establishing efficient system of planning and budgeting
3. It makes possible the efficient utilisation of the available resources and thereby increase the return on capital employed.
4. It ensures effective control by comparing actual results with the standards

5. It maintains a good public relation by providing quality service to the customers of the business;
6. It provides means to motivate the employees of the organisation
7. It keeps management informed about the on-going operations enabling it to suggest remedial measures in case of deviations; and
8. It helps in evaluating the efficiency and effectiveness of the company's business policies with the incorporation of management audit.

2.8 LIMITATIONS OF MANAGEMENT ACCOUNTING :

Management accounting is a very useful tool of management. However, it suffers from certain limitations as stated below.

1. **Based on historical data** : Management accounting helps management in making decisions for the future but it is mainly based on the historical data supplied by financial accounting and cost accounting. This implies that historical data is used for making future decisions. In other words, if past data is not accurate, management decisions may not be correct.
2. **Lack of wide knowledge** : The management accountant should have knowledge of not only financial and cost accounting but also many allied subjects like economics, management, taxation, statistical and mathematical techniques etc. Lack of knowledge of these subjects on the part of management accountant limits the quality of management accounting.
3. **Complicated approach** : Management accounting provides mass of data using various accounting and non accounting subjects for decision making purpose. But sometimes, management avoids this complicated and lengthy course of decision making and makes decisions based on intuition. This leads to unscientific approach to decision making.
4. **Not a substitute of management** : Management accounting only provides information to management for decision making, but it is not a substitute of management and administration.
5. **Costly system** : The installation of management accounting system in an organisation is a costly affair as it requires a wide net work of management information system, rules and regulations. All this requires heavy investment and small concerns may not be able to afford it.

6. **Developing stage** : Management accounting is a relatively recent development and it has not fully developed as yet. This limits the utility of this system to management in making perfect and correct decisions.
7. **Lack of objectivity** : The interpretation of information provided by management accounting may be influenced by personal bias of the interpreter of data. This tells upon the quality of managerial decisions.
8. **Resistance from staff** : The existing accounting and management staff may not welcome the introduction of management accounting system. This may be because they look at the system with suspicion that will add to their work and responsibilities.

2.9 QUESTIONS

A. Short Answer Questions :

1. What are the limitations of Financial Accounting?
2. Define Management Accounting
3. State the scope of Management Accounting
4. State the role of the Management accountant in the Management of a firm.

B. Essay Questions :

1. What is management accounting? Explain the reasons for its origin.
2. Define Management Accounting. Explain objectives and functions.
3. Explain the functions of management accounting. State the nature and scope of management accounting.
4. Explain the detail the meaning, scope and objectives of management accounting.
5. Explain the differences between Cost accounting and Management Accounting
6. Explain the methods and techniques of management accountings
7. Explain the advantages and limitations of management accounting
8. Explain the differences between financial accounting and management accounting

2.10 SUGGESTED READINGS

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4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
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6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter - 3

MATERIALS

Objectives :

After reading this lesson you should be able to :

- Understand the meaning of material
- Need and requirements of material control
- Know the methods of purchasing, receiving and inspection of materials
- Understand the meaning of storekeeping, type of inventory records and inventory control methods.
- Discuss materials issue control, and the various methods of pricing materials

Structure :

3.1 Introduction

3.2 Material Control

3.3 Purchasing of Materials

3.4 Receiving and Inspection of Materials

3.5 Store keeping : Need

3.6 Classification and Codification of Materials

3.7 Inventory Records

3.8 Inventory Control Methods

3.9 Material Issue Control

3.10 Methods of Pricing of Material Issues

3.11 Pricing Material Issues : Methods

3.12 Questions

3.13 Exercises

3.14 Suggested Readings

3.1. INTRODUCTION :

In as much as materials costs for the average firm amount to roughly 50 percent of the total manufacturing costs, the importance of control in this area deserves special emphasis. It is not unusual to find that payments for materials represent the largest single use of cash. However, while most companies take great care to safeguard cash it is not unusual to find materials of even greater value handled almost without precaution. Where materials are not systematically controlled, excess stocks of some items are likely to occur with a consequent unnecessary tying up of capital and loss through obsolescence and deterioration. Many materials can be damaged by exposure to weather, others become obsolete or spoil if not used promptly, many materials can be lost by theft, and all can be wasted through careless usage. Ultimately the loss arising from carelessness, waste and pilferage may be incalculable. An efficient system of material control is, therefore, an indispensable concomitant of cost accounts. If a cost accounting system is to be fully effective, there must be a proper system for the control of material from the time an order is placed with a supplier until the material is issued to production.

Meaning

The term materials includes: raw materials, components (instruments), consumable stores (Soap, cotton waste etc.), tools and maintenance materials (spare parts). It may not be out of context to compare the term with that of inventories. The International Accounting Standards Committee has defined inventories as 'tangible property (a) held for sale in the ordinary course of business; (b) in the process of production for such sale; or (c) to be consumed in the production of goods or services for sale'. Thus, inventory may include, finished goods inventory, work-in-progress inventory and raw material inventory. Raw materials may be defined as commodities which will be consumed or changed in form during the manufacturing process in the purchaser's plant. It may be subdivided into (i) direct materials, or (ii) indirect materials. Direct materials are materials which can be specifically charged to production orders or to any class or type of product. They usually form part of the finished product and include boxes and containers into which the products are packed. Materials is direct only if it can conveniently and definitely be identified with or charged to a particular product, job, or process. If it cannot conveniently or economically be charged in this way, it should be classed as an indirect material to be spread over production on some logical basis. Indirect materials are materials which cannot be definitely assigned to a job or process. They are of insignificant value such as nuts, bolts and screws and which do not physically become part of the finished product. Indirect material may be used in the factory,

the office or the selling and distribution departments. The term supplies includes material used in production; like factory supplies, office supplies, delivery supplies, packing and shipping supplies. In practice, many concerns use the terms 'indirect material' and 'factory supplies' (oil, grease, brooms, rags, cleaning materials) synonymously. Finally, the term stores includes those items that are ordinarily kept in stock in a storeroom.

3.2. MATERIAL CONTROL :

Material control may be defined, in simple terms, as 'providing the right quantity of material of the right quality at the right time and place at the minimum cost'. It provides a systematic control over the procurement, storage and usage of materials and ensures an even flow of materials without creating excessive investment in inventories. In the words of Buyers and Holmes, 'material control is the system that ensures the provision of the required quantity of material of the required quality at the required time with the minimum amount of capital tied up'. Thus, the basic objectives of material control are : (I) to ensure regular and uninterrupted supply of material; (ii) to purchase materials of right quality on favourable terms; (iii) to ensure proper storage and proper handling of materials, and most importantly; (iv) to keep investments in inventories at a reasonable level.

3.2.1 Requirements of a system of Material Control :

Specific techniques for achieving the necessary control of materials vary from company to company according to size, organisational structure, type of goods manufactures, and other considerations. However, most modern systems of control include the following features :

1. The use of standard forms for orders, requisitions etc., upon which written and signed instructions are given.
2. The planning and programming of material requirements.
3. Centralization of purchasing under the authority of a competent buyer.
4. Materials must be properly classified and, where applicable, codified. To be effective, standardisation and simplification of materials should be undertaken.
5. Adequate physical safeguards for receipt, storage and issuance of materials.
6. The operation of internal check to ensure that all transactions involving materials and equipment are checked by reliable and independent officials.

7. The operation of efficient stock control procedures and records.
8. Control of budget of material and equipment purchases.
9. Co-ordination between the departments involved in the buying, receiving, inspection and storage of materials and in accounting for them.
10. Regular records to management upon purchases of materials, issues, stocks, and in particular obsolete stocks, returns to suppliers, spoilage and waste etc.

3.3 PURCHASING OF MATERIALS

3.3.1 Purchasing Department:

One of the important requirements of material control is the centralisation of purchasing under the direction and authority of a trained purchasing agent. In most of the organisations the responsibility for purchasing materials in correct quantities, at the proper time, and at most economical cost to the company is delegated to the purchasing Department. The Purchasing Department keeps itself informed of various sources of supply, negotiates purchase contracts, prepares purchase orders, and follows through to obtain delivery as promised. However, this arrangement is not always welcomed by all. It may be pertinent here to report about the controversy between centralised and decentralised purchasing.

3.3.2 Functions of Purchasing department :

The purchasing department should : (i) receive purchase requisitions for materials, supplies and equipment; (ii) keep informed concerning sources of supply, prices and shipping and delivery schedules; (iii) prepare and place purchase orders; and (iv) arrange for adequate and systematic reports between the purchasing, the receiving, and the accounting departments.

3.3.3. Purchasing Forms and Records :

Whilst there is room for considerable variation in practice, the principal forms and records used in connection with purchasing are as follows :

- (i) **Purchase Requisition** : The purchase Requisition is 'the formal instruction to the Buying Department to purchase goods'. The Department does not ordinarily initiate the purchase, it acts upon the receipt of the purchase requisition. The requisition may come from several sources among which are : (I) Stores department to replenish materials regularly carried in stock, (ii) Production department for material which is essential for immediate consumption, (iii) The Production Planning Department for material which is needed for orders schedules, (iv) Office manager, for supplies to be used in the office etc. According to Blocker and Weltmer, 'the purchase requisition serves the dual purpose of authorizing the purchasing department to make a purchase and provides a written record showing quantities, specifications, and date the purchase is required. Fig 1.1 shows a typical purchase requisition.

Purchase Requisition

Selwell Company Limited Purchase Requisition				
To				Requisition No.
Purchasing Department				
Deliver				
To.....				Date Required.....
.....				
Item No.	Quantity	Description	Unit Price	Amount Rs.
For use of Purchasing Department only			Required by :	
Purchase Order No....			Checked by :	
Supplier.....			Approved by :	
Delivery Date.....				

The Purchase requisition is usually prepared in duplicate, the original going to the purchasing department, and the duplicate being retained by the department issuing it. It contains, as illustrated above, the requisition number, date, department, quantity, description, specifications, signature of the person initiating the purchase and signature of the authorizing executive. Where many individuals are authorized to sign the requisitions, it is important to define each persons, responsibility clearly. In any case, the buyer must not accept any requisition that is not properly authorized. Chaos and confusion would result in where the buyer accepts requisitions from various departments without authorization. It is also necessary to check the requisitions thoroughly and see that all details given are correct.

- (ii) **Issue of tenders to suppliers** : On receipt of Purchase Requisition the Purchase Department would invite tenders or quotations for supply of goods through leading newspapers and magazines. The suppliers quote their terms or price and delivery payment. After the last date for receipt of quotations is over, the tenders are opened and a comparative statement is prepared.

Statement of Tender

Selwell Company Limited Comparative Statement of Tender							
P. O. No.....		Last purchase date :			Tender No.		
Material code		Rate :					
Date							
Sl. No.	Particulars	Quantity	Name of supplier	PRICE		Delivery Terms	Remarks
				Per Unit	Total		
Order placed : Order No.....for.....units of item No... With.....Company Prepared by : Purchase Manager :							

While finalising the list of suppliers, the reliability of the supplier and his previous record of supplying quality goods should receive meritorious attention. The financial stability and capacity to delivery goods on time should also be verified.

- (iii) **Purchase Order** : After having selected the supplier, the purchasing department should now prepare five copies of the purchase order. The supplier, stores, inspection department store accounting section, purchase department are sent one copy each. The purchase order is a written authorization to the supplier to supply a specified quantity and quality of materials according to the terms and conditions of the order. The purchase order is an important document not only from the legal point of view, but also from the accounting point of view. As a formal contract it binds the purchaser to accept the delivery and arrange payment for materials. The supplier, in turn, is expected to supply materials of right quality and at prices stated in the order. Thus the purchase order commits the organisation to a certain amount of expenditure and becomes a basis for making payment to supplier and pass the appropriate early in relevant accounting records.

Purchase Order

Selwell Company Limited Purchase Order					
To		Order No..... Requisition No..... Date.....			
Your quotation no.....dated.....has been accepted. Please supply the following materials in accordance with the instructions mentioned herein and charge to company.					
No.	Description of articles	Quantity	Rate	Amount	Remarks
Terms of Delivery : Terms of Payment : Special conditions :			Purchase Manager The Selwell Co. Ltd.		

3.4. RECEIVING AND INSPECTION OF MATERIALS

The supplier delivers the goods at the place specified. The receiving department should take care of the packages, open them and conduct a physical verification of the contents. In a small organisation, receiving and inspection of materials is done by the Storekeeper but in a large concern separate departments handle these functions. The receiving clerk or department should :

1. receive, unload, unpack and mark the goods received;
2. check the quantity and quality of materials received, note down their shortage and damage;
3. prepare a statement of the goods received, and
4. deliver the goods accepted to the Stores.

Inspection Report : Initially the receiving departments should compare the purchase order with the delivery note sent by the supplier to see whether goods of right quality and quantity are sent or not. If the goods received do not conform to the specifications contained in the purchase order, either goods are rejected or the purchase department is informed of the situation through an Inspection Report. The Inspection Report is prepared in triplicate, one copy is sent to supplier, one to the Stores and one to the Inspection Department.

Materials Inspection Note

Selwell Company Limited					
Materials Inspection Note					
From (supplier)		Inspection Note No.....			
.....		Date.....			
.....		Purchase Order No.....			
Stores code	Description	Qty. on order	Qty. Received	Qty. Rejected	Remarks
Special Remarks :					
INSPECTOR					

Before preparing the Inspection Report, the inspector should examine the various points to be checked (weight, count or measurement etc.), the standard expected, tolerances allowed and the method to be adopted. If necessary, certain laboratory tests can also be conducted.

(iv) Materials Debit Note : The goods rejected at this stage would be sent back to the supplier along with a Debit Note. There can be other reasons for issuing the Debit Note:

1. Short supply of materials.
2. Materials rejected on inspection.
3. Materials damaged in transit and not acceptable to the buyer.
4. Materials supplied not of required quality.
5. Discrepancies in the prices charged, discounts allowed etc.

Materials Debit Note

To Supplier	No Date..... P.O. No..... Invoice No.....					
Your account is debited with the value of materials mentioned hereunder for the reasons stated herein. Please confirm and reply,						
Item No.	Description	Qty.	Rejected	Rate	Amount	Remarks
Signed by : Purchasing Department						

In a similar manner, the Purchase Manager can also issue Credit Note to the supplier when the materials received are in excess of ordered quantity.

- (v) **Goods Received Note** : The Storekeeper prepares a Goods Received Note for the quantity of stock accepted in inspection. After five copies of this note are usually prepared to be sent to purchase department, accounting section, supplier, the department which initiated the requisition and the final copy to be retained by the storekeeper.

Goods Received Note

Selwell Company Limited Goods Received Note					
S.R. No. :		P.O. No. :		Inspection Note No :	
Date :		Date :		Date :	
Received from M/s.....under their delivery challan No.....dated.....					
the following materials against the above purchase order :					
Store Code No.	Description	Quantity	Rate	Amount	Remarks
Posted in Bin Card		Stores Ledger		Price By Storekeeper	

After issuing the Goods Received Note, the Storekeeper is responsible for the stocks. There are several advantages in preparing the Goods Received Note : (i) it acts as first acknowledgement of the materials received, (ii) it serves as a sound basis for the stores accounting, (iii) it enables the purchasing department to settle vendor's claims quickly, (iv) it helps in inventory control, and (v) it facilitates follow up action for returns and replacements.

Approval of Invoice :

Generally, the supplier sends an invoice in respect of materials supplied. It contains details regarding material supplied and the amount to be paid for it. On receipt of invoice, the

purchase department clerk checks and compares the details with the purchase order, materials received note, inspection report, materials debit note etc. to see that :

1. materials received were actually ordered.
2. Materials received conform with the quantity and quality ordered.
3. Materials supplied strictly as per the terms and conditions laid down in purchase order (discounts, price, freight etc.)
4. The arithmetical accuracy is also ensured.

Having checked all these items, the bill is passed and sent to the accounts section, which makes the payment by accepting a stamped.

3.5 STORE – KEEPING : NEED

When the materials have been received by the goods' clerk according to the purchase order, they are forwarded to the stores department where they are expected to be held and issued to production as and when required. Thus the stores department, usually headed by the Store – keeper, rendered an important service to manufacturing division and enables it to keep the production cycle going. Purchasing enables the organisation to obtain materials. But materials procured thus are not immediately processed. There is always a time gap between procurement of material and their final usage in production processes. During this period, materials have to be held in storage.

3.5.1 Meaning :

According to Alford and Beatty, 'Store- keeping is that aspect of material control which is concerned with the physical storage of goods'. Knowles and Thomson describe it as "the connecting link between the planning and production department and the shops. Parts and materials move through its such as money moves into and out of the commercial department of a bank." Thus, storekeeping is a service function. The storekeeper is the custodian of all the items kept in the store. He should take care of both the physical custody of materials in stock and also the clerical phase of stock records maintenance.

3.5.2. Objectives :

Efficient store – keeping involves management of materials with the following objectives :

1. Efficient and economical receiving, handling and issuing of stores items.
2. Effective use of storage space and labour.

3. Protecting goods stored against fire loss, labour, theft and obsolescence.
4. Minimising the cost of storage.
5. Ensuring adequate supply of stores to the production and service departments under proper authority.
6. Facilitating inventory taking.
7. Facilitating ordering of needed materials.

3.5.3 Importance :

Store – keeping helps the organisation to receive, store and distribute materials easily, quickly and efficiently. It permits the company to make use of resources and facilities in a prudent way. The dangers arising out of under stocking and overstocking are avoided and with minimum working capital the manufacturing operations are carried out. A continuous flow of requisite materials enables the company to keep the production cycle going and honour the commitments regarding delivery of goods to customers. Store keeping also helps in knowing the latest stock position and ensure timely replenishment of needed items. Further, materials are protected against damage, deterioration, pilferage, theft etc. All these crucial services enable the organisation to keep the cost of inventory at the lowest.

3.6 CLASSIFICATION AND CODIFICATION OF MATERIALS :

Efficient store – keeping requires a proper classification and codification of different items held in stock. For facilitating easy identification of materials, each item of stores should be given a distinct name. Similar items should be divided into sub – groups and a number of sub – groups classified under one major group. Classification is usually done on the basis of the nature and type of material. In case of engineering concerns, for instance, materials are classified into mild steel, alloy steel, stainless steel, tool steel etc. each group is then classified further into sub – groups on the basis of shape, size, colour, size and other similar features of the items. Classification of materials into various facilitates easy identification and issue of materials when necessary.

Codification is the procedure for assigning symbols for each stores item according to a plan. Coding may be done by allotting numbers, alphabets or both.

3.7 INVENTORY RECORDS

Two sets of records for materials received, issued or transferred are generally maintained; one set maintained by the store – keeper (Bin Card) and the other set by the costing office (Stores Ledger)

(a) Bin Card : Bin is a place, rack or cupboard where materials are stored. To each bin is attached a card to indicate the stock position of the bin. This card is known as bin card or stores card. Bin Card is maintained to (i) indicate the flow of material and to show the stock on hand; (ii) to enable preparation of interim P & L account and the Balance Sheet at any time without actual stocktaking ; and (iii) to facilitate continuous stocktaking.

(b) Stores Ledger : This ledger is kept in the cost office and is identical with the bin card except that receipts, issues and balances are shown along with their money values. This contains an account for every item of stores and makes a record of the receipts, issues and balances both in quantity and value. Thus, this ledger provides the information for the pricing of materials issued and the money value of each item of stores at any time.

Specimen

Stores Ledger

Folio No.	Max. Level
Description of Material	Re-ordering Level
Stores Code No.	Minimum Level
Bin Card No.	Ordering Period
Bin No.	E.O. Quantity

Date	Receipts				Issues				Balance		
	G.R. Note	Units	Rate Rs.	Amt. Rs.	M.R. No.	Units	Rate Rs.	Amt. Rs.	Units	Rate Rs.	Amt. Rs.

3.8 INVENTORY CONTROL METHODS

3.8.1. Fixation of Stock levels :

Inventory control demands the maintenance of every item of material at a low level, but at the same time making it available when needed. These twin objectives could be realized only through proper planning of inventory levels. Without proper planning, the firm may be compelled to incur losses in the form of either overstocking or under stocking. The store – keeper therefore fixes the maximum and minimum levels for important stores items on a regular basis. This is also known as ‘deemed and supply method of inventory control’. The various stock levels that are usually considered under this method are :

Maximum Level :

This is the level beyond which stock should not be maintained. In technical terms, it is the sum total of the minimum quantity and the economic order quantity. If stock levels go beyond this level, overstocking results in eating away capital, space and the energies of the store – keeper. The losses arising from depreciation in value, obsolescence, careless and reckless handling of materials also pose additional dangers. The maximum level is fixed after a careful conditional dangers. The maximum level is fixed after a careful consideration of : the availability of capital, space available in stores, rate of consumption, delivery time to obtain fresh stock, price fluctuations, cost of holding the inventories, seasonal nature of supply, fashion changes, changes in governmental policies, reorder level and economic order quantity.

Formula :
$$\text{Max. Stock Level} = (\text{Reorder Level} + \text{Reorder quantity}) - (\text{Minimum consumption} \times \text{Minimum recording period})$$
Minimum Level (Safety or buffer stock) :

This is the level below which the stock of an item should not fall. This is essentially a safety stock and hence, it is not normally touched. If the stock of an item goes below this level, there is every possibility of production being held up for want of materials. Consequently, the minimum level is fixed to avoid the danger of production dislocations due to the non – availability of materials. This level is decided on the basis of rate of consumption, the lead time, the availability of substitutes and reorder level.

Formula :

Minimum Stock level = Reorder level – (Average rate of consumption x Average Lead time)

Or

Min L = Reorder level – (Normal consumption x Normal reorder period or average delivery time)

Reorder Level (Ordering level)

This is the point at which the store – keeper should initiate purchase requisition for fresh supply. This is normally the point lying between the maximum and minimum levels. It is fixed in such a way that the difference between the minimum level and the reorder level is sufficient to meet the production requirements till fresh stocks arrive. Basically two factors : Maximum consumption and lead time, determine the reorder level.

Formula :

Reorder Level = Maximum consumption x Maximum reorder period

Or

= Minimum level + Consumption during the time required to get fresh supply.

Or

= Safety stock + Consumption during lead time

Illu.1 The following information is available in respect of a component.

Calculate reorder level and re-order quantity:-

Maximum stock level : 8,400 units

Budgeted consumption : Maximum 1500 units per month

Minimum 800 units per month

Estimated delivery period : Maximum 4 months

Minimum 2 months

Solution :

Calculation of Re – order Quantity:

Reorder level = Maximum consumption x Maximum time for delivery

= 1500 x 4

= 6,000 units

Maximum level = Reorder level + Reorder quantity – (Minimum consumption x Minimum time for delivery)

$$8,400 = 6,000 + \text{Re-order quantity} - (800 \times 2)$$

$$\text{Re-order quantity} = 8,400 - 6,000 + 1,600 = \mathbf{4,000 \text{ units.}}$$

Danger Level :

This is the level below which the stock should never be allowed to fall under normal circumstances. It is slightly less than the minimum level. When the materials reach danger level, the store – keeper should make special efforts to get fresh supplies, so that production is not held up for want of materials.

Formula :

$$\text{Danger level} = \text{Average rate of consumption} \times \text{Urgent supply time}$$

Average stock level :

Average stock level denotes the average stock held by a concern. It is calculated by the following formula

Formula :

$$\text{Average Stock Level} = \frac{1}{2} (\text{Maximum level} + \text{Minimum level})$$

A more refined version of measuring the average stock level takes the re-order quantity into account. Under this the average stock level is calculated thus :

$$\text{Average Stock Level} = \text{Minimum Stock Level} + \frac{1}{2} \text{Reorder}$$

Economic Order Quantity (Reordering quantity) :

It is the quantity of material which can be reasonably ordered at a time and purchased most economically. It is the quantity which is most favourable to order when fresh supplies are needed. Reorder quantity, it should be remembered, is such that when it is added to the minimum stock it does not exceed the maximum stock level. EOQ is fixed after taking the following costs into consideration :

- (a) Ordering cost :** This is the cost of placing an order and securing the supplies. It depends on the number of orders placed and the number of items ordered each time. Whenever orders increase number and fewer quantities are purchased on each order, the ordering cost would begin to rise.

$$\text{Annual ordering cost} = \frac{D}{Q} \times S$$

Where D = demand for item, Q = units to be purchased on each order and S = Cost per order.

(b) Carrying Cost : This is the cost of holding inventory known as possession cost, it includes storage cost, obsolescence and interest on invested funds. The larger the volume of inventory, the higher will be the inventory carrying cost.

(c) Depletion cost : This is the cost involved in failing to meet the demand. It refers to the penalties businessmen (have to) pay whenever demand exceeds supply. Known as shortage cost, it includes cost of expediting purchases, obtaining rush deliveries, wastage of manpower during production hold-up, loss of sales, loss of customers and goodwill etc. These arise primarily because of non – fulfillment of delivery promises due to non – availability of required material in the stores.

How much to buy a time ?

It is not easy to resolve this question. In case large quantities are to be purchased to avoid depletion costs, carrying costs would increase. In case we resort to hand-to-mouth buying to avoid high carrying costs, ordering cost (frequent purchasing in small quantities) and depletion costs would increase. Therefore, to determine the economic lot size, a happy balance has to be achieved between these apparently irreconcilable forces. In other words, when an order for material is placed, it must allow us economies in the form of discounts, transport costs etc. and enable us to avoid heavy expenses on account of storage, insurance etc.

Formula :

$$EOQ = \sqrt{\frac{2AB}{S}}$$

Where A = Annual consumption; B = Buying cost per order, S = Storage and carrying cost per unit per annum.

Thus the demand and supply method of inventory control places emphasis on two things : (i) it uses the principles of planning the demand and supply of each item at the lowest cost possible and the lowest possible inventory with operating requirements, and (ii) it develops economic purchasing and manufacturing lot sizes so as to minimize the total cost of procuring, storing and utilising each type of material.

Illu.2 Find out the Economic Order Quantity from the following particulars:

Annual usage = 6000 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 :

$$EOQ = \sqrt{\frac{2CO}{I}}$$

EOQ = Economic order quantity

C = Annual Consumption of materials 6000 units

O = Cost of placing and receiving an order = Rs.60

I = Annual carrying cost per unit = 10% of Inventory Value

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

$$EOQ = \sqrt{\frac{2 \times 6000 \times 60}{2}} = \sqrt{3,60,000} = 600 \text{ units}$$

Illu.3 : Find out E.O.Q. from the following:

Annual consumption 3600 units, price per unit Rs.4, cost of placing one order 32paise.

Cost of storage per year 25%.

Solution :

EOQ = Economic order Quantity

C = Annual Consumption of materials = 3,600 units

O = Cost of placing an order = 0.32ps

*I = cost of storage = 25/100 x Rs.4 = Rs.1.

$$\begin{aligned} EOQ &= \sqrt{\frac{2CO}{I}} = \sqrt{\frac{2 \times 3600 \times 0.32}{4 \times \frac{25}{100}}} \\ &= \sqrt{\frac{2304}{1}} = \sqrt{2304} = 48 \text{ units} \end{aligned}$$

∴ Economic order Quantity = 48 units

Lead time :

While determining inventory levels, lead time has to be kept in mind always. The level of inventory of an item will depend upon the length of lead time. The longer the time, the higher will be the level of inventory holdings. By lead time, we mean the time that lapses between the raising of the indent by the stores and the receipt of materials by them.

(a) The ABC Analysis (Control according to value) : In recent years the Always Better Control (also known as Proportional Parts Value Analysis) method has acquired significance in many large scale undertakings, where a considerable number of items of stores are undertakings, where a considerable number of items into three categories : (I) high priced materials (A), medium priced materials (B) and low priced materials (C). This classification permits management to give greater attention to the movement of costlier items in the inventory.

The annual consumption analysis of most organisations would show that a handful of items constitute less than 10 per cent of the total number but account for a substantial promotion of the total value of materials consumed. Such vital items are called "A" items. Similarly, large number of bottom items constituting over 70 per cent of the total number account for only 10 per cent of the value of materials consumed. While 'A' items will need careful control in estimating the requirements, making purchase schedule, calculating safety stock, prompt receipt and inspection, 'C' items need not be subjected to such a rigorous examination and control process. 'C' items can be controlled loosely. There can be large buffer stocks and the responsibility for making these available to the production can be fully delegated to lower levels of management. In the case of 'A' items maximum follow up, expediting, and strict control process must be ensured and these must be handled by senior officers only. The following table summarises how an organisation would treat the various items of stock according to their value.

A items 70% of value but 10% of total quantity	B items 25% of value but 35% of total quantity	C items 5% of value but 55% of total quantity
1. Rigorous control to be exercised	Moderate control may be necessary.	Can be subjected to loose control.
2. Cannot afford to have even low safety stocks.	Only low safety stocks.	High safety stocks can be had.
3. Maximum follow up and expediting necessary.	Follow – up action can be effected periodically.	Only in exceptional cases follow up ensured

4. Must be handled by top management because mistakes may prove to be suicidal.	Can be handled by middle management.	Can be fully delegated to lower levels of management.
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Thus on the basis of value of materials, the materials are conveniently categorised into three categories with a view to exercise a closer and more strict control over items having high value. Based on the principle of management by exception, this method enables the principle of management by exception, this method enables management to utilize working capital in a prudent way and ensure a high inventory turnover rate, with minimum cost.

Advantages : The advantages of ABC analysis are :

1. Ensures strict control over such items having a sizable investment in them.
2. Working capital could be put to use in a better way.
3. Helps in maintaining enough safety stock for 'C' category store items.
4. Enables the maintenance of a high inventory turnover rate.

(b) The perpetual Inventory System : As noted earlier, inventory means a 'schedule of items held at a particular point in time'. The perpetual inventory system aims at providing details regarding the quantity and value of each stock item at all times. According to ICMA, London, it is 'a system of records maintained by the controlling department, which reflects the physical movement of stocks and their current balance'. According to Wheldon, it is a 'method of recording stores balances after every receipt and issue, to facilitate simple terms, perpetual inventory system involves : (a) maintenance of Bin Card and Stores Ledger which show good received, issued and the stock on hand at any time; and (b) Continuous stock taking to compare the actual stock with stock shown by Bin Card and Stores Ledger. Since Bin Cards and Stores Ledger have already been discussed, we shall briefly discuss continuous stock taking system here.

Continuous Stocktaking : Continuous stocktaking is an essential feature of perpetual inventory system. Under this system, a permanent stocktaking team (usually internal audit staff) is appointed. This team compares the physical quantities shown in the bin card and the stores ledger. It makes note of condition of various stock items and studies stock turnover rate of each item. The stock turnover is done throughout the year. It makes a report in a statement known as Stores Audit Note which shows the date of verification, quantity as per Bin Card, actual stock, reasons for discrepancy and adjustments to be carried out.

3.9 MATERIALS ISSUE CONTROL

1. Issue Procedure :

The storekeeper receives materials and other items, stores them carefully and finally issues them to various departments in an organisation. He is responsible for every item received and stored under his care. Material control includes issue control, i.e., the store – keeper making issues against proper authorisation following as systematic procedure.

A standard procedure of material issue should have the following points :

1. Materials should be issued against proper authorisation only.
2. Issue of material should not take unduly long time causing inconvenience or interruption in production process.
3. Materials should be positioned in a convenient place, facilitating quick issue.
4. Materials should be properly classified with a view to avoid the issue of wrong materials.
5. Persons who come to draw materials from the stores should not be allowed to while away the time under some pretext.
6. Every issue should be recorded in proper records like bin cards, stock register etc.
7. Material issued should be priced and entered into the stores ledger by costing office and not by stores personnel.
8. Unauthorised persons should not be permitted to meddle with the stocks in any manner.

2. Objectives of Issue Control :

To ensure proper utilisation of materials, it is essential to control the materials effectively. While issuing materials, it is necessary that a proper control is exercised to ensure :

1. that the materials issued have been authentically authorised;
2. that every authorised issue of material has been properly and accurately accounted for; and
3. that every issue of material has been properly priced and charged to costs.

3. Material Requisition :

Materials should be issued by the store-keeper only on presentation of a duly authorised 'Material Requisition Note'. It is defined as a 'document which authorises and

records the issue of material for use'. It is a formal request to issue the materials stating description and quantity and the work order for which the material is required. The Materials Requisition Note should be signed by the requisitioner and authorised by a higher authority. Materials Requisition Note is prepared in triplicate, one for departmental reference and the other two meant for stores. The store-keeper will retain one copy after issuing materials and send the other copy to costing office for material pricing and passing entries. The specimen ruling of Materials Requisition Note is given below :

Materials Requisition Note

M. R. No.

Date.....

Job No.....

Stores L.F.....

Please issue the following materials, as detailed below :

S.No.	Description of Materials	Code No.	Quantity		Price		Remarks
			Required	Issued	Rate	Total	

Requisitioned by :

Issued by :

Bin No.

Authorised by :

Received by :

Bin Card No.

Costed by :

4. Bill of Materials :

A bill of materials is a list of all materials required for a specific job, process or work order. It is generally prepared by the production planning department and sent to the storekeeper in lieu of one or more material requisitions. It serves as an advance intimation to the store – keeper about the requirements and reduces the clerical work of issuing several requisitions. Four copies of the Bill of Materials are usually prepared. One copy of each is sent to the Production, Stores and Costing department and the fourth is retained by the Planning Department. A bill of materials performs the following functions.

1. It gives advance information to all concerned of the order to be executed.

2. It helps the store – keeper in initiating purchase requisitions in a timely fashion and keep the materials ready at the time of manufacture.
3. It reduces the clerical work of issuing several requisitions.

The specimen ruling of a bill of material is given below :

Bill of Materials

Job No.

No.....

Department authorised :

Date :.....

S.No.	Name	Code No.	Description	Quantity	Rate	Amount	Remarks

Prepared by : Checked by: Received by : Casted by : Store -keeper

5. Return of Materials :

Sometimes materials issued from store may be in the excess of the quantity required by department. The return of such excess materials to the store is accompanied by a note known as Materials Returned Note. The ruling of this note is somewhat similar to that of the Material Requisition Note. So it is printed in red to facilitate identification. It is prepared in duplicate and both the copies are to be signed by the store – keeper on receipt of materials. One copy is returned to the concerned section and the other copy is sent to the cost office. The specimen ruling of a Materials Returned Note is given below :

Materials Returned Note

No. :

Date:.....

Department

Job/ Order No. :

Quantity	Description	Code No.	Rate	Cost

Entered on Store Card :

Materials received by :.....

Signature of person returning Material

Date:.....

6. Transfer of Materials:

In some cases, part of the materials issued to one department or in respect of a particular job may be transferred directly to another department or job. This is permitted under special circumstances e.g., when a more urgent order has to be executed in place of a less urgent one. A strict procedure is generally laid down for such transfer; otherwise, it may not be properly accounted for. The materials such transferred directly from one department to another, are to be recorded in Material Transfer Note. The note is passed on to the Stores Department which, after necessary record, forwards it to the costing department. Given below is a specimen form of the note.

Materials Transfer Note

No. _____ Date :.....
 From: _____ To :
 Job No. _____ Job No.....
 Order No. _____

S.No.	Description	Qty.	Code	For cost office use		Remarks
				Rate	Amount	

Authorised by : _____ Receiver :.....
 Transfer _____ Priced by :.....
 Credit to Job No. _____ Debited to job No.:.....

7. Material losses :

In the process of handling, storage and usage of materials, a part of the materials may be wasted, spoiled or scrapped and thus lost. The problems of wastage, spoilage

and scrap are common to all manufacturing organisations. There is no uniformity, however, in the accounting treatment of these items. The most commonly followed practices in respect of these items are given below :

1. Wastage and its Treatment : Wastage is that portion of basic raw material, lost in the processing, having no value to be recovered. Wastage is a complete loss. Wastage may occur due to evaporation, breaking the bulk, loading and unloading, leakage, inefficient handling, fire etc. it may be visible or invisible. There can be two types of wastage, viz., normal wastage and abnormal wastage.

- i. **Normal Wastage:** Normal wastage is one which is natural and incidental to production. It is one which can be pre – determined on the basis of past experience. The wastage is unavoidable. The causes which bring about such wastage are : evaporation of oil, paints etc. absorption of moisture in the case of lime etc., natural deterioration (rusting), difficulty of breaking the bulk as in the case of coal etc. the costing rule is that the loss on account of normal wastage will be borne by the good units. Normal Wastage is treated as a part of cost, i.e., the rate per unit is inflated to recover the loss.
- ii. **Abnormal Wastage :** Loss of materials which is in excess of normal wastage is known as abnormal wastage. Such losses may be caused by any of the following factors : pilferage, defective storage, careless handling of materials, obsolescence, natural calamities, theft etc. The value of such type of wastage is not added to the cost of production but is transferred to Costing Profit and Loss Account so that a meaningful comparison of cost of production of different periods could be made. Abnormal wastage needs careful investigation to determine the causes so as to prevent recurrence.

2. Treatment of Scrap :

Scrap is the residue from certain types of manufacture, usually of small quantity and low value, recoverable without further processing. Scrap may arise on account of turnings, borings, trimmings etc. from metals on which certain machine operations are carried out. Examples of scrap are : metal from stamping operation; iron fillings, odd pieces of timber, strips of cloth, chemical residue etc., left after the completion of the manufacturing process. Scrap may occur because of : faulty planning, poor

manufacturing methods, employment of low quality materials, defective inspection methods, outdated machines and tools etc.

The usual methods for the treatment of scrap may be listed thus :

- i. When the value of scrap is negligible, the realisable value is credited to the costing profit and loss account as an abnormal gain. This method is simple but it fails to have effective control over scrap because no detailed records are maintained.
- ii. When several production orders are processed simultaneously, the sale value of the scrap may be deducted from the material cost or factory overhead. This will reduce the material cost or factory overhead. However, this methods fails to ensure effective control over scraps.
- iii. The value realised from sale of scrap may be credited to the particular job, process or operation.

3. Spoilage and its Treatment :

Spoilage occurs when goods are so damaged in course of manufacturing process as to become not rectifiable with some additional cost. Material used in spoiled units can be used again as material by the same or another process or product. Spoilage cost is the difference between the cost incurred up to the point of rejection less salvage value or cost of material used.

The treatment of cost of spoilage depends upon the nature of spoilage. If the spoilage is normal, the cost is to be borne by good units of output. In case of abnormal spoilage, cost of spoilage is transferred to Costing profit and Loss Account. When, the normal spoiled units are used again as raw material in the same manufacturing process, no separate treatment becomes necessary. If they are used for another process, job or order a proper credit should be given to the process, job or order a proper credit should be given to the process, job or order, giving rise to the spoilage keeping in view the utility value of the spoilage to the process, job or order for which the same is used.

4. Defectives and Accounting Treatment :

Defectives are the part of product which in the process of manufacturing, develop some imperfection. They are to be rectified at an extra cost of operation on it. Defective work is to be distinguished from spoiled work. There is some imperfection which can be brought up to the standard by additional materials or labour in respect of defective. But the spoiled work cannot be reconditioned and the units must be sold as scrap or second grade products.

Treatment : The usual methods regarding treatment of defectives are as follows :

- i. If the defective production is identified with a specific job or department, the cost of rectification is charged to that specific job or department.
- ii. If the defective production is not identified with a particular job or department, the cost of rectification is added to general factory overhead.
- iii. If the defective production is due to abnormal reasons, the rectification cost is transferred to Costing Profit and Loss account.

8. Cost of Containers :

1. Where the containers or the packing boxes are received free, the cost of the materials is not affected by them. But if these containers fetch a value in the market by their sale, the sale price is credited to the overheads.
2. Where the containers are non-returnable but charged in the invoice, the cost of such containers should be added to the purchase price of the materials.
3. Where the containers are returnable but are to be credited at the reduced price by the suppliers, on their return, only the difference in cost charged and credited should be added to the purchase price of the materials.
4. Where the returnable containers are to be credited by the suppliers at full value on their return, the cost of such containers is not to be added to the cost of the materials.

3.10. METHODS OF PRICING OF MATERIAL ISSUES

The material issued from the stores to the various jobs or orders should be priced at the value at which they are carried to stock. But, since materials in stock have been purchased in different consignment values at different prices, it is a problem to determine of pricing issues generally used are as follows :

A. Cost Price Methods :

1. First in First Out (FIFO)
2. Last in First Out (LIFO)
3. Highest in first out (HIFO)
4. Next in First out (NIFO)
5. Base Stock
6. Specific price.

B. Average Price Methods (Derived from Cost price)

1. Simple Average
2. Weighted Average
3. Periodic Simple Average
4. Periodic Weighed Average
5. Moving Simple Average
6. Moving Weighted Average.

C. Market Price Methods :

1. Replacement price
2. Realisable price

D. Notional Price Methods :

1. Standard Price
2. Inflated Price.

3.11. PRICING MATERIAL ISSUES : METHODS**Need for Pricing :**

Normally, materials must be priced for two reasons. They are : (i) when charged to production, and (ii) when materials are computed for financial statements. The need for determining the prices of material arises from the fluctuations in the prices of similar materials purchased on different dates.

Cost price of an article is significantly affected by the price at which materials are issued from the stores to the production department. Materials are frequently purchased at varying price and are issued to different production departments according to their needs. At what price should the materials issued on a requisition be charged to a production department ? If material is purchased for a specific job, pricing of such issue does not pose any problem. The price paid for the procurement of such material will be charged to that job. Frequent changes in the material prices, inflationary trends, nature of material and its storage and the frequency with which materials are issued to production departments are some of the matters which further complicate the pricing of material issues. However, in order to ascertain the cost of production per article as accurately as possible and value the closing stock of raw materials reflecting its true valuation, the pricing of material issue should have

to be based on some accepted principles. Before adopting a particular method of pricing materials issues, the following points should be considered :

1. As far as possible the method of pricing material issues should reflect the market price of the material.
2. The method should be simple and should not involve much adjustments at the closing period.
3. Frequency of receipt and issue transactions be taken into account.
4. The nature of materials and type of costing system be considered.
5. Frequent change in pricing material issues should, as far as possible, be avoided.
6. Cost of clerical work involved should be minimum
7. The proportion which raw materials bear to total cost should , as far as possible, be minimum.
8. The uniformity, if any, should be maintained within an industry.

There are different methods of pricing material issues which can be summarised in the following main categories :

1. Cost price methods :

- (i) The actual cost / specific price.
- (ii) First-in, First –out (FIFO) price.
- (iii) Last-in, First-out (LIFO) price.
- (iv) Next-in, First-out (NIFO) price.
- (v) Base stock price.
- (vi) Highest-in, first-out (HIFO) price.
- (vii) First-in, last-out (FILO) price.

2. Average cost price methods :

- (i) Simple average price,
- (ii) Weighted simple average price.
- (iii) Periodic simple average price.
- (iv) Periodic weighted average price
- (v) Moving simple average price
- (vi) Moving weighted average price.

3. Notional Price Methods :

- (i) Standard price.
- (ii) Inflated price.
- (iii) Replacement price.

Of the above, the following important methods are explained with suitable examples :

1. The actual Cost :

Under this method, the materials issued are priced at their actual cost which involves identification of each lot purchased. The identified cost is applicable for materials purchased for a specific job and for which separate cost records have been maintained. The material is stored at a special place avoiding much efforts in its identification and cost price incurred. The method may be usefully applied if purchase prices are fairly stable and material is readily identifiable.

2. First-in, First-out Method :

This method is commonly known as FIFO. The principle is that issues are priced in chronological order of the purchases and at their cost price. The materials received first are to be issued as soon as the material requisitions are received.

Advantages :

- (i) This is a very simple method and is useful for the issue of bulky materials with high price.
- (ii) Under this method, material is issued at near the market price. The last price of lot purchased is immediately issued first as soon as the material requisition is received.
- (iii) In periods of rising prices this method is suitable as the materials would be issued at the latest actual cost price. Thus, the method, to some extent, gives the benefit of accounting for inflation.
- (iv) This method is suitable in a falling market for purchases. Profits tend to rise as the cost of production reflects the lower material prices.
- (v) Under this method, neither profit nor loss is unduly made.

Disadvantages :

- (i) Calculations become very complicated, hence more chances of clerical errors.
- (ii) Like FIFO, more than one price is to be adopted for the same issue lot of materials.
- (iii) Comparison among similar jobs is very difficult because different jobs may bear different charges for materials.

- (iv) During falling markets, issues are priced at lower rates whereas materials in the stock purchased at higher rates need adjustments for valuation of closing stock purposes.

The following illustration will make the working of FIFO and LIFO methods and the distinction between the two fairly clear :

Illu.5 : The Stores Ledger Account of Materials B – 1 in the books of Chemical Processors Ltd. revealed the following transactions for the month of March 1990 :

1. On March 1, the opening balance on hand is 150 units @ Rs.15 each.
2. March 6, 150 units are purchased at Rs.15.50 each.
3. March 10, 180 units are issued on SR No. 105.
4. March 21, 150 units are purchased for Rs.15.60 each.
5. March 23, 160 units are issued on SR No. 110.
6. March 25, 10 units are returned to the stores. These units had been issued on March 10 on SR No. 105.

Prepare Stores Ledger Account on the basis of (i) FIFO and (ii) LIFO methods.

Solution :

(i) **FIFO Method :**

Stores Ledger Card

Date	Reference	Received			Issued			Balance		
		Units	Price Rs.	Amount Rs.	Units	Price Rs.	Amount Rs.	Units	Price Rs.	Amount Rs.
1982										
Mar 1	Balance							150	15.00	2,250
6	P.O. No.	150	15.50	2,325	150	15.00	2,715	150	15.60	
					30	15.50		150	15.50	4,575
10	S. R. 105							120	15.50	1,860
21	P. O. No.	150	15.60	2,340				120	15.50	
								150	15.60	4,200
23	S. R.				120	15.50	2,484	110	15.60	1,716
					40	15.60				
25	M. R.				10	15.50	155	10	15.50	
								110	15.60	1,871

(ii) LIFO Method :**Stores Ledger Card**

Date	Reference	Received			Issued			Balance		
		Units	Price Rs.	Amount Rs.	Units	Price Rs.	Amount Rs.	Units	Price Rs.	Amount Rs.
1982										
Mar 1	Balance							150	15.00	2,250
6	P.O. No.	150	15.50	2,325	150	15.50		150	15.60	
					30	15.60	2,775	150	15.50	4,575
10	S. R. 105							120	15.00	1,800
21	P. O. No.	150	15.60	2,340				120	15.00	
								150	15.60	4,140
23	S. R.				150	15.60	2,490	110	15.00	1,650
					10	15.00				
25	M. R.				10	15.00	150	10	15.00	1,800
								110	15.00	

Illu.6: The Stores Ledger Account of Material C in the books of Chemical Processors Ltd. revealed the following transactions for the Month of November, 1990:

November 1990

1. Opening Stock 200kg. @ Rs.7.50 per kg.
5. Received from Supplier S₁ 400kg. @ 7.75 per kg. (GRN No. 448)
8. Issued to Production Department 240kg. (S. R. No. 883)
10. Issued to Production Department 160kg. (S. R. No. 897)
12. Received from Supplier S₂ 500kg. @ Rs.7.90 per kg. (GRN No. 455)
15. Issued to Production Department 400kg. (S. R. No. 912)
16. Received from Supplier S₃ 250kg. @ 8.00 per kg.(GRN No. 461)
19. Received from Supplier S₁ 600kg. @ Rs.8.25 per kg. (GRN No. 469)
21. Issued to Production Department 350kg. (S. R. No. 946)
24. Issued to Production Department 260kg. (S. R. No. 959)
27. Issued to Production Department 340kg. (S. R. No. 974)

(GRN denotes Goods Received Notes. S. R. denotes Stores Requisition).

You are requested to price the issues and draw out the closing balances in the form of Stores Ledger Account under the pricing method suitable for any one of the following two alternatives:

- (i) The closing balances should be closely related to the current prices.
- (ii) The materials costs charged to production should be closely related to the current prices.

Solution :**Stores Ledger Account**

1990 Nov.	Receipts			Material C Issues				Balance			
	Kg.	Price Rs.	Amount Rs.	Kg.	Price		Amount Rs.		Kg.	Amount Rs.	
					(i)	(ii)	(i)	(ii)		(i)	(ii)
1.	200	7.50	1,500						200	1,500	1,500
5	400	7.75	3,100						600	4,600	4,600
8				240	7.50		1,500		360	2,790	2,740
					7.75	7.75	310	1,860	200	1,550	1,500
10				160	7.75	1,240	1,240	1,240			
12	500	7.90	3,950						700	5,500	5,450
15				400	7.75		1,550				
					7.90	7.90	1,580	3,160	300	2,370	2,290
16	250	8.00	2,000						550	4,370	4,290
19	600	8.25	4,950						1,150	9,320	9,240
21				350	7.90		2,370				
					8.00	8.25	400	2,888	800	6,550	6,352
24				260	8.00	8.25	1,600	2,062			
					8.25	8.00	495	80	540	4,455	4,210
27				340	8.25	8.00	2,805	1,920			
						7.90		790	200	1,650	1,500

- (i) The closing balance on the basis of first-in-first out pricing policy is closely related to current price as may be evident. The closing stock of 200kg. at the last purchase price of Rs.8.25 amounts to Rs.1,650.
- (ii) Material issues charged to production on the basis of last in first out pricing policy are closely related to the current prices and the closing stock is valued at the oldest price of Rs.7.50, i.e., Rs.1,500.

3. Base Stock Price :

Every enterprise has to maintain a minimum quantity of stock at all times. This minimum stock is also known as base stock. The quantity beyond the base or minimum stock is available for production purpose but the minimum stock is only used in case of emergency. The minimum or base stock is priced at the actual cost of the first lot of materials purchased or the minimum purchase price of stock while the moving portion of the store over and above the base stock is priced in conjunction with some other methods. It may be FIFO, LIFO or some average method. This method is generally used in industries having relatively long processing period and

where the cost of finished product is largely made up of basic raw materials – hides, crude oil, etc.

This method of pricing material issue cannot be used independently. Moreover, estimation of base stock may be difficult and it is not made up of fixed assets. Besides, this method suffers from all disadvantages of FIFO, LIFO and other average methods of pricing issues because it is dependent on other methods.

4. Highest-in, First-out (HIFO):

This method is based on the assumption that it is desirable to maintain the inventory value of materials at the lowest possible price. Hence, materials with highest price in the stock are issued first, irrespective of date of purchase. Suppose on the receipts side of stock ledger the units and their prices are : Jan 1, balance 100 units @ Rs.10.00 per unit; Jan 5, 200 units @ Rs.11; and Jan 10, 300 Units @ Rs.11.50 per unit. On Jan 15 a requisition for 200 units is received. The issue price, on the basis of HIFO, would be the highest purchase price between Jan1 and Jan 10. The highest price per unit is Rs.11.50, hence 200 units would be issued at this price.

This method has the advantage of recovering the highest price of the materials first and consequently valuing the closing stock on a conservative basis. Hence, undervaluation of closing stock results in creation of secret reserves. The method suffers from the amount of details needed in the records like FIFO and LIFO methods. It sounds well in theory, but in practice it is not popular.

Illu. 7 : The following are the transactions in respect of purchase and issue of components forming part of an assembly of a product manufactured by a firm which required to update its cost of production, very often for bidding tenders and finalising cost plus contracts.

Date	Quantity (in Nos.)	Particulars
1986		
January 5	1,000	Purchased at Rs.1.20 each
11	2,000	Issued
February 1	1,500	Purchased at Rs.1.30 each
18	2,400	Issued
26	1,000	Issued
March 8	1,000	Purchased at Rs.1.40 each

17	1,500	Purchased at Rs.1.30 each
28	2,000	Issued

The stock on January 1, 1986, was 5,000 Nos. valued at Rs.1.10 each. State the method you would adopt in pricing the issue of components giving reasons. What value would you place on stocks as on March 31 which happens to be the financial year-end and how would you treat the difference in value, if any, on the stock account ?

Solution :

Stock Ledger (LIFO Method)

Date	Receipts			Issues			Stock		
	Qty. Rs.	Rate Rs.	Value Rs.	Qty.	Rate Rs.	Value Rs.	Qty.	Rate Rs.	Value Rs.
Jan 1							5,000	1.10	5,500
5	1,000	1.20	1,200				6,000		6,700
11				1,000	1.20	1,200			
				1,000	1.10	1,100			
				2,000		2,300	4,000		4,400
Feb 1	1,500	1.30	1,950				5,500		6,350
18				1,500	1.30	1,950			
				900	1.10	990			
				2,400		2,940	3,100		3,410
26				1,000	1.10	1,100	2,100		2,310
Mar 8	1,000	1.40	1,400				3,100		3,710
17	1,500	1.30	1,950				4,600		5,660
28				1,500	1.30	1,950			
				400	1.40	700			
				2,000		2,650	2,600		3,010

The closing stock of 2,600 components represents 500 components purchased on March 8 @ Rs.1.40 and the balance, 2,100 components, represents the opening stock @ Rs.1.10. If the closing stock of 2,600 components is valued at the current rate of Rs.1.30, then the value of closing stock will be Rs.3,380. However, the value as shown in the ledger is Rs.3,010.

From the above calculations it is clearly evident that the purchase price is going up month by month. Therefore, during rising prices, it is better to adopt LIFO method of pricing issues.

Average price :

The methods of pricing material issues described so far are based on the assumption that the materials to be priced are either on the basis of actual cost price or exact cost. The average cost price is different from the actual cost price and is based on two assumptions : (i) when different lots of materials are received into store, their identity is usually lost as a lot and for that reason an issue cannot be made from the first or last lot of goods received, and (ii) the wide fluctuations in prices of purchases should be smoothed and the change in the issue price, if any, should be gradual. The average price method may either be simple average or weighted average or in some other variation form. The following methods of averaging issue prices are in use :

- (i) Simple average method.
- (ii) Periodic simple average method.
- (iii) Moving simple average method.
- (iv) Weighted average method.
- (v) Periodic weighted average method.
- (vi) Moving weighted average method.

5. Simple Average price :

According to the C.I.M.A. simple average price means "A price which is calculated by dividing the total of the prices of the materials in the stock from which the material to be priced could be drawn by the number of prices used in that total". Thus the prices of the receipt lots are average regardless of the quantity in each lot. Suppose, the following are the four different lots of materials in stock when the material is to be issued on a requisition slip.

- 500 units purchased @ Rs.6 per unit
- 1000 units purchased @ Rs.6.50 per unit
- 2000 units purchased @ Rs.7.50 per unit
- 4000 units purchased @ Rs.8.00 per unit.

The simple average price for the issue of materials will be worked out as follows :

$$\frac{\text{Rs.}6 + 6.50 + 7.50 + 8.00}{4} = \frac{28}{4} = \text{Rs.}7 \text{ pr unit.}$$

This method is suitable where there is uniformity in the lots purchased and the price fluctuations are very minor.

6. Periodic Simple Average :

The method is also based on the principle of simple average except that the issue price is fixed periodically, say, a month, instead of calculating fresh average price every time after receipt of a new consignment. It involves numerous calculations, ignores sharp fluctuations and requires heavy clerical work. Under this method actual cost price of materials is not recovered. Moreover, the issue price so determined is to be adopted for next month rather than the current month.

7. Moving Simple Average :

This method is the average of the average method. It is similar to the periodic method except that the average of a given number of period, say, 4 weeks, 4 months, is calculated by adding periodic averages of these periods and dividing it by the number of periods. In next period the periodic average of first period is omitted and that of next period for which issue rate is to be calculated is added. The method has the advantages and disadvantages of other average methods of pricing issues.

8. Weighted Average price :

According to the C.I.M.A., "A price which is calculated by dividing the total cost of materials in the stock from which the materials to be priced could be drawn by the total quantity of materials in the stock." The weighted average method takes into account both quantity and price of material in the store for determining the issue price. The weighted average price in the above illustration would be Rs.7.67 per unit calculated as below :

$$\frac{500 \times 6 + 1000 \times 6.50 + 200 \times 7.50 + 4000 \times 8}{500 + 1,000 + 2,000 + 4,000} = \frac{56,500}{7,500}$$

= Rs.7.53 per unit.

Weighted average is superior to simple average because the former recovers nearly cost price of the material from the production department. If all the 7,500 units are issued, the price recovered under the two methods would be as follows :

Simple Average
7,500 x Rs.7 = Rs.52,500

Weighed Average
7,500 x Rs.7.53 = Rs.56,475

It would be seen that the entire cost price of the material is not recovered under the simple average method whereas full cost price is recovered under the weighted average method (Rs.25 being due to rounding of the figure). Under this method issue price is calculated on receipt of materials and not on issue of materials. As soon as a fresh lot is received, a new price is calculated for future issue units the next lot of material is received. The following illustration will explain the working of two methods.

Illu. 8: The following transactions took place in respect of material A 5:

Date	Receipts Rate	Units	Issues Unit
1.3.91	1.00	400	
10.3.91	1.20	600	
16.3.91			500
19.3.91	1.30	500	
25.3.91			400

Prepare a priced ledger sheet, pricing the issues at :

(a) Simple Average Rate, and (b) Weighted Average Rate.

Solution :

Simple Average :

Notes :

(1) When material issue is to be made on 16.3.91, the average price would be as follows:

$$\text{Average Rate} = \frac{1.00 + 1.20}{2} = \frac{2.20}{2} = \text{Rs.1.10 per unit.}$$

(2) When material is issued on 25.3.90, the units in stock are 500 + 500 at Rs.1.20 and 1.30 per unit.

$$\text{Average Rate} = \frac{1.20 + 1.30}{2} = \frac{2.50}{2} = \text{Rs.1.25 per unit}$$

N. B : It must be notes that the lot which has been completely exhausted has been omitted for calculating the simple average rate on 25.3.91.

Weighted Average :

(1) Total units in the stock on 16.3.91 is 1,000 at Rs.1,120 thus weighted average would be :

$$\text{Weighted Average} = \frac{400 \times 1.00 + 600 \times 1.20}{400 + 600} = \frac{400 + 720}{1,000}$$

(2) Weighted average on 25.3.91 when 400 units are issued :

$$\frac{560 + 500 \times 1.30}{500 + 500} = 560 + 650 = \frac{1,210}{1,000} = \text{Rs.1.21 per unit}$$

$$= \frac{1,210}{1,000} = \text{Rs.1.12 per unit}$$

Note : Since units purchased on 1.3.91 have been completely exhausted, they have been omitted for calculating weighted average on 25.3.91.

(a) Simple Average Rate :

Stores Ledger Account

Date	Reference	Receipts			Issues			Balances	
		Rate Rs.	Qty. Rs.	Total Rs.	Rate Rs.	Qty.	Total Cost Rs.	Qty.	Balance
1.3.91	Material Received Note No....	1.00	400	400	-	-	-	400	400
10.3.91	M. R. No.	1.20	600	720	-	-	-	1,000	1,120
15.3.91	Requisition Slip No.....	-	-	-	1.10	500	550	500	570
19.3.91	M. R. Note No.....	1.30	500	650	-	-	-	1,000	1,220
25.3.91	Requisition Slip No.....	-	-	-	1.25	400	500	600	720

(b) Weighted Average Rate :

Stores Ledger Account

Date	Reference	Receipts			Issues			Balances	
		Rate Rs.	Qty. Rs.	Total Rs.	Rate Rs.	Qty.	Total Cost Rs.	Qty.	Balance
1.3.91	Material Received Note No....	1.00	400	400	-	-	-	400	400
10.3.91	M. R. No.	1.20	600	720	-	-	-	1,000	1,120
15.3.91	Requisition Slip No.....	-	-	-	1.12	500	560	500	560

19.3.91	M. R. Note No.....	1.30	500	650	-	-	-	1,000	1,210
25.3.91	Requisition Slip No.....	-	-	-	1.21	400	484	600	726

Illu. 9 : Pricing of issues of materials are made as per “weighted average price for previous month”. Accounting year is from April to March and the annual stock is valued at “Cost or price, whichever lower’. From the following particulars show the entries in a stores ledger and value the closing stock. How would you treat the difference in the stock value, if any?

- (a) February 1990 – weighted average price Rs.8.56 per kg.
 (b) Transactions in March 1990.

Date March 90	Receipts		Issues Kg.	Balance	
	Kg.	Value Rs.		Kg.	Value Rs.
1			1,800	2,200	19,800
2	6,000	55,500	1,800		
3			2,000		
4			2,000		
5	5,000	40,000			
7			3,000		
16	4,000	30,000	2,000		
22			3,000		
28	8,000	58,000	3,000		
30			2,000		

Solution :

Stores Ledger

(Method of pricing : Weighted average price for previous month Rs.8.50)

Date	Quantity	Receipts		Date	Qty.	Issues Price	Amount Rs.	Qty.	Balance	
		Price Rs.	Amount Rs.						Price Rs.	Amount Rs.
1.3								2,200	9.00	19,800
				1.3	1,800	8.50	15,300	400	9.00	4,500
2.3	6,000	9.25	55,500	2.3	1,800	8.50	15,300	4,000	9.00	44,700
				3.3	2,000	8.50	17,000	2,600	9.00	27,700

				4.3	2,100	8.50	17,850	500	9.00	9,850
5.3	5,000	8.00	40,000					5,500	9.00	49,850
				7.3	3,100	8.50	25,500	2,500	9.00	24,350
16.3	4,000	7.50	30,000	16.3	2,000	8.50	17,000	4,500	9.00	37,350
				22.3	3,000	8.50	25,500	1,500	9.00	11,850
28.3	8,000	7.25	58,080	28.3	3,000	8.50	25,500	6,500	9.00	44,350
				30.3	2,000	8.50	17,000	4,500	9.00	27,350
	23,000		1,83,500		20,800		1,75,950			

$$\text{weighted average price for March} = \frac{1,83,500}{23,000} = 7.98$$

Since current price (i.e., latest price) is lower than the weighted average cost for March, closing stock should be valued at the current price of Rs.7.25. But the value of closing inventory as per stores ledger is Rs.27,350 which is lower than the stock valued at current price (4,500 @ 7.25 = 32,625).

Thus stock value should be taken as per stores ledger balance. If the stock value had been higher than cost or price (which ever is lower), the difference should have been written off the profit and loss account.

Advantages :

- (i) This method is easy to operate since only simple calculations are involved.
- (ii) This method is more advantageous in case of high fluctuations in price and quantities of different purchase lots.
- (iii) Issue price is not calculated at every time a requisition is received rather it is calculated only when fresh purchase lot is received.
- (iv) The closing stock under this method indicates a fair value and it can be used for financial statements.
- (v) This method makes for uniformity of price where there are market fluctuations.
- (vi) It is suitable to manufacturing enterprises where several processes are involved.

Disadvantages :

- (i) Calculations in this method become more complicated specially when receipts are numerous and prices of materials are continually changing.

- (ii) The issue rate is to be calculated each time a new purchase is made even though no issue of material is involved.
- (iii) Excessive high or low prices for materials paid in the past are reflected for a considerable time.

9. Standard Price :

This method of pricing issues is based upon a standard price for a specified period. The standard price is a predetermined price or notional price and is not based on actual purchase cost. While determining the standard price, various influencing factors like quantity of purchase, quantity discount, anticipated price fluctuations and transportation costs are taken into consideration. The method is specially designed where standard costing is relevant. The standard price for all issues is predicted at the commencement of the accounting period. Any difference between the standard and actual price of purchase is known as material price variance and is transferred to various accounts.

The following is an illustration of receipts and issues where a standard price is used:

Illu. 10 : Receipts :

Date Jan 1 **100 Units @ Rs.1.10 each**
 Jan 18 **200 units @ Rs.1.10 each**

Issues:

Date Jan 3 **50 units**
 Jan 19 **100 units**
 Jan 26 **50 units** **all issued at standard rate of Rs.1.10 each unit**

Solution :

Stores Account

Date	Receipts			Issues			Balance	
	Rate	Qty.	Amount Rs.	Rate	Qty.	Amount Rs.	Qty.	Amount Rs.
Jan 1	1.10	100	110	-	-	-	100	119
3	-	-	-	1.10	50	55	50	55
18	1.10	200	220	-	-	-	250	275
19	-	-	-	1.10	100	110	150	165
26	-	-	-	1.10	150	165	-	-

Note: In the above illustration the standard rate of issues is Rs.1.10 whereas purchased price is also Rs.1.10 each unit. There is no variance in this illustration. The method had all merits and demerits of standard costing. Hence, for relative merits and demerits refer to the chapter on standard costing.

Illu. 11 : The purchases and issues of material X in the month of January 1990 are as follows :

Jan 3	Purchase	800 units @ Rs.20 per unit
Jan 8	Purchase	700 units @ Rs.18 per unit
Jan 9	Issue	600 units
Jan 11	Issue	800 units
Jan 17	purchase	800 units @ Rs.20 per unit
Jan 25	Purchase	500 units @ 25 per unit
Jan 31	Issue	1000 units

The standard price per unit of material is Rs.20 fixed for the year 1990. Show the Store Ledger entries and determine the price variance for the month of January.

Solution :

Stores Ledger Account

Method of Pricing : Standard

Material X

Month : January 1990

Date	Particulars	Qty.	Price	Amount Rs.	Date	Particulars	Qty.	Price	Amount Rs.
3	Purchase	800	20	16,000	9	Issue	600	20	12,000
8	Purchase	700	18	12,600	11	Issue	800	20	16,000
17	Purchase	800	20	16,000	31	Issue	1,000	20	20,000
25	Purchase	500	25	12,500		Balance	400		9,100
		2,800		57,100			2,800		57,100

If the closing stock is valued at standard rate of Rs.20 per unit, then its valuation comes down to Rs.8,000. The difference that is Rs.1,100 (Rs.9,100 – Rs.8,000) represents price variance which is adverse. When price variance is thrown out at the point of receipt of material at the store, then

Price variance = Rs.57,100 – 2,800 x 20 = Rs.1,100 adverse.

But when price variance is thrown out at the time of issue from store –

		Price variance
--	--	-----------------------

9.1.90	600 (20 – 20) =	Nil
11.1.90	200 (20 – 20) =	Nil
	600 (20 – 18) =	1200 favourable
31.1.90	100 (20 – 18) =	200
	800 (20 – 20) =	Nil
	100 (20 – 25) =	500 adverse
Total		900 favourable

Closing inventory in that case will be valued at the last purchase price i.e., Rs.25 and its valuation will be Rs.10,000.

Date	Particulars		Debit Rs.	Credit Rs.
	When price variance is thrown out on receipt in stores :			
	Material Price Variance To Stores Ledger Account	Dr.	1,100	1,100
	When price variance is thrown out on issue from stores :			
	Stores Ledger Account To Material Price Variance	Dr.	900	900

10. The market Price Method

This method is based on the idea that since the customer expects to pay the current price, he is prepared to buy the goods on prevailing market price, i.e., high or low as the case may be. Under this method, materials are issued at a price at which they can be replaced, i.e., at the market price prevailing on the date of issue. This method applies principally to materials purchased in advance for use in large quantities in anticipation of economic or profitable use, and in such items of stores either are obsolete or lying unused for a long time in the store. In such cases the realisable price would be advantageous. This method may be useful in such cases where quotation based on competitive market prices, so far as material is concerned, are sent. It is advantageous as it always reflects current cost of production.

This method suffers from various disadvantages :

- (i) It is very difficult to ascertain current price of each item of material at the time of issue, and hence the element of estimate and uncertainty are very much involved here.
- (ii) Under this method, the store records are not cleared of the full value of materials purchased unless the market price happens to coincide with the purchase price. So at the end of accounting period adjustments have to be made. Moreover, unearned profits or losses are reflected both in issue and stock value.
- (iii) This method cannot be applied for goods purchased for every-day manufacture.

The following is an illustration of pricing issues at market price :

Illu. 12 :

Purchases:

Jan 1 1,000 units @ Re.1 per unit

Jan 15 1,500 units @ Re.1 per unit

Issues :

Feb 10 500 units at Rs.1.10 per unit

May 15 1,000 units at Rs.1.25 per unit

Prepare a Stores Account.

Solution :

Stores Account

Date	Receipts			Issues		
	Rate Rs.	Qty.	Amount	Rate	Qty.	Amount
Jan 1	1.00	1,000	1,000	-	-	-
Feb 10	-	-	-	1.10	500	550.00
Mar 15	1.00	1,500	1,500	1.25	1,000	1,250.00
Mar 15	1.00	2,500	2,500		1,500	1,800.00
Balance			300	1.00	1,000	1,000.00
Gain on Material Issue		2,800			2,500	2,800.00

If would be seen that there is a gain of Rs.300 on account of material issues. This would be credited to a gain on Material Account.

Note : In the absence of market price for closing stock it has been valued at cost or market price whichever is less.

The formal entries would be :

(i)	Work-in-progress	1,800	
	To Materials		1,800
(ii)	Materials	300	
	To gain on materials		300

In case of loss the II entry would be reversed.

11. Inflated Price :

In some cases materials are issued above the cost price. The inflated price includes not only the cost of raw materials purchased but also contingencies and other related costs. Above all, certain losses arising out of evaporation, leakage's and loss due to loading and unloading of materials (like coal) have to be recovered. In all these circumstances, the price of materials is suitably pushed up to recover the full cost of the concerned materials.

Pricing of Returns :

It frequently happens that the materials issued to production departments are returned to the store on Material Return Note. The materials returned may be of the following types :

- (i) Unused portion of materials in the original form.
- (ii) Materials requisitioned for a specific job order which has been subsequently cancelled.
- (iii) Residuals, scraps, waste, etc.

The materials so returned are recorded in the respective bin cards and in the stores ledger either as receipts or as minus issue.

The unused returned materials may be valued by one of the following methods :

- (i) **At the same price at which issued :** Under this method, the materials returned by the various production departments are entered in the stores ledger at the original issue price. The relevant requisition slips are used for determining the issue price and entries are shown as minus issue. Alternatively, the returns may be recorded as a fresh purchase in the bin cards and stores ledger but at the original issue price (reference being made to original requisition slip).

- (ii) **At the Current price of issue** : Under this method, the return of materials are priced on the same rate at which materials are issued on the date of return of materials. But it may so happen that the date of return of materials may not coincide with the date of issue of materials. Under such circumstances material returned is to be priced on the issue rates proceeding the date of return of materials.

The pricing of the residual materials, scrap, waste and is done on a different basis depending upon the condition of the materials being returned. These returns are recorded separately and priced accordingly.

3.12. QUESTIONS

A. Short Answer Questions.

1. What is minimum level?
2. What is maximum level?
3. What is re-ordering level?
4. What is danger level?
5. What is ABC analysis method?
6. Draw up the specimen of Bin card.
7. Differentiate between bin card and stores ledger.
8. Write short notes on material control system.
9. Write short note on inventory carrying cost.
10. Write short note on weighted average price method.

B. Essay Questions :

1. Describe the meaning, objectives and basic principles of material control system.
2. Explain the concept of ABC analysis as a technique of inventory control
3. Give the advantages and disadvantages of the actual cost basis of pricing of material issues.
4. What are the methods of pricing material issues? When do you advocate pricing the issues at cost price based on LIFO?
5. Describe the FIFO and LIFO methods of pricing the issue of materials.

3.13 EXERCISES

1. Find out the economic order quantity from the following:

Annual usage 6000 units; cost of material per unit Rs.20; cost of placing and receiving one order Rs.120 and annual carrying cost per unit 10% of inventory value.

[Ans.: 848.52]

2. Calculate EOQ from the following

Annual consumption 600 units

Ordering cost Rs.12 per order

Carrying cost 20%

Price per unit Rs.20

[Ans.: 600 units]

3. Calculate Economic Order Quantity from the following particulars:

Annual consumption of materials 5,000 units

Ordering cost Rs.20 per order

Carrying cost per unit 8%

Price per unit Rs.250

[Ans.: 100 units]

4. Calculate the minimum stock level, maximum stock level, reordering level and average stock level:

(a) Minimum consumption = 100 units per day

(b) Maximum consumption = 150 units per day

(c) Normal consumption = 120 units per day

(d) Re-order period = 10 – 15 days

(e) Re-order quantity = 1500 units

(f) Normal re-order period = 12 days.

[Ans.: (a) Re order level = 2,250 units; (b) Minimum stock level : 810 units (c)

Maximum Stock level = 2,750 units; (d) Average stock level : 1,780 units]

5. Two components A and B are used as follows:

Normal usage: 50 units per week, Minimum usage 25 units per week, Maximum usage: 75 units per week, Re-order quantity A – 300 units, B – 500 units. Recorder period A; 4 to 6 weeks, B = 2 to 4 weeks.

Calculate for each component: a) Reorder level, b) Minimum level, c) Maximum level, d) Average stock level.

[Ans.: (a) A = 450 units; B = 300 units (b) A = 200 units B = 150 units; (c) A = 650 units; B = 750 units; (d) A = 425 units; B = 450 units]

6. The particulars of material A are as follows :

Normal Usage	20 units per week
Minimum Usage	30 units per week
Re-order quantity	10 units per week
Re-order Quantity	120 units
Re-order period	3 to 5 weeks

Calculate Minimum stock level, Maximum Stock level, Average stock level.

[Ans.: Re-order Level = 150 units; Minimum level = 70 units; Maximum level = 240 units; Average level = 130 units]

7. From the following particulars, prepare a stores ledger account charging the issues on the principle of "First in First out" (FIFO). The stores verification reports reveal a shortage of 5 tons on 15th and 4 tons on 28th January, 2003.

January 1	Opening balance 500 tons at Rs.20 per tone
2	Issued 100 tons
3	Issued 50 tons
7	Issued 200 tons
12	Purchased 200 tons @ Rs.19.50 per tone
13	Refund of surplus from a work order 20 tons (issued on 3rd January)
17	Issued 200 tons
21	Purchased 150 tons @ Rs.20.50 per tone.
25	Issued 250 tons
27	Purchased 300 tons @ 20 per tone
30	Refund of surplus from work order 15 tons @ Rs.20.50 per tone
31	Issued 300 tons.

[Ans.: Closing Stock Value : 71 units, per unit Rs.20 Amount Rs.1,420]

8. Prepare stores ledger account from the following transactions according to (1) FIFO and (2) LIFO methods of pricing issue of materials.

2004

- March 1 Purchased 250 units @ Rs.10 each
 March 3 Purchased 400 units @ Rs.12 each
 March 10 Issued 200 units
 March 16 Purchased 150 units @ Rs.9 each

March 21 Issued 300 units

March 24 Purchased 100 units @ Rs.13 each

March 27 Issued 220 units.

[Ans.: Value of Closing Stock : (1) FIFO : 180 units @ Rs.11.22 = Rs.2,020; (2) LIFO 180 units @ Rs.10 = Rs.1,800]

9. Prepare a storage ledger for the following transactions adopting 'LIFO' Method of Pricing of Issues.

1-1-2005:	Opening Balance 500 units @ Rs.3 per unit.
5-1-2005:	Issued out to production 20 units
7-1-2005:	Purchased 480 units @ Rs.4 per unit.
10-1-2005:	Issued out 200 units to production.
19-1-2005:	Issued out 260 units to production.

[Ans.: Closing Stock Value : 20 units @ Rs.4.00 = Rs.80]

10. The following are the particulars of the receipt and issue of materials in a factory during January 1988.

Jan. 1	Opening balance	1,000Kgs	At Rs.30
3	Issued	140Kgs.	
4	Issued	200Kgs.	
8	Issued	160Kgs.	
13	Received from vendor	400Kgs.	At Rs.35
15	Returned of surplus from a work order	30Kgs.	At Rs.28
16	Issued	300Kgs.	
18	Received from vendor	600Kgs.	At Rs.32
20	Issued	550Kgs.	
22	Received from vendor	400Kgs.	At Rs.34
24	Issued	250Kgs.	
29	Return of surplus from a work order	40Kgs.	At Rs.32
30	Received from vendor	200Kgs.	At Rs.36

Prepare Stores ledger showing the above transactions under F.I.F.O and L.I.F.O method.

[Ans.: Value of Closing Stock : (1) FIFO = 1,070 units @ Rs.33.49 = Rs.35,840; (2) LIFO = 1.070 units value Rs.34,730]

11. From the following prepare stores ledger by LIFO and weighed average methods:

2004	
Jan. 1	Balance of units in stores 500@ Rs.15 per unit.
5	Purchases 1200 units @ Rs.16 per unit.
8	Issues 1000 units.
10	Received 600 units from stores supplies @ Rs.16.50 per unit.
15	Issues to workshop 'A' 500 units.
20	Purchase of stores from the market 800 units @ Rs.18 per unit.
25	Issued to production department 'x' 600 units.
30	Returns from workshop 'A' 20 units.
31	Purchased 400 units from a credit supplier @ Rs.17.50 per unit.
31	Issue to production department 'Y' 400 units.

[Ans.: Closing stock value : (1) LIFO : 1,020 units @ Rs.15.96 = Rs.16,280; (2) Weighted Average Method : 1,020 units @ Rs.17.15 = Rs.17,498]

12. From the following particulars prepare stores ledger under FIFO and Weighted average methods.

2004	
Jan 1	Balance 500 units at Rs.25 per unit
3	Issues 250 units
10	Purchases 200 units at Rs.26 per unit
12	Returns from departments 15 units at Rs.24
15	Issues 180 units.
16	Stock verification reveals loss of 5 units
20	Purchases 320 units at Rs.30 per unit
28	Stock verification reveals of loss of 8 units
30	Issues 112 units

[Ans.: Value of Closing Stock : (1) FIFO = 480 units value Rs.13,730; (2) Weighted Average Method = 480 units value Rs.13,369]

13. The following information is provided by Swetha Industries for the month of May 2002:

Purchases:

5-5-2002 300 Units @ Rs.6 each

8-5-2002 500 Units @ Rs.7 each

12-5-2002 600 Units @ Rs.8 each

20-5-2002 300 Units @ Rs.10 each

Issues:

6-5-2002 250 Units

10-5-2002 400 Units

14-5-2002 500 Units

25-5-2002 200 Units

Calculate using 'Simple Average Method' of pricing issues:

- i) The Value of materials consumed during the period and
- ii) The value of Stock of materials on 15-5-02.

[Ans.: (1) Rs.9,525; (ii) Rs.4,075]

14. Prepare a statement showing pricing of issues on the basis of simple average method from the following information:

March 2003

- | | |
|----|-------------------------------------|
| 1 | Purchased 200 units @ Rs.10 each |
| 2 | Purchased 400 units @ Rs.10.20 each |
| 5 | Issued 500 units to job X |
| 7 | Purchased 600 units @ Rs.10.50 each |
| 10 | Purchased 400 units @ Rs.10.80 each |
| 13 | Issued 400 units to Job Y |
| 18 | Issued 400 units to Job X |
| 20 | Purchased 200 units @ Rs.11 each |
| 25 | Issued 300 units to Job A |

[Ans.: Value of closing Stock = 200 units @ 10.60 = Rs.2,120]

15. The following is an extract of the record of receipt and issue of raw material x in a factory during a month.

2005	
January 1 st	Purchased 500 units @ Rs.2.00 per unit
January 6 th	Purchased 300 units @ Rs.2.10 per unit
January 13 th	Issued 600 units
January 19 th	Purchased 400 units @ Rs.2.20 per unit
January 23 rd	Issued 300 units
January 27 th	Purchased 500 units @ Rs.2.10 per unit
January 31 st	Issued 200 units

Prepare a stores ledger a/c according to base stock method when it operates with (a) FIFO (b) LIFO. Base stock is 200 units.

[Ans.: Value of closing Stock : (a) FIFO = 600 units @ Rs.2.07 = Rs.41,240; (b) LIFO = 600 units @ Rs.2.08 = Rs.1,250]

3.14 SUGGESTED READINGS :

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
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4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
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Chapter - 4

LABOUR

Objectives :

After going through this lesson you should be able to

- Understand the meaning of direct and indirect labour and the need for control over labour costs.
- Know the purposes of time keeping department, methods of time keeping and treatment of idle time etc.
- Discuss the different methods of remunerating the labour along with their pros and cons.

Structure

4.1 Introduction

4.2 Direct and Indirect Labour

4.3 Control over Labour Costs

4.4 Personal Department

4.5 Time keeping Department

4.6 Treatment of Idle Time, Overtime, Holiday pay etc.

4.7 Labour Turnover

4.8 Methods of Remunerating Labour

4.9 Questions

4.10 Exercises

4.11 Suggested Readings

4.1. INTRODUCTION

Labour cost constitutes a significant portion of the total cost of a product manufactured or service rendered. Efficient and effective utilisation of labour, therefore, is an important need of the modern business world. To this end, everything concerned with employment and

utilisation of labour force should be looked into carefully. A rational approach to the problems of labour-fair maintenance of wage records for wage ascertainment, fair wage policy and incentives for superior performance-will go a long way in providing a sense of security and stability to the workmen, in minimising labour turnover and in exercising effective labour cost control.

4.2 DIRECT AND INDIRECT LABOUR :

Labour can be direct as well as indirect. The labour spent in altering the construction, composition and condition of the product is known as Direct Labour. It must be directly identifiable with the products so that direct allocation to cost centre or cost unit is possible (Examples of direct labour are operators in production process, operators directly engaged in manufacturing jobs, workers in assembly lines etc.) 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 examples of indirect labour are supervisors, sweepers, watchmen, time-keeper, repairers etc. the cost of indirect labour cannot be conveniently allocated to a particular job, order or process.

The line of demarcation between direct and indirect labour is very thin. For example wages paid to a foreman at a fixed point of production are direct. On the other hand, if he is engaged for repairing various machines in the factory – thereby making identification difficult and costly – his wages would be indirect. Nevertheless, this distinction is essential because : (i) direct labour is part and parcel of prime cost whereas indirect labour costs are treated as overheads; (ii) it helps in preparing labour cost estimates; (iii) it facilitates introduction of incentive schemes and (iv) it prevents errors in the allocation of overheads.

4.3 CONTROL OVER LABOUR COSTS

The importance of controlling labour costs need not be over-emphasized because usually it forms the major part of the total cost. Management is interested in keeping the labour costs under control :

1. to use direct labour cost as a basis for increasing the efficiency of workers;
2. to identify direct labour cost with product, orders, jobs or processes for ascertaining the cost of every product, order, job or process;
3. to employ direct labour cost as a basis for absorption of overhead, if percentage of direct labour cost to overhead is to be used as a method of absorption of overhead;

4. to determine indirect labour cost to be treated as overhead, and
5. to reduce the labour turnover.

This, in turn, demands employment of competent workers, maintenance of proper records and payment of wages on an equitable basis. In a large industrial concern there are five departments for effecting control over labour costs :

1. Personal Department,
2. Engineering Department,
3. Time-keeping department,
4. Pay-roll Department,
5. Cost Accounting Department.

4.4 PERSONAL DEPARTMENT :

The Personal department has to hire the workers, train them and place them on appropriate jobs. Whenever a new worker is recruited, a copy of the appointment letter must be sent to Time keeping Department for recording attendance and to Pay Roll Department for making enrolment in the Pay Roll. Following are the two important records used in connection with the recruitment and placement of workers :

Employees History Card :

A personal card is kept for each employee by the Personal Department. This card serves the dual purpose of keeping an account of the personal data and also the general performance of the employee during the term of his employment. It usually contains details regarding particulars of employee, medical category, previous employer, clock number, date of joining occupation, rate of pay etc. A specimen of an employee's card is given below :

Employee's History Card

	No.....
Name	Category.....
Department.....	Engaged on.....
Address.....	As.....
Date of birth.....	Grade.....
Education.....	Starting pay.....
Material Status.....	Children.....
	Previous employer.....

Reasons for leaving.....
Re-engaged.....

Particulars of Changes in Pay and Service

Date	Trade	Grade	Pay	Reason for change (increment, promotion, demotion etc.)	Remarks

Columns are generally provided on the reverse side of the card to give information regarding leave entitlement, leave taken, medical and other benefits availed by the worker.

4.5 TIME KEEPING DEPARTMENT :

For the purpose of maintaining discipline, regularity and punctuality in the factory's working, proper attendance records for each worker must be maintained. The Time Keeping Department looks after this function usually. The work of time recording is usually divided into two parts (I) Time Keeping and (ii) Time Booking. Time keeping means the recording of time of worker's arrival at and departure from factory for the purpose of attendance and preparation of wage sheets.

4.5.1 Time Keeping : Purposes

Recording of time is essential for the following purposes :

1. Preparation of Pay Rolls, where the workers are paid on time basis.
2. Meeting the statutory requirements.
3. For internal administration, like increments, pension, provident fund, gratuity and leave benefits.
4. For proper distinction between direct and indirect costs, normal time and overtime, and regular and late comers.
5. For overhead rates, if based on labour hours.
6. For enforcing regularity, discipline and ensuring daily requirement of labour force in the factory.

4.5.2. Methods of Time keeping :

The following are the usual methods of recording attendance of workers.

1. Manual Methods :

- (a) Attendance Register Method
- (b) Disc or Token Method.

2. Mechanical Methods :

- (a) Time Recording Clock Method
- (b) Dial Recorders and Key Recorders.

3. Job Cards : A Job Card is used to keep a close check on the time spent by a worker on each job which he does during the day. Its main objects are :

- (a) Authorising the worker to carry out the operation of described therein,
- (b) Facilitating time booking to the job done.

Usually, one card is issued to worker by the shop supervisor at a time. When the worker starts the work he records the time through the time recording clock on the card. The card is punched again at the end of the work or when the operation is over. When the operation is too long and the worker has to discontinue his work either for meals or for personal work he has again to punch the 'off' and 'on' time to keep record of the time not spent on the job or operation. When the job is finished, he has to surrender the card to the time-keeper and he is issued another job card with the start time recorded i.e., the same time.

Job Card for Each Worker

Name.....

Department.....

Clock No.....

Week Ending.....

Cost Centre.....

Date	Job No.	Description	Time			For Cost Office	
			In	Out	Hours	Rate	Amount
Mon.							
Tue.							
Wed.							
Thurs.							
Fri.							
Sat.							

Worker

Foreman

Ref.....

Date.....

Some times, job cards are issued for each job separately. Such a card gives total time spent by different workers on different operations involved in finishing a job. It helps in determining the total labour cost for the job fairly easily. However, it does not provide the total time spent by a single worker on different operations.

4.6 TREATMENT OF IDLE TIME, OVERTIME, HOLIDAY PAY ETC.

Idle Time:

Idle time denotes payment made to a worker for a period during which he remains 'idle' and does no work. It is the time for which the employer pays without any benefit to him. Idle time is represented by the difference between the time clocked at the gates of the factory and the time actually spent on production.

Types :

Idle time is of two types- normal idle time and abnormal idle time. Normal idle time is mainly due to unavoidable reasons such as time required to go from gate to the department, waiting time in changing jobs and machines, time taken in receiving instructions from foreman, tea and lunch breaks and time for attending personal needs. Abnormal idle time is the wasted time, which can be avoided. For example, machine breakdown, power failure, strike lack outs, depression, scarcity of materials etc.

Causes :

The following are the causes of idle time :

1. Productive Causes which may be further categorised as under :

- (a) Waiting for work
- (b) Waiting for tools and/or raw materials
- (c) Waiting for instructions
- (d) Power failure
- (e) Machine breakdown
- (f) Tea break etc.

2. Administrative Causes : i.e., arising out of administrative decisions, e.g., when there is a surplus capacity of plant and machinery which the management decide not to work, there may be some idle time.

3. Economic Causes : Stoppage of production due to non-availability of raw materials, fall in demand, etc.

Some of the causes mentioned are controllable internally while others are beyond the control of management. Therefore, from the standpoint of controllability, idle time may be of two types :

- (a) Controllable i.e., idle time due to productive causes is subject to control internally.
- (b) Uncontrollable e.g., idle time arising out of economic and administrative causes.

Treatment :

Cost of normal idle time may be treated in either of the following ways : (I) Spreading idle time cost over effective hours by inflating hourly rate proportionately (ii) Charging the idle time cost as an overhead expenses, (iii) If the responsibilities can be allocated to a departmental overhead. Cost of abnormal idle time is written off to costing profit and loss account.

Overtime :

Overtime is the extra time put in by workers who work beyond their normal hours of work. According to the Indian Factories Act, no adult workers shall be required or allowed to work for more than 9 hours in any day or 48 hours in any week. Where, however, a worker works for more than 9 hours on any day or for more than 40 hours in any week, he has to be paid for his overtime work at twice his ordinary, rate. The additional amount paid on account of overtime is known as overtime premium. For calculating the overtime wages, the term 'ordinary rate' includes basic wages and allowances also.]

Treatment :

The accounting treatment of overtime depends on the reasons for overtime as explained below :

1. If overtime is necessitated to expedite the work at the request of the customer, overtime premium is directly charged to that work or job.
2. If it is due to increase in general pressure of work, the premium may be treated as general overhead or charged to entire production at an inflated hourly rate of wages.

3. If overtime arises on account of mis-management in a department, the premium may be treated as a part necessary of departmental overheads.
4. In case of abnormal reasons (failure of power supply, interruption in material supply, accidents, fire, etc.), the overtime premium should be transferred to costing profit and loss account.

4.7. LABOUR TURNOVER :

Labour turnover is the ratio of the number of workers leaving the factory during a given period to the average number of workers in employment during the same period. It is defined by the ratio:

$$\frac{\text{Number of workers leaving during the period}}{\text{Average number employed during the period}}$$

If the rate of labour turnover is more, this is a sign of instability of labour and it adversely affects their efficiency as well as the profitability of the factory.

4.7.1 Measurement :

Labour turnover may be measured by any of the following methods. The choice of a particular method will depend on whether emphasis is put on labour separations, replacements or both.

- (a) Separation Method :** In this method, labour turnover for any period is measured by dividing the total number of separations by the average number of workers on the roll, then multiply by 100. Thus,

$$\text{Labour Turnover} = \frac{\text{Number of separations during a period}}{\text{Average No. of workers during the period}} \times 100$$

- (b) Replacement Method :** In this method, only the actual replacement of labour during a period is taken into consideration irrespective of the number of workers leaving. Thus,

$$\text{Labour Turnover} = \frac{\text{Number of replacements in a period}}{\text{Average No. of workers in the period}} \times 100$$

When new recruitment takes place for expansion purposes, such new recruits should be excluded from the number of replacements.

(c) Flux Method : Labour turnover is obtained by dividing the total number of separations and replacements by the average number of workers. Thus,

$$\text{Labour Turnover} = \frac{\text{No. of additions} + \text{No. of separations}}{\text{Average No. of workers during the period}} \times 100$$

4.7.2 Causes of Labour Turnover :

The various causes of labour turnover within a concern can be sub-divided under two main headings :

- (i) Avoidable Causes.
- (ii) Unavoidable Causes.

(i) Avoidable Causes : These Include :

1. Redundancy – This could arise from the seasonal nature of the trade, shortage of imported raw materials, policy of the government, lack of planning and foresight of higher management, technological unemployment, etc.
2. Low wages may compel workers to look for higher wages elsewhere.
3. Job may be dissatisfying.
4. Bad working conditions e.g. bad environment, inadequate ventilation and sanitation.
5. Bad relationship with fellow workers.
6. Relationship with supervisors – Unsympathetic and non-cooperative attitude of the supervisors and/ or management may force the workers to leave.
7. Dissatisfaction with hours of work.
8. Lack of proper recreational facilities and other benefits.

(ii) Unavoidable Causes : They are :

1. Personal betterment.
2. Domestic responsibilities.
3. Illness or accident.
4. Dismissal or discharge due to insubordination, negligence, in efficiency, etc.
5. Marriage.
6. National service.

7. Retirement, death, etc.
8. Housing difficulties, transport difficulties, etc.

4.7.3 Effects of Labour Turnover :

A high turnover has an adverse effect on the cost of production due to the following reasons :

1. Frequent changes in the labour force interrupts production and the production goes down.
2. New workers take time to become efficient. Selection and training costs of new workers also increase. They may turn out defective products initially. Being inexperienced, they may use materials extravagantly and cause more depreciation of tools and machinery. They are more prone to accidents.

4.7.4 Cost of Labour Turnover :

The cost of labour turnover can be divided under two heads:

- (i) Preventive Costs.
- (ii) Replacement Costs.

(i) Preventive Costs : These are costs which are incurred to prevent excessive labour turnover. The aim of these costs is to keep the workers satisfied so that they may not leave the factory.

The costs may include :

1. Personal Administration.
2. Medical services.
3. Welfare – e.g. provision for subsidized canteen meals, sports facilities, etc.
4. Gratuity and Pension schemes.
5. A portion of high wages, bonuses, perquisites. Etc. which are paid in excess of the average amount paid in the industry to discourage labour turnover.

As “prevention is better than cure”, preventive cost should be increased to arrest excessive labour turnover. This cost of labour turnover should be apportioned among different departments on the basis of average number of employees in each department.

(ii) Replacement Costs : These costs are associated with replacement of workers and include :

1. Cost of recruitment, training, induction, etc.
2. Loss of output due to :
 - (a) time-lag between defection and recruitment :
 - (b) inefficiency of new workers.
3. Cost of tool and machine breakage.
4. Cost of scrap and defective work.
5. Cost of additional supervision necessitated by inexperience of new workers.

4.7.5 Treatment of Labour Turnover :

The cost of labour turnover is generally treated as overhead. When costs are segregated into preventive costs and replacement costs, preventive costs should be charged as a works overhead item and apportioned to different departments on the basis of number of workers engaged in each department. Replacement costs should also be treated on the same basis if they arise because of the short sighted policy of the management. However, if they arise on account of the fault of a particular department, they should be directly charged to the department.

It may not be out of context to point out here that labour turnover cannot be completely wished away but its rate can be kept at a moderate level by taking such steps like : good working environment, fair rates of pay and allowances, encouragement to competent and efficient workers, encouraging workers to participate in important organizational matters etc.

4.8 METHODS OF REMUNERATING LABOUR :

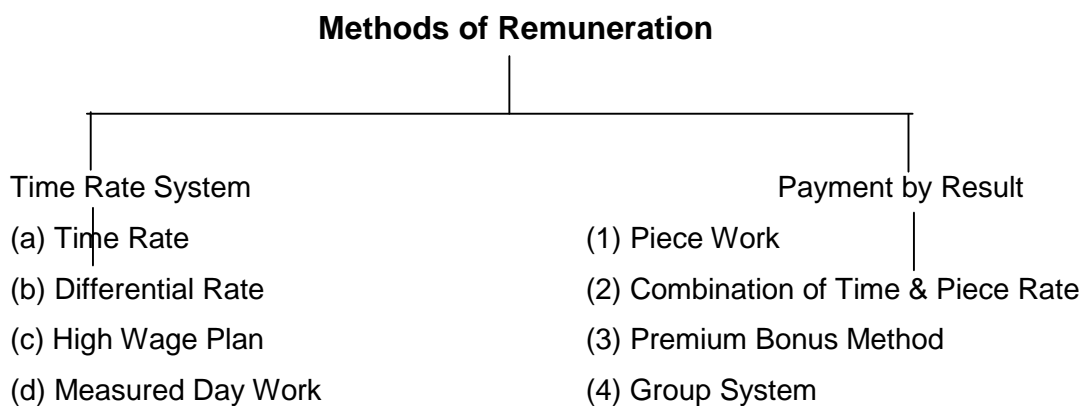
There are many well known systems of remunerating labour, each of which specifies a distinct method of calculating the wages payable to workers. In practice, these basic systems have been modified and adopted in numerous ways to suit the needs of individual concerns. This accounts for a very large number of methods of wage payments in use.

The installation of a suitable system of wage payment in a business is of particular interest to the cost accountant, because, wage system which allow high wages have the effect of increasing labour costs but this may not always result in high total cost. High wages may have the advantage of increased production as well as productivity and thus reducing the impact of fixed overheads and wages on unit cost.

On the other hand, low wages sometimes lead to high unit costs, due to reduced efficiency and increased labour turnover. Therefore, it is the responsibility of the cost accountant to suggest the management in achieving efficiency and ensuring economy.

A satisfactory wage systems should reflect the following features :

- (a) It should guarantee a minimum living wage to all workers.
- (b) It should be flexible and capable of being adopted to changed circumstances.
- (c) It should be consistent with the wage rates prevalent in the industry.
- (d) It should reduce labour absenteeism and labour turnover.
- (e) It should be based upon scientific time and motion studies.
- (f) It should not be in violation of any Government policy.
- (g) The system should finally promote healthy industrial relations.



Piece work method may be Straight Piece Rate or Differential Piece Rate Methods. Again, Differential Piece Rate Method can be Taylor's Differential Piece Rate Method or Merrick Differential Piece Rate Method.

A combination of time and piece work methods consists of Gantt Task Bonus System, Emerson's Efficiency system and Bedaux Points Scheme.

Premium Bonus Methods may be Halsey Plan and Rowan Plan.

4.8.1 Time Wage System :

This is the most popular method of payment to workers. Under this system, wages are based on the amount of time spent by a worker inside the factory. He is paid at a specified rate per unit of time (for example, per hour, per day, per week or per month) for his services rendered to the organisation.

Calculation of wages under this method of remuneration takes into account: (i) the time for which the workers are engaged on the job and, (ii) the rate per unit of time fixed for payment. For example, if a worker gets Rs.5 per hour, he works for 8 hours per day and has been present for duties on 25 days during the month, his wage for the month on the basis of Time Rate will be : $\text{Rs.}5 \times 8 \times 25 = \text{Rs.}1,000$.

The main advantages of Time Rate method of wage payment are :

1. It offers a fixed minimum wage to the worker for a defined period of time.
2. It simplifies calculation of the payable amount of wages.
3. It makes a stable and secure return to the workers.
4. It encourages the workers to do their jobs with utmost quality, care and efficiency and in the best possible manner.
5. It promotes a sense of equality and unity among the workers.
6. It is an economical system to the organisation in respect of wage administration, material use, plant operation and quality control.

The major disadvantages or limitations of Time method of wage payment are :

1. It ignores the individual quality and quantity of output.
2. It reduces personal initiative to work faster.
3. It treats both efficient and inefficient workers at par
4. It increases the cost of labour per unit because of the tendency to consume more time in finishing a job.
5. It needs a close supervision to ensure continuity of operations.

4.8.2 Piece Wage System :

When workers are paid on the basis of their output, irrespective of the time consumed in completing the work, it is termed as Piece Wage. The rate of payment under this method is related to the quantity of work done i.e., per unit of output, per article, per job or per commodity. Under this system, the total units produced or manufactured by the worker during a given period from the basis of computation of his wages for the period. For example, if the rate of labour per chair is Rs.50 and the worker has completed 10 chairs during a week, his wages for the week on the basis of piece rate will be :

$$\text{Rs.}50 \times 10 = \text{Rs.}500.$$

The major advantages of Piece Wages system are that it

1. places greater reliance on the merit and efficiency of workers;
2. induces workers to be efficient, produce more and earn higher wages;
3. facilitates prompt computation of cost for quotations; and
4. maintains plant and equipment properly so as to avoid disruption in work.

The main demerits or disadvantages of the piece wage system of wage payment are that it :

1. ignores quality of products in an effort to maximise output;
2. kills a long – term interest and continuity of engagement in the organisation of the workers;
3. treats workers as unsecured and uncertain in terms of wages payable during different periods;
4. creates dissatisfaction among workers owing to disparity in wages;
5. needs a continuous supervision over the quality of operations;
6. enhances wastage of materials, wear and tear of machines and absenteeism of workers; and
7. declines the level of labour discipline.

4.8.3 Balance of Debt System :

In order to retain the merits of both Time Wage and Piece Wage Systems, as also to minimise their demerits, a balanced system of wage payment is recommended in developing units. This is known as 'Balance of Debt system' which is a compromise between the Time Wage and Piece Wage.

The two main features of Balance of Debt system are :

- (i) **Minimum Payment** : The worker is paid on the basis of a piece rate per unit of output. In case, due to some unavoidable factors, the earnings of a worker at piece rate are less than his earnings at time rate, he is paid on time basis.
- (ii) **Recoupment** : The difference between the time rate and piece wage paid to the worker is treated as an extra payment to be recouped from his subsequent earnings when his piece rate wages are more than time rate wages. This grants protection to workers to earn a minimum wage on the basis of time rate even if recovery of extra payment too may not be felt inconvenient by the worker when his piece wage earnings exceed the time rate wages.

Under the Balance of Debt System, therefore, a worker gets fixed wages for the time he works, plus extra payment for his performance beyond a certain prescribed limit of output.

Incentive Plans :

You have learnt that wages are paid to labour on time rate or piece rate basis. But individual performance must also receive attention in a structure of wages so that an appreciable difference is maintained between a good worker, an average worker and a bad

worker. Not only that, efficiency of labour usually saves time and cost. Hence, it would be justified that a portion of the benefit which goes to the organisation through labour efficiency is also shared by those who generate this benefit. Incentive plans are used to compensate the efficiency of labour for his extra efforts used in minimising the time or cost. It may be in the form of a bonus or premium. Incentive plans are devised to compensate the worker through an additional payment over and satisfied with their employment. The plans also aim at keeping efficient workers satisfied with their employment. The standard time and standard performance are determined in advance so as to judge individual contribution. In case there is a gain on time saved, it is distributed between the employers and workers.

The main features of most incentive plans are :

1. The standard time and standard performance are determined in advance.
2. Time wages are guaranteed to all workers.
3. Efficient workers are given incentive by way of bonus for the time saved.
4. Wages per hour increase but not in the same proportion as the output.
5. Labour cost per unit of output decreases. The employer also shares the benefit of efficiency which induces him to improve the methods and equipment.

Some of the prominent plans are discussed here in detail.

Halsey Premium Plan :

The main features of Halsey Premium Plan as a method of incentive to efficient workers are as follows :

1. Standard time and standard work are prescribed in advance.
2. Workers are paid for the actual time they take to complete the job as per the time rate.
3. If a worker completes the job in less than the pre-determined standard time, he is given a bonus for the time saved. This is in addition to his wages for the actual time spent on the job.
4. A bonus equal to 50 per cent of the wages of time saved is paid to the worker as a reward to his good work.
5. Workers who fail to reach the prescribed standard get the time wage.

The rate of bonus under the Halsey Premium Plan may vary according to the policies of the organisation. In some cases, it may be $\frac{1}{3}$ of the wages of time saved.

It is a simple system to operate. It guarantees the hourly wages to workers for the actual time. But fixation of standard time is a difficult process. Workers however, feel that they do not get the full benefit for the time saved under this system.

Method of Computation :

Total Earnings of the worker = (Time Rate x Time Taken) + $\frac{1}{2}$ x Time saved x Time Rate

Or, $(T \times R) + \frac{1}{2} \times (S - T) \times R$

Where S = Standard Time

T = Actual Time taken

R = Rate of wages per hour

Now, if the Standard Time for a job = 8 hours

Actual Time = 6 hours

Rate per hour = Rs.7

Then, Total Earnings of the worker are

$$= (6 \times 7) + \frac{1}{2} \times 2 \times 7$$

$$= \text{Rs.}49$$

This includes time wages of Rs.42 and Rs.7 as bonus for time saved. It is to be noted here that the worker gets Rs.49 for 6 hours, which comes to Rs.8.16 per hour.

Rowan Premium Plan :

Rowan Premium Plan is similar to Halsey Plan. The main features of Rowan Plan are :

1. Workers are paid for the actual time taken by them in completing the job on the basis of time rate.
2. They are paid a bonus for the time save i.e., for the difference between the standard time and actual time.
3. Bonus under this method is calculated as a proportion of the time wages as time saved bears to the standard time.

Method of Computation :

$$\text{Bonus} = T \times R \times \frac{\text{Time Saved}}{S}$$

$$\text{Total Earnings} = (T \times R) + (T \times R \times S - T / S)$$

$$\begin{aligned} \text{In the above example, it will be} &= (6 \times 7) + (6 \times 7) \times 8 - 6 / 8 \\ &= \text{Rs.}52.50. \end{aligned}$$

This includes time wages of Rs.42 and Rs.10.50 as bonus for time saved. Since the worker gets Rs.52.50 for 6 hours, it amounts to Rs.8.75 per hour.

The merits and demerits of Rowan Plan are similar to those of Halsey Plan. An additional advantage under Rowan Plan is that the worker is not induced to rush through the work because if time saved is more than 50 per cent of the standard time, the bonus will decrease. However, the calculation of hours is complicated.

Differential Piece Rate System :

Besides Halsey and Rowan Premium Plans, there is yet another line of thought in respect of incentive methods. This system believes in payment of wages to labour on the basis of piece rates varying with the level of efficiency of workers.

Some of the exponents of differential piece rate system are :

- i. Taylor
- ii. Gantt
- iii. Emerson
- iv. Merrick

Let us now study the main features of their suggestions regarding the exact basis on which the rates of payment should be distinguished between one worker and another.

Taylor System :

The main features of this system are :

- a. It offers a higher piece rate to workers beyond a defined level of output;
- b. It distinguishes between workers through two types of piece rates : (i) a lower rate for sub – standard performance (e.g. 80% of piece rate) and (ii) a higher rate for standard and above standard performance, which is much more than time wages (e.g. 120% of piece rate)
- c. It acts as an additional incentive to expert workers towards maximisation of production; and
- d. It ignores any form of guaranteed day wages.

Gantt Task Bonus Plan :

This system combines the (a) Time Wage, (b) Piece Wage, and (c) Bonus Plan. It mainly follows a differential piece rate basis of remuneration with the following method of computation :

- a. Output below standard to be paid at guaranteed Time Rate
- b. Output at standard to be paid with 20 per cent of Time Rate as Bonus
- c. Output above standard to be paid at high piece rate on the entire output of the worker.

Gantt system, therefore, offers an incentive to efficient workers for increase production. It means lesser the time consumed in completing the job, higher the earnings per hour. The standard output within a specified period is pre-determined. Bonus is paid at the rate of 20% for 100% efficiency. Those workers who complete their job in the standard time are treated as 100 per cent efficient. They get wages for time taken plus bonus at a fixed percentage of

wages. If a worker completes his job in less than the standard time, he gets wages for standard time plus bonus at a fixed percentage of wages earned (which is usually 20%). Slow workers, however, still get the guaranteed wage for the day.

Emerson Efficiency Scheme :

The main features of this scheme are :

- a. It combines minimum day wages with the differential rate of bonus related to the level of efficiency of workers.
- b. It rewards efficiency according to the actual time taken in completing the job.
- c. The standard output is pre-determined, i.e., a standard task for a unit of time or standard time for a job is fixed and then the level of efficiency of workers is determined on that basis.
- d. If a job is completed in standard time, it is treated as 100% efficiency. If it takes double time, it is 50% efficiency.
- e. Bonus is paid to workers when their level of efficiency is 66 2/3% or more.
- f. The rate of bonus increases gradually with increase in the output; the scheme contains about 32 differentiating rates at different levels of efficiency.
- g. Those workers who fail to attain 66 2/3 % level of efficiency are paid at Time rate.

Look at the following two tables to understand the level of efficiency and its relationship with the rates of bonus under this scheme.

Standard Time : 20 hours

Time taken to complete the job	Level of Efficiency
20 hours	100%
16 hours	125%
40 hours	50%

Level of efficiency	Bonus Rate
66 2/3%	Guaranteed Time Rate
90%	10%
100%	20%
Above 100%	Time wages + 20% of wages earned + wages for Time Saved
125%	Time wages + 20% Bonus + 25% of Time saved

Merrick Differential Piece Rate System ;

The main features of this system are as follows :

- a. It is a multiple piece rate system.
- b. All workers under this scheme are paid only on the basis of their output.
- c. Time Rate wages are not guaranteed to the workers; they are paid on the basis of their efficiency.
- d. The rates of payment under this system are ;

Level of Efficiency

Up to 83% of the standard

83% to 100%

Above 100%

Payment

Normal Piece rate

110% of Normal Piece Rate

120% of Normal Piece rate

Group Bonus Scheme :

This system rewards a group associated with production rather than the individual workers. The main characteristics of this system are :

- a. Bonus is paid for collective efficiency in production
- b. Bonus is payable to a group of workers for their joint output over and above the given target.
- c. Distribution of bonus to the individual members of the group is made on some agreed basis or in specified proportions.
- d. Production is considered to be a team effort governing the efficiency of performance.
- e. It is a method of payment by results based on group productivity being shared by the workers either equally or in different specified proportions between workers of different skills.
- f. The aim is to create a team spirit for increased production and lower cost per unit through healthy competition between different groups.

Illu.1 : Standard time allowed for a job is 100 hours. The hourly rate of wage is Rs.4 per hour plus a dearness allowance of Rs.5.50 per hour worked. The actual time taken by the worker was 80 hours. Calculate total wages on time rate basis.

Solution :

Calculation of Total Wages on time Rate Basis:

Standard Time: 100 hours; Time taken = 80 hours.

Hour Rate = Rs.4/- per hour, D. A. = Rs.5.50 per hour worked

∴ Time Wages = Time Taken X hourly Rate

$$= 80 \text{ hours} \times \text{Rs.}4.00 = \text{Rs.}320.00$$

D. A.: = Time Taken x D. A. Rate per hour

$$= 80 \text{ hours} \times \text{Rs.}5.50 = \text{Rs.}440.00$$

$$\text{Total Wages} = \text{Rs.}760.00$$

Illu.2 : Calculate the wages under the time rate system if time allowed is 48 hours, time taken is 40 hours and rate per hour is Rs.2

Solution :

Time Allowed: 40 hours ;

Time Taken: 40 Hours;

Hour Rate = Rs.2.

∴ Time Wages = Time Taken x Rate per hour

$$= 40 \text{ hours} \times \text{Rs.}2 = \text{Rs.}80/-$$

Illu.3 : Compute the earning of a worker under Halsey Plan of standard time is 10hours, wage rate is Rs.6 per hour and time taken is 7 hours.

Solution :

The earning of a worker under Halsey Plan:

Standard Time : 10 hours

Time Taken : 7 Hours

Time Saved : 3 Hours

Rate per hour = Rs.6

∴ Total Earnings = Time Taken x Rate per hour + (50% of Time saved X

Rate per hour)

$$= 7 \text{ hour} \times \text{Rs.}6 + (3 \text{ hours} \times 50/100 \times \text{Rs.}6)$$

$$= \text{Rs.}42 + \text{Rs.}9 = \text{Rs.}51.00$$

Illu.4 : Compute the earnings of a worker under Halsey Premium Bonus**Scheme.****Standard time: 10 hours; Time rate – Rs.10 per hour; Time Taken – 8 hours.****Solution :****Halsey Premium Bonus Scheme**

Earnings = No. of hours worked x Rate per hour + 50% of the time saved x
Rate per hour

$$\begin{aligned}
 &= 8 \times 10 + \frac{50}{100} \times 2 \times 10 \\
 &= 80 + 10 \\
 &= \text{Rs.90.00}
 \end{aligned}$$

Illu.5 : From the following particulars of workers X, Y, and Z calculate their total earnings under (a) Halsey Bonus (50%) Plan and (b) Rowan Premium Plan. Comment on the earnings:

- (i) Standard time to produce one dozen articles is 20 hours. Hourly rate is Rs.5.
 (ii) To produce one dozen of articles the time taken by X, Y and z respectively 8 hours, 10 hours and 15 hours.

Solution :

Standard time = 20 hours
 Time Taken by X = 8 hours
 Time Taken by Y = 10 hours
 Time Taken by Z = 15 hours

Particulars	X	Y	Z
Standard time	20 Hours	20 Hours	20 Hours
(-) Time Taken	8 Hours	10 Hours	15 Hours
Time saved	12 Hours	10 Hours	5 Hours

(A) Total Earnings of 3 workers under Halsey Bonus Plan:

Particulars	X	Y	Z
	Rs.	Rs.	Rs.
Normal Wages: (Time Taken x Hourly Rate) A: 8 x 5.00 B: 10 x 5.00 C: 15 x 5.00	40.00	50.00	75.00
50% of time saved x Hourly Rate =			
A = $12 \times 50/100 \times 5.00$ B = $10 \times 50/100 \times 5.00$ C = $5 \times 50/100 \times 5.00$	30.00	25.00	12.50
Total Earnings	70.00	75.00	87.50

(B) Total Earnings of 3 workers under Rowan Plan:

Particulars	X	Y	Z
	Rs.	Rs.	Rs.
Normal Wages: (Time Taken x Hourly Rate)	40.00	50.00	75.00
Bonus: Time Taken x Time Saved / Standard time x Hourly Rate			
X = $8 \times 12/20 \times 5 =$	24.00		
Y = $10 \times 10/20 \times 5 =$		25.00	
Z = $15 \times 5/20 \times 5 =$			18.75
	64.00	75.00	93.75

Illu.6 From the particulars given below, prepare labour cost per man-day of 8 hours.

- (a) Basic salary Rs.2 per day
- (b) Dearness allowance 25 paise per every point over 100 cost of living index for working class. Current cost of living index is 700 points.
- (c) Leave salary 10% of (a) and (b)
- (d) Employer's contribution to state insurance –25% of (a), (b) and (c).
- (e) Employer's contribution to Provident Fund – 8% of (a), (b) and (c)

(f) Expenditure on amenities to labour Rs.20 per month per head.

(g) Number of working days in a month 25 days, of 8 hours each.

Solution :

Statement of labour cost per man-day of 8 hours

Particulars	Per month	Per day
	Rs.	Rs.
(a) Basic Salary	50.00	2.00
(b) Dearness allowance	150.00	6.00
(c) Leave Salary	20.00	0.80
(d) Employer's contribution to state insurance	55.00	2.20
(e) Employer's contribution to provident fund	17.60	0.70
(f) Expenditure on amenities to labour	20.00	0.80
Labour cost per day of 8 hours	312.60	12.50

Illu.4 From the following particulars calculate the earnings of a worker under (a) Halsey Plan, (b) Rowan Plan

Hour rate of wages (guaranteed) Rs.7.50

Standard time: 3 hours per 1 dozen units

Actual time taken by the worker to produce 20 dozens in 48 hours.

Solution :

Task to be completed = 20 dozens units

Standard time for 20 dozen units = 20 x 3 : 60 hours

Actual time taken for 20dozen units : 48 hours

Time saved = 60 – 48 : 12 hours

Wage rate : Rs.7.50ps

(a) Halsey Plan:

Earnings = Normal wages + Bonus

Normal wages = Time Taken x Hourly rate

= 48 x 7.50 = 360.00

Bonus = Time saved x 50/100 x Hourly rate

$$= 12 \times 50/100 \times 7.50 = \text{Rs.}45.00$$

$$\therefore \text{Total earnings} = 360 + 45 = \text{Rs.}405.00$$

(b) Rowan Plan:

$$\begin{aligned} \text{Earnings} &= \text{Normal wages} + \text{Bonus} \\ \text{Normal wages} &= \text{Time Taken} \times \text{Hourly rate} \\ &= 48 \times 7.50 = \text{Rs.}360.00 \end{aligned}$$

$$\text{Bonus} = \text{Time Saved} \times \frac{\text{Time taken}}{\text{Standard time}} \times \text{Hourly rate}$$

$$= 12 \times \frac{48}{60} \times 7.50 = \text{Rs.}72.00$$

$$\therefore \text{Total earnings} = 360 + 72 = \text{Rs.}432.00$$

Illu.5 : Mr. Rajesh, a worker in factory, takes 9 hours to complete a job on daily wages and 6 hours on a scheme of payment by results. His day rate is Rs.8 per hour. The material cost for the product is Rs.40 and Factory overheads are 150% on direct wages.

Calculate the factory cost under:

- (a) Piece Work Plan (b) Halsey plan (c) Rowan Plan

Solution :

(a) Piece work rate:

$$\begin{aligned} \text{Earning} &= \text{No. of units produced} \times \text{unit rate} \\ \text{No. of units produced} &= \text{Job itself one unit.} \\ \text{Unit rate} &= \text{Time taken under payment by results} \times \text{Hourly rate} \\ &= 6 \times 8.00 = \text{Rs.}48.00 \end{aligned}$$

(b) Halsey Plan:

	Rs.
Earnings	= Normal wages + Bonus
Normal wages	= Time Taken x Hourly rate
	= 9 x 8.00 72.00
Bonus	= Time saved x 50/100 x Hourly rate
Time saved	= 9 hours – 6hours
	= 3 hours

$$= 3 \times 50/100 \times 8.00 \quad 12.00$$

$$\text{-----}$$

$$84.00$$

$$\text{-----}$$

(c) Rowan Plan:

$$\begin{aligned} \text{Earnings} &= \text{Normal wages} + \text{Bonus} \\ \text{Normal wages} &= \text{Time taken} \times \text{Hourly rate} \\ &= 9 \times 8.00 \quad 72.00 \end{aligned}$$

$$\text{Bonus} = \text{Time Saved} \times \frac{\text{Time Taken}}{\text{Standard time}} \times \text{Hourly rate}$$

$$\begin{aligned} \text{Time saved} &= 9 - 6 \\ &= 3 \text{ Hours} \\ &= 3 \times 6/9 \times 8.00 \quad 16.00 \\ &\text{-----} \\ &88.00 \end{aligned}$$

Statement of Factory Cost

	Piece Work	Halsay	Rowan
Direct material	40.00	40.00	40.00
Direct wages	48.00	84.00	88.00
Prime cost	88.00	124.00	128.00
Factory overheads:			
150% of direct wages	72.00	126.00	132.00
Factory cost	160.00	250.00	260.00

4.9 QUESTIONS**A. Short Answer Questions :**

1. What is method of study?
2. What is work study?
3. What is meant by payment of wages by time?
4. What is meant by piece rate wages?
5. What is Differential Piece Rate System?
6. How is labour Turnover measured?
7. What is Merric differential piece rate system?
8. Distinguish time wage from piece wages

B. Essay Questions :

1. State some of the important features of a good wage system.

2. What are the documents used in accounting for wages? State in brief the purposes of each of them.
3. Enumerate the factors to be considered before introducing a scheme of incentives to workers.
4. What is meant by Time Rate System of wage payment? What are the conditions under which this system of payment is followed?
5. Discuss the objectives of time keeping and time booking.
6. What is standard time? Explain how standard time is determined.

4.10 EXERCISES

1. Find out earnings of a worker under Halsey Plan

Standard hours 9

Actual hours worked 6

Hourly rate 0.75 paise

Bonus 50% of the time saved

[Ans.: Rs.5.63]

2. Calculate the earnings of worker under halsey Weir premium plan (50% of time saved).
 - a) Hourly rate guaranteed Rs.5.
 - b) Standard time for producing 1 dozen articles 3 hours.
 - c) Actual time taken to produce 20 dozens 48 hours.

[Ans.: Rs.270]

3. Standard time allowed for a job is 50 hours. The hourly rate of wages is Rs.20. The actual time taken by the worker was 40 hours. Calculate the total wages as per Rowan Plan.

[Ans.: Rs.960]

4. Calculate the earnings of a worker from the following information under (a) Time Rate Method, (b) Piece Rate Method, (c) Halsey Plan and (d) Rowan Plan. Standard Time: 30 hrs. Time taken: 20 hrs. Hourly rate of wage is Rs.2 per hour plus a dearness allowance at the rate of 1,00 per hour worked.

[Ans.: (a) Rs.60.00 (b) Rs.80.00 (c) Rs.70.00 (d) Rs.73.33]

5. From the following particulars calculate the earnings of a worker under:

a) Rowan premium bonus system and

b) Halsey premium bonus system

'Hourly rate of wages Rs.0. 75.

Standard time for producing 1 dozen articles is 3 hours.

Actual time taken by the worker to produce 20 dozen articles is 48 hours.

[Ans.: (a) Rs.43.20 (b) Rs.40.50]

6. Ascertain the wages paid to worker 'X' under Taylor's differential price rate system from the following information:

Standard output and time allowed 25 units per hour

Standard wage Rate Rs.20 per hour

Differential piece rates to be applied:

80% of the piece rate when below standard

120% of the piece rate, when at and above standard

X produced 450 units in a day of 8 hours.

[Ans.: Earnings Rs.432]

7. A worker takes 9 hours to complete a job on daily wages and 6 hours on a scheme of payment by results. His day rate is Rs.15 an hour, the material cost of the product is Rs.80 and the overheads are recovered at 150% of the total direct wages. Calculate the factory cost of the product under :

(i) Piece Work Plan

(ii) Rowan Plan

(iii) Halsey Plan

[Ans.: Factory Cost (I) Rs.305 (ii) Rs.361.25 (iii) Rs.380]

8. From the following particulars prepare Normal wages & Overtime Wages of a worker.

Day

Hours worked

Monday	08
Tuesday	10
Wednesday	09
Thursday	11
Friday	09
Saturday	04
	51

Normal working hours per day is 8 hours. Normal rate per hour is Rs.150. Over time rate per hour is Rs.3.00.

[Ans.: Total Wages Rs.87.00]

9. Using the following data, you are required to ascertain the wages paid to workers Ram and Raj under the Taylor's system.

Normal wage rate : Rs.10 per hour

Differential piece rates to be applied

- (a) 75% of piece rate when below standard
 (b) 125% of piece rate when at or above standard

The workers have produced in a day of 8 hours as follows.

Ram – 60 units; Raj – 100 units.

[Ans.: Ram's earnings Rs.5.63; Raj earnings Rs.15.63]

10. Calculate the amount of wages and bonus earned by this worker :

Name	:	Balu
Ticket No.	:	786
Job commenced	:	Monday 20 th December, 2004 – 8.00 am.
Job finished	:	Saturday 25 th December, 2004 – 1.00 p.m.
Quantity produced	:	628 units
Quantity approved	:	600 units

Worker's rate is Rs.1 per hour

Time allowed is 10 units per hour

Bonus is 50% of time saved

Assume that the employee worked for 9 hours a day no overtime.

[Ans.: Rs.55.00]

4.11 SUGGESTED READINGS

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Chapter - 5

OVERHEADS

Objectives :

This lesson helps you in

- Understand the meaning and classification of overheads
- Knowing the distribution, collection, classification of overheads
- Discussing the allocation and apportionment of overheads
- Understanding the methods of absorption along with the advantages and disadvantages.

Structure :

5.1 Introduction

5.2 Classification of Overheads

5.3 Distribution of Overhead

5.4 Secondary Distribution of Overheads

5.5 Methods of Reapportionment

5.6 Absorption of Factory Overhead

5.7 Questions

5.8 Exercises

5.8 Suggested Readings

5.1 INTRODUCTION :

Overheads comprise all indirect expenditure. The CIMA of UK has defined overhead as “the aggregate of indirect materials cost, indirect wages and indirect expenses”.

In the words of Wheldon, “Overhead may be defined as the cost of indirect materials, indirect labour and such other expenses, including services, as cannot conveniently be

charged direct to specific cost units. Alternatively, overheads are all expenses other than direct expenses.”

According to bloker and Welmer, “Overhead costs are the operating costs of a business enterprise which cannot be traced directly to a particular unit of output.”

Overhead is also known by other terms like on cost, supplementary costs, non-productive costs, burden, etc. However, the term overhead is most commonly used.

5.2 CLASSIFICATION OF OVERHEADS :

Overhead classification refers to the process of grouping the overheads according to their common characteristics so as to provide the managers with information that will enable them to manage the business effectively.

The overheads can be classified according to :

1. Elements
2. Functions and Departments
3. Behavior.

5.2.1 Element – wise Classification :

According to elements overhead is divided into :

- i. Indirect materials
- ii. Indirect labour
- iii. Indirect expenses

(i) Indirect Materials : It is that material which does not form a part of the finished product or saleable service. Examples of indirect materials are : coal, Lubricating oil, grease, sand paper used in polishing, etc. there are some items which may become a part of the finished product like nuts, screws, bolts, pins, etc., but these are still considered as indirect materials for costing purposes as their cost is comparatively small.

(ii) Indirect Labour : Indirect labour is not directly engaged in the production operations. They only assist or help in production operations. Examples of indirect

labour are supervisor, clerk, cleaner, inspector, peon, watchmen, etc. Remuneration paid to these employees is considered as indirect labour cost.

- (iii) **Indirect expenses** : All indirect costs, other than indirect materials and indirect labour are considered to be indirect expenses like rent, depreciation, lighting and power, advertising, insurance, etc.

5.2.2 Function – Wise Classification :

In this method, classification is carried out according to the major functions of a concern. It consists of :

- (i) Factory or Manufacturing Overheads,
- (ii) Administration Overheads, and
- (iii) Selling and Distribution Overheads.

- (i) **Factory or Manufacturing overhead** : All costs incurred in the factory over and above direct material cost, direct labour and direct expenses are known as Production Overhead. In other words, it is the aggregate of factory indirect material cost, indirect labour and indirect expenses. Examples of factory Overhead are :

Cost of consumable stores, small tools etc.

Materials of small value such as cotton waste, lubricating oil, brushes, stationery used in the factory etc.

Salary of plant manager and fees paid to Directors devoting attention to production problems.

Salary of Store Keepers.

Contribution to Social Security Schemes such as the Employees' State Insurance Corporation.

Contribution to Provident Fund.

Pay for holidays and sick leave.

Salary paid to the Foremen, Time- keeper and other clerical staff of the factory.

Wages paid for normal idle time if they are not directly charged.

Overtime wages.

Rent, Municipal taxes, Depreciation, Insurance etc. of the factory land and building.

Insurance, Depreciation etc. of the factory plant, machinery's, and equipment's.

Factory lighting, heating and air- conditioning.

Power and fuel (coal, gas, electric etc.)

Canteen and welfare expenses.

Carriage inwards on materials purchased, if such carriage has not been included in the cost of materials.

Buying and store – keeping expenses including value of normal losses.

Works telephone charges.

Cost of training new employees.

Cost of experiment and research work.

Cost of designing for production and drawing office expenses.

- (ii) **Administration Overheads** : It refers to the cost of formulating the policy, directing the organisation and controlling the operations of an undertaking, which is not related directly to a production, selling, distribution, research or development activity or function.

In short, administration overhead includes all those costs which are incurred in the general and financial management of concern.

The common items falling under this category are :

Rent, rates and insurance of general offices, their lighting, heating and cleaning.

Office salaries, including salaries of administrative directors.

Depreciation of office buildings, furniture, machinery, etc.

Bank Charges,

Hire of office machinery

Audit fees.

Legal expenses.

Office telephone and postage's

Printing and stationery

Superannuating.

(iii) **Selling and Distribution Overhead** : Selling overhead is the cost of seeking to create and stimulate demand and of securing orders. It is incurred with a view to promote sales either in existing markets or new markets. The examples are advertising, publicity, window display, training of salesmen, after-sales services etc.

Distribution overhead consists of all expenditure incurred from the time the product is completed in the factory until it reaches its destination. For example, warehouse rent, warehouse staff, expenses of delivery Van, packing, storage insurance, loss of warehouse stock, repairing of empties, carriage outwards etc.

1. Element – wise Classification : This method of classification follows the definition of overhead. In this method, overhead is broken down into three elements. Indirect material, indirect labour and indirect expenses.

(i) **Indirect Material** : It includes those materials which do not normally form a part of the finished product. It has been defined as 'materials which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost units'. Examples are :

Fuel, Lubricating oil

Stores consumed for repair and maintenance work.

Sundry consumed for repair and maintenance work

Small tools for general use

Cotton waste, etc.

Deficiencies, loss and deterioration of stores.

(ii) **Indirect Labour** : Labour charges which cannot be allocated to a particular unit of cost are called indirect labour or wages examples are :

Wages for maintenance workers

General indirect labour salary of store – keeper and foreman.

Idle time

Workmen's compensation

Overtime and night –shifts bonus.

Employers contribution to funds.

Holiday Pay / Leave pay

- (iii) **Indirect Expenses** : These are expenses which cannot be allocated but which can be apportioned to or absorbed by cost centres or cost units. Examples are :
- Salary of factory staff.
 - Training expenses
 - Depreciation of Plant, Machinery and Buildings.
 - Insurance,
 - Taxes,
 - Rates and rents, lighting, heating of factory
 - Hospital, dispensary and Canteen expenses.

5.2.3. Behaviour – wise Classification :

All items of overhead do not vary in sympathy with production. Some expenses increase with an increase in production volume, some remain constant irrespective of the changes in the level of production, whereas others do not change up to a certain volume but change after that. Based on this behaviour, the overhead expenses may be classified into :

- (i) Fixed overhead,
- (ii) Variable overhead, and
- (iii) Semi-fixed overhead or semi-variable overhead.

(i) **Fixed Overhead** : Fixed overheads are period costs. They remain constant irrespective of changes in the volume of production. These must be paid whether the factory is working or not. They accrue over a period of time, hence known as time costs. Examples of fixed costs are depreciation of plant and machinery, rent and rates, insurance, depreciation of buildings, legal expenses, bank charges, pay and allowances of managers etc. another important point to be noted in respect of fixed cost is that it is not a constant quantity permanently. The firm, when it increases its capacity, might have to acquire additional buildings, plants, equipment and other facilities in the long run. Then the fixed expenses which were constant begin to increase. Thus, fixed changes are fixed only within a certain range of plant capacity.

(ii) **Variable Overhead** : Variable overheads tend to vary directly with variations in volume of production. These expenses change in the same ratio in which output

changes. Total variable cost will tend to vary directly with changes in volume, while unit variable cost is likely to remain constant at all production levels. The examples are : Indirect labour, indirect material, power and fuel, overtime, stores handling etc.

- (iii) **Semi- variable Overhead** : There are certain overhead items which neither fall in the category of fixed costs nor of variable costs. These are known as semi-variable or semi-fixed overheads. They remain fixed at certain levels of output, while they vary at other levels, but not in the proportion of output changes. Examples are repairs and maintenance, depreciation of plant and machinery, Salary payable to a supervisor etc. For instance, in the case of depreciation, a certain percentage can be attributable to lapse of time and hence fixed; another percentage can be attributable to use.

5.3 DISTRIBUTION OF OVERHEAD :

Overheads are not directly attributable to a particular cost unit, process or department. Hence, there is a need for distribution of overheads to different products manufactured or to the different departments. There are four steps in overheads distribution. They are :

- (i) Collection of overheads
- (ii) Allocation and apportionment to production and service departments
- (iii) Re-apportionment of service department costs
- (iv) Absorption of overheads.

5.3.1 Collection and Classification :

Collection of factory overhead expenses involves the processing of various documents from which the required data can be extracted. The two important sources of information are the records of (i) financial accounts and (ii) cost accounts. The source documents for different items of factory overhead expenses are : (a) Invoices, stores requisition slips and material analysis sheets (for indirect materials) (b) Job cards or wage analysis book or wage abstracts, salary or pay bills (for indirect labour) and (c) expenditure vouchers.

5.3.2 Allocation and Apportionment of Overheads :

Not all items of the factory overhead are amenable to direct allocation. While some items can wholly be allocated to specific departments of cost centres, there are certain expenses which need to be apportioned amongst different departments on an equitable basis.

Allocation : Cost Allocation may be defined as the allotment of whole items of cost to cost centres of cost unit. The nature of expense is such that it can easily be identified and allocated to a cost centre. For example, salary paid to the sales manager is allocated to the sales department.

Apportionment : Cost apportionment is the allotment of proportions of items of cost to cost centres or cost units. This is done in the case of those items of overhead which cannot be allocated to a particular department. Such expenses require division and apportionment over to or more cost centres or cost units. For example, rent of the factory is an expense which cannot be allocated to any one department, but is to be shared by all the production departments service departments on a suitable basis (e.g. floor area). Thus cost allocation deals with whole items whereas apportionment deals with proportions of items of cost. Allocation is done directly, whereas apportionment requires judgment, in that it requires selection of a suitable basis for dividing expenses.

Primary distribution of overhead involves allocation or apportionment of different items of overhead to all departments of a factory. This is also known as departmentalization of overheads. While making primary distribution, the distinction between departments and service departments is ignored.

5.3.3. Bases of Apportionment :

Common expenses relating to various departments have to be apportioned on a suitable basis. The following bases are most commonly employed for apportioning items of overhead expenses among production service departments.

Bases	Item of Overheads
1. Floor Area	Rent, rates and taxes paid for the building, air conditioning, etc.
2. No. of employees or wages of	Group insurance, canteen expenses, E.S. I.

each department	contribution, general welfare expenses, compensation and other fringe benefits, supervision etc.
3. Capital Values	Insurance and depreciation of plants, machinery and equipment
4. Direct labour hours	Works managers remuneration, general overtime expenses, cost of inter-department transfers etc.
5. No. of light points	Electric light.
6. Horse power of machines or machine hours	Electric power
7. Audit fee	Sales or total cost
8. Value or weight of direct material	Stores overhead
9. Weight, volume, tonne, mile	Delivery expenses
10. Cubic content	Building Maintenance

5.3.4 Principles of Apportionment

Selection of suitable base is important while distributing overheads. The following principles need to be kept in mind by the cost accountant in this regard :

1. **Service or Use** : Overheads should be apportioned on the basis of service or benefit received by cost centre or department. The greater the amount of service received by a department, the greater the share of an item of overhead to be apportioned to that department. On this basis common expenses like electricity (use), rent (space) insurance and taxes are apportioned.
2. **Survey or Analysis** : In some cases it may not be possible to measure exactly the extent of benefit which the various departments receive as this would vary from period to period. In that case, overheads are apportioned on the basis of an analysis or survey of existing conditions. For instance of foreman may supervise two departments A and B; devoting 60 per cent of his time to A and forty per cent to B. His salary will be apportioned between the two departments on 60 : 40 basis.

- 3. Ability to Pay :** This principle presumes that higher the revenue of a particular department, higher should be the proportionate charge for services. This principle however, is not equitable in that it penalises the efficient and profitable units of a business to the advantage of the inefficient ones.

5.4 SECONDARY DISTRIBUTION OF OVERHEADS

Primary distribution of overheads to production and service departments is known as 'departmentalisation'. Service departments as we know, do not manufacture products but render services. Hence, it is logical that product cost should bear an equitable share of the cost of service departments. The process of redistribution of the cost of service departments. The process of redistribution of the cost of service departments among production departments (where products are manufactured) is known as 'secondary distribution' or reapportionment. Following is a list of bases, which are commonly employed for reapportioning the expenses of service departments to production departments :

Service department costs	Basic of apportionment
1. Maintenance department	Hors worked for each department
2. Employment / personnel department	Rate of labour turnover or number of employees in each department
3. Payroll or time department	Direct labour hours, machine hours number of employees.
4. Stores keeping department	No. of requisitions, quantity or value of materials
5. Welfare department	No. of employees in each department
6. Internal transport service	Truck hours, truck mileage or tonnage
7. Building service department	Relative area of each department
8. Power house	Floor area, cubic contents.

5.5 METHODS OF REAPPORTIONMENT OR REDISTRIBUTION OF OVERHEAD

There are three methods of redistribution of service department costs. They are : (I) Direct redistribution, (ii) Step Method and (iii) Reciprocal Services Method.

- (i) **Direct Distribution Method** : In this method, the costs of service department are apportioned directly to the production department, without considering the service rendered by one service department to the other.
- (ii) **Step Method** : In this method the cost of most serviceable department is first apportioned to other production as well as service departments. Initially, therefore, a sequence of apportionment must be chosen. After apportioning the first service department, the next service department is taken up. This process goes on till the cost of last service department is apportioned. The department to which apportioning has already been done is not charged again. As a result, the cost of last service department is apportioned among production departments only.
- (iii) **Reciprocal Service Method** : One important limitation of 'Step method' is that it does not take into account the fact that service department may render service to other service departments on a reciprocal basis. To overcome this limitation, the reciprocal method has been suggested. This method gives due weightage to inter – departmental service while redistributing the expenses of service departments. There are three methods for dealing with inter – service departmental costs : (I) Simultaneous Equation Method, (ii) Repeated Distribution Method, and (iii) Trial and Error Method.
 - (i) **Simultaneous Equation Method** : In this method, the true cost of service departments is first ascertained with the help of simultaneous equations. These are then distributed among production departments on the basis of given percentages.
 - (ii) **Repeated Distribution Method** : In this method service department costs are apportioned to other departments, production as well as service, according to the agreed percentages and this process is repeated till the total costs of service departments are exhausted or the figures become too small to matter.

- (iii) **Trial and Error Method** : In this method the cost of one service departments (S_1) is apportioned to another service department (S_2). The cost of another service department (S_2) plus the share received from the first service department (S_1) until the balancing figure becomes nil.

5.6. ABSORPTION OF FACTORY OVERHEAD :

The absorption of overheads is the last step in the distribution plan of production overheads. It is the process of charging to the product or output of the production department, all the overhead expenses which have been allocated and apportioned to it. The purpose behind absorption is that overheads should be absorbed in the cost of the output of the given period. Absorption of overhead is also known as recovery or application of overheads.

5.6.1 Methods of Absorption

There are various methods of absorbing manufacturing overhead. These methods have their own merits and demerits. The method finally selected for the purpose of absorption of manufacturing overhead should :

Requisites of a Good Absorption Rate

1. involve minimum clerical effort
2. be according to the nature of product
3. be stable so that comparisons can be made
4. be flexible enough to take note of changing conditions
5. not bring much difference between recovered overheads and actual overheads
6. be capable of being used conveniently.

Several methods are commonly employed for computing the appropriate rate to be employed. The more common of these are :

1. Percentage of direct materials cost.
2. Percentage of direct labour cost
3. Percentage of prime cost

4. Direct labour hour rate
5. Machine hour rate
6. Combined machine hour and labour hour rate

1. Percentage of direct material cost : In this method the cost of direct materials used in the manufacture of a product is used as the base in absorption of factory overheads. The overhead rate is calculated on the basis of the following formula :

$$\text{Overhead rate} = \frac{\text{Factory overheads}}{\text{Direct material cost}} \times 100$$

This method yields satisfactory results in the following cases :

- (i) Where the proportion of overheads to the total cost is significant.
- (ii) Where the prices of materials are stable.
- (iii) Where the output is uniform i.e., only one kind of article is produced.

Advantages :

- (i) The calculation of overhead rate is simple as the cost of direct material is easily available.
- (ii) This method is more suitable when prices of material are fairly stable, when one kind of article is produced, when the same quantity of materials is used for all units and when material cost forms a greater part of the cost of production.
- (iii) Overhead cost relating to up keep and handling of materials can be absorbed equitably by this method.

Disadvantages :

- (i) The relationship between overhead expenses and material prices is somewhat remote. Material price fluctuations do not reflect overhead expenses. When prices of raw materials fluctuate, the absorption rate applied ultimately may give misleading results.
- (ii) The time factor is thoroughly discounted in this method.
- (iii) Variable expenses vary with the volume of production, whereas fixed expenses may not behave in a similar way. This distinction, however, is ignored in this method.

2. Percentage of direct labour Cost : In this method, overheads are charged as a percentage of the direct wages incurred on jobs. The formula for computing the percentage is as under :

For example when Factory overheads one Rs.2,000 and Direct Labour Cost is Rs.8,000 the percentage.

$$\begin{aligned}\text{Overhead rate} &= \frac{\text{Factory overheads}}{\text{Direct wages or labour cost}} \times 100 \\ &= \frac{2,000}{8,000} \times 100\end{aligned}$$

This method is suitable (i) when production is uniform (ii) when direct labour constitutes a major portion of the total cost of production, (iii) when there is more or less uniform efficiency and productivity of labour, (iv) when there is no variation in the rates of pay, and (v) when the ratio of skilled and unskilled labour is constant.

Advantages :

- (i) It is simple and economical to apply
- (ii) The time factor is given due importance
- (iii) This is a stable method, because labour rates do not fluctuate like material prices

Disadvantages :

- (i) If piece rate system is followed, the time factor is totally ignored.
- (ii) No distinction is drawn between skilled and unskilled labour and differences in rates of pay. Therefore a job demanding services of skilled labour and so involving higher wages will be loaded with more overhead than another job demanding services of unskilled labour involving less labour cost, though both jobs may take the same time to complete.
- (iii) When machinery is used to some extent in the process of manufacture, an allowance for such a factor is not made.

- 3. Percentage on Prime cost :** Here both material cost and labour cost are taken for calculation of the percentage. The formula is :

$$\text{Percentage on Prime Cost} = \frac{\text{Factory Overheads}}{\text{Prime Cost}} \times 100$$

For example if factory overheads amount to Rs.2,000 and the prime cost is Rs.10,000, prime cost percentage rate comes to:

Since this method is a combination of the earlier two methods. It has all the merits and demerits of the two methods.

- 4. Direct Labour Hour Rate :** In this method, the overheads are charged to production on the basis of number of labour hours spent on every job. The formula is :

$$\text{Direct labour Hour Rate} = \frac{\text{Factory Overheads}}{\text{Direct labour Hours for the period}}$$

Thus if total manufacturing overheads for a period are Rs.4,000 and the number of direct labour hours is 10,000 then the labour hour rate is :

$$= \frac{2,000}{10,000} = 40 \text{ Paise}$$

If a job takes 20 hours, then overheads applied will be $20 \times 0.40 = \text{Rs.}8$.

This method is suitable when (i) work most is done manually (ii) production is not uniform, and (iii) direct labour rate can be calculated for each category of workers.

This method, obviously, is a distinct improvement on the percentage of direct wages basis, as it gives due importance to the time factor.

- 5. Machine Hour Rate :** Machine Hour rate is the cost of running a machine per hour. It is calculated thus :

$$\text{Machine Hour Rate} = \frac{\text{Factory Overheads}}{\text{Machine hours during a given period}}$$

There are two methods of calculating machine hour rate : (i) ordinary machine hour rate and (ii) composite machine hour rate. The ordinary machine hour rate is calculated by taking only direct machine expenses into account. The composite machine hour rate, on the other hand, takes into account direct machine expenses as well as other general overheads of the department like supervision, rent, lighting and heating, insurance etc.

These are called 'standing charges'. These are apportioned to each machine on some suitable basis. Usually the following bases are applied while calculating the machine hour rate :

Expenses	Basis
Standing charges :	
1. Rent and Rates	Floor area occupied by each machine
2. Heating and lighting	The number of points used plus cost of special lighting or heating for any individual machine or according to floor area occupied by each machine.
3. Supervision	Estimated time devoted by the supervisory staff to each machine.
4. Lubricating oil and Consumable stores	On the basis of past experience capital value or machine hours.
5. Insurance	Insurable value of each machine.
6. Miscellaneous expenses	Equitable basis depending upon facts.
Machine Expenses :	
1. Depreciation	Cost of Machine + Installation expenses – Scrap Value / life in terms of Machine hours
2. Power	Actual consumption as shown by meter readings or estimated consumption ascertained from past experience
3. Repairs	Cost of repairs spread over its working life

Calculation of Machine Hour Rate :

The following steps are required to be taken for the calculation of machine hour rate :

- (i) Each machine or group of machines should be treated as a cost centre.
- (ii) The estimated overhead expenses for the period should be determined for each machine or group of machines.
- (iii) Divide overheads relating to the machine into two parts; standing charges and machine expenses (the also called variable or running expenses).

- (iv) The standing charges do not vary with the use of machines. Estimate the total standing charges for the machine and divide the total working hours of the machine for the period.
- (v) The machine expenses are to be estimated separately. These are divided by the normal working hours to give hourly rate for each item.
- (vi) The total of rates for standing charges and machine expenses will give the machine hour rate.
- (vii) Machine idle time and setting time : while arriving at the figure of normal working hours, due allowance must be given for idle time, maintenance time and setting up time.

Advantages :

- (i) Where machinery is the main factor in production, this method gives the best results.
- (ii) The relative efficiencies of various machines can be found out easily.
- (iii) It is also useful where one operator uses several machines or where several operators are working on one machine.
- (iv) It gives due importance to the time factor.

Disadvantages :

- (i) Additional clerical effort is involved in calculating the operating time of machines.
- (ii) Expenses which are not proportional to working hours of machines are ignored in this method.
- (iii) It gives inaccurate results if hand labour is equally important.

6. Combined machine hour and direct labour hour rate : A combination of machine hour rate and direct labour rate (called as dual hour rate) could also be used in those departments depending on both manual and machine work. In such cases, the overheads relating to labour are absorbed on the basis of labour hours.

Illu.1 : Calculate percentage of production overheads to direct wages:

	<i>Rs.</i>
Stock of Materials on 1-1-2002	30, 580
Work in progress 1-1-2002	60,900
Purchase of Raw Materials	1,43, 250
Direct wages	1,78,500
Production overhead expenses	1,42,800
General overhead expenses	1,12,700
Stock of Raw Materials 31-12-2002	37,700
Work in progress 31-12-2003	67,750
Sales for the year	8,60,000

Solution :**Cost Sheet for the year ended 31-12-2003**

	<i>Rs.</i>	<i>Rs.</i>
Opening Stock materials	30,850	
Add: Purchase of Materials	1,43,250	
	1,74,100	
Less: Closing stock of materials	37,700	
Value of Direct materials consumed		1,36,400
Direct wages		1,78,500
Prime Cost		3,14,900
Factory overheads: (Production overhead expenses)		1,42,800
		4,57,700
Add: Opening work in progress		60,900
		5,18,600
Less: Closing work in progress		67,750
Factory Cost/ Works Cost		4,50,850
Office overheads / General overhead expenses		1,12,700
Total Cost (or) cost of Sales		5,63,550
Sales – Total Cost		2,96,450
Sales		8,60,000

		Rs.
(a) (i) The direct materials consumed	-	1,36,400
(ii) Prime cost-		3,14,900
(iii) Production cost		4,50,000

(iv) Total cost 5,63,550

(v) Profit 2,96,450

(b) Percentage of production overheads to direct wages:

$$\frac{\text{Production overhead}}{\text{Direct Wages}} \times 100$$

$$= \frac{1,42,800}{1,78,500} \times 100 = 80\%$$

Ilu.2 : Find out Production Departmental hour rate charging Service Department Expenses to Production Departments:

<i>Particulars</i>	<i>Total</i>	<i>Production Depts.</i>			<i>Service Depts.</i>	
		<i>P1</i>	<i>P2</i>	<i>P3</i>	<i>S1</i>	<i>S2</i>
Rent	1,000	200	400	150	150	100
Electricity	200	50	80	30	20	20
Insurance	400	80	160	60	60	40
Depreciation	4,000	1,000	1,500	1,000	300	200
Carriage	400	50	50	50	100	150
Hours worked	-	1,000	2,500	1,800	-	-

The service department expenses are to be allocated as under:

	<i>P1</i>	<i>P2</i>	<i>P3</i>	<i>S1</i>	<i>S2</i>
S1	30%	40%	20%	-	10%
S2	10%	20%	50%	20%	-

Solution :

<i>Nature of Expenses</i>	<i>Basis for distribution</i>	<i>Total Rs.</i>	<i>Production Depts.</i>			<i>Service Depts.</i>	
			<i>P1 Rs.</i>	<i>P2 Rs.</i>	<i>P3 Rs.</i>	<i>S1 Rs.</i>	<i>S2 Rs.</i>
Rent	Allocation	1,000	200	400	150	150	100

Electricity	Allocation	200	50	80	30	20	20
Insurance	Allocation	400	80	160	60	60	40
Depreciation	Allocation	4,000	1,000	1,500	1,000	300	200
Carriage	Allocation	400	50	50	50	100	150
As primary distribution		6,000	1,380	2,190	1,290	630	510
S1	3:4:2:1	-	189	252	126	-630	63
S2	1:2:5:2	-	57	115	286	115	-573
S1	3:4:2:1	-	34	46	23	-115	-12
S2	1:2:5	-	1	3	8	-	12
As per secondary Distribution		6,000	1,661	2,606	1,733	0	0

$$\text{Hourly Rate} = \frac{\text{Production Departmental Overheads}}{\text{Hours worked in Production Departments}}$$

$$P_1 = \frac{\text{Rs.1661}}{1000\text{hours}} = \text{Rs.1.66}$$

$$P_2 = \frac{\text{Rs.2606}}{2500\text{hours}} = \text{Rs.1.04}$$

$$P_3 = \frac{\text{Rs.1733}}{1800\text{hours}} = \text{Rs.0.96}$$

Illu.3 : Estimates of factory overhead costs to be incurred by each department in the forth-coming year for Deccan Manufacturing Ltd. Are as follows along with the data required for distribution:

Department	Factory overhead Rs.	Direct labour hrs.	No. of employees	Area in sq. m
Production X	1,93,000	4,000	100	3,000
Y	64,000	3,000	125	1,500
Z	83,000	4,000	85	1,500
Service P	45,000	1,000	10	500
Q	75,000	5,000	50	1,500
R	1,05,000	6,000	40	1,000
S	30,000	3,000	50	1,000

The overhead cost of the four service departments P, Q, R, S are distributed in the same order on the following basis:

Departments	Basis
P	No. of employees
Q	Direct labour hours
R	Area in Sq. ft.
S	Direct labour hours.

Prepare a schedule showing the distribution of overhead costs of the four service departments to the three production Departments.

Solution :

Statement Showing the distribution of overheads:

Expenses	Basis of apportionment	Production Depts.			Service Departments			
		X Rs.	Y Rs.	Z Rs.	P Rs.	Q Rs.	R Rs.	S Rs.
Overheads		1,93,000	64,000	83,000	(+) 45,000	(+) 75,000	+1,05,000	+30,000
Service Dept. P	No. of employees (20 : 25 : 17)	14,516	18,145	12,339	(-) 45,000			
Service Dept. Q	Direct labour hours (4 : 3 : 4)	27,272	20,456	27,272		(-) 75,000		
Service Dept. R	Area in Sq. feat (2 : 1 : 1)	52,500	26,250	26,250			(-) 1,05,000	
Service Dept. S	Direct Labour hours (4 : 3 : 4)	10,909	8,182	10,909				(-) 30,000
Total Overheads		2,98,197	1,37,033	1,59,770	-	-	-	-

Illu.4 : In an Engineering factory, the following particulars have been extracted for the quarter ended 31st December 2003. Compute departmental overhead rate for each of the production departments, assuming that overheads are recovered as a percentage of direct wages: -

	Production Departments			Service Departments	
	A	B	C	X	Y
Direct Wages (Rs.)	60,000	90,000	1,20,000	30,000	60,000
Direct Material (Rs.)	30,000	60,000	60,000	44,000	45,000
Staff (number)	1,500	2,250	2,250	750	750
Electricity (KWH)	6,000	4,500	3,000	1,500	1,500
Asset Value (Rs.)	6,00,000	4,00,000	3,00,000	1,00,000	1,00,000
Light Points	10	16	4	6	4
Area (Sq. yards)	150	250	50	50	50

The expenses for the period were:

	Rs.		Rs.
Power	2,200	Depreciation	60,000
Lighting	400	Repairs	12,000
Stores overhead	1,600	General O. H.	24,000
Welfare of staff	6,000	Rent and taxes	1,110

Apportion the expenses of service department 'Y' according to direct wages and those of service department 'X' in the ratio of 5:3:2 to production departments.

Solution :

Items of Expenditure	Basis	Production Departments			Service Departments	
		A	B	C	X	Y
Direct Materials	Given	-	-	-	44,000	45,000
Direct Wages	Given	-	-	-	30,000	60,000
Power	Electricity (KWh) (4:3:2:1:1)	800	600	400	200	200
Lighting	Light points (5:8:2:3:2)	100	160	40	60	40

Stores overhead	Direct materials (30:60:60:4 4:45)	200	400	400	295	305
Welfare to staff	Staff (number) (2:3:3:1:1)	1,200	1,800	1,800	600	600
Repairs	Value of the asset (6:4:3:1:1)	4,800	3,200	2,400	800	800
General O. H.	Direct wages (2:3:4:1:2)	4,000	6,000	8,000	2,000	4,000
Rent and taxes	Area (3:5:1:1:1)	303	504	101	101	101
		35,403	28,664	25,141	82,056	1,15,046
Service Department X	5:3:2	41,028	24,617	16,411	(82,059)	-
Service Department Y	2:3:4	25,566	38,348	51,132		(1,15,046)
		1,01,997	91,629	92,684	-	-

Department Overheads rate =

$$A = \frac{1,01,997 \times 100}{60,000} = 169.995\%$$

$$B = \frac{91,629 \times 100}{90,000} = 101.81\%$$

$$C = \frac{92,684 \times 100}{1,20,000} = 77.236\%$$

Illu.5 : A Company is having three production departments X, Y and Z and two service departments – boiler – house and pump – room. The boiler – house has to depend upon the pump-room for supply of water pump – room in the turn is dependent on the boiler – house for supply of steam – power for driving the pumps.

The expenses incurred by the production departments are

X – Rs.6, 00,000; Y – Rs.5, 25,000; Z – Rs.3, 75,000.

The expenses for boiler –house are Rs.1,75,500 pump-room are Rs.2,25,000. The expenses of the boiler – house and pump – room are apportioned to the production department on following basis:

Particulars	Departments			Boiler House	Pump Room
	X	Y	Z		
Expenses of boiler house	20%	40%	30%	-	10%
Expenses of Pump-room	40%	20%	20%	20%	-

Required: Show clearly as to how the expenses of boiler –house and pump – room would be apportioned to X, Y and Z departments.

Solution :

**Statement showing the Secondary Distribution of overhead expenses
under Repeated Distribution Method**

Particulars	Basis for Distribution	Total Rs.	Production Departments			Service Depts.	
			X Rs.	Y Rs.	Z Rs.	Boiler House Rs.	Pump House Rs.
As per primary distribution	-	19,00,500	6,00,000	5,25,000	3,75,000	1,75,500	2,25,000
Boiler house Expenses	2 : 4 : 3 : 1	-	35,100	70,200	52,640	-1,75,500	17,550
Pump House	4 : 2 : 2 : 2	-	97,020	48,510	48,510	48,510	-2,42,550

Expenses							
Boiler House Expenses	2 : 4 : 3 : 1	-	9,702	19,404	14,553	-48,510	4,851
Pump House Expenses	4 : 2 : 2 : 2	-	1,941	970	970	970	-4,851
Boiler House Expenses	2 : 4 : 3 : 1	-	194	388	291	-970	97
Pump House Expenses	4 : 2 : 2 : 2	-	49	24	24	-	-97
		19,00,500	7,44,006	6,64,496	4,91,998	0	0

Illu.6 : The following are the information related to the factory wherein 5 equal machines are working. The annual expenditure of the factory are as under:

- (1) Rent and Rates Rs.4, 800
- (2) Depreciation of a machine Rs.500
- (3) Repairs for five machine Rs.1, 000
- (4) Power for the factory (as per metre) at the rate of 5paise per unit Rs.3, 000
- (5) Lighting for the factory Rs.540
- (6) Salary of the each attendant at the rate of Rs.60 per month. Two attendants are working on all five machines.
- (7) Supervisor 's salary per month Rs.250. He is supervising all the five machines.
- (8) Greese, cotton waste etc., for the factory Rs.450
- (9) Hire –purchase installment paid for the machine (including interest Rs.300) Rs.1, 200.
- (10) Machine requires 10 units power per hour.

Find out Machine Hour Rate.

Solution :

Calculation of machine hours:

i) Power units:

Ps.0.05 – 1 unit

Rs.3, 000 - ?

$$\frac{1 \times 3,000}{0.05} = 60,000 \text{ units}$$

ii) Total Machine hours:

10 units – 1 hour

60,000 units - ?

$$\frac{1 \times 60,000}{10} = 6,000 \text{ hours}$$

iii) Machine hours of each machine

$$= \frac{6,000}{5} = 1,200 \text{ hours}$$

<i>Particulars</i>		<i>Rs.</i>
I. Fixed Expenses:		
a) Rent (4,800 ÷ 5 ÷ 1,200)	0.80	
b) Lighting (540 ÷ 5 ÷ 1,200)	0.09	
c) Salary of attendant (2 x 60 x 12 ÷ 5 ÷ 1,200)	0.24	
d) Supervisor's salary (250 x 12 x 1/5 ÷ 1,200)	0.50	
e) Greese (450 ÷ 5 ÷ 1,200)	0.07	1.70
II. Variable expenses:		
a) Repairs (1,000 ÷ 5 ÷ 1,200)	0.17	
b) Depreciation (500 ÷ 1,200)	0.42	
c) Power (10 x 0.05)	0.50	1.09
Machine Hour rate		2.79

Note: Hire – purchase installment and interest thereon should not be taken.

5.7 QUESTIONS

A. Short Answer Questions.

1. What are fixed overheads?
2. What are variable overheads?
3. What are semi variable overheads?
4. What is simultaneous equation method?
5. What is Repeated Distribution Method?
6. What is the need for predetermined overhead recovery rate?
7. Write short note on Machine Hour Rate.

B. Essay Questions

1. What do you understand by the term 'Overheads'? Explain different methods of classification of overheads.
2. Explain the concept of Factory Overheads? Describe their characteristics.
3. What do you understand by classification, allocation and apportionment in relation to overhead expenses? Explain fully.
4. Distinguish between allocation and apportionment of overheads
5. Discuss the secondary distribution of overheads.
6. Explain the different methods for apportionment of Service Department's Costs over Production Departments.
7. What is machine hour rate? Explain briefly the circumstances in which a machine hour rate may suitably be used in Cost Accounting.

5.8 EXERCISES

1. Indian Manufacturing Ltd. has four productions Viz., A, B, C and D and has two service departments Transport and Power supply. The expenses in the Primary distribution are as follows:

A – Rs.1, 000; B – Rs.900; C – Rs.800.

Transport Rs.550; Power Supply Rs.380. Expenses of the service departments are apportioned as follows:

	A	B	C	D	Transport	Power Supply
Transport	10%	30%	20%	20%	-	20%
Power Supply	30%	20%	30%	10%	10%	-

Find out the overheads of production departments by Repeated Distribution Method.

[Ans.: Production Departments : A Rs.1,210.16; B Rs.1,179.89; C Rs.1,070.06; D Rs.169.89]

2. From the following information work out the production hour rate of recovery of overhead departments P1, P2, and P3

Particulars	Total	Production Depts.			Service Depts.	
		P1	P2	P3	S1	S2
		Rs.	Rs.	Rs.	Rs.	Rs.
Rent	1,000	200	400	100	150	100
Electricity	200	50	80	30	20	20
Fire Insurance	400	80	160	60	60	40
Plant Depre.	4,000	1,000	1,500	1,000	300	200
Transport	400	50	50	50	100	150
Estimated working hours		1,000	2,500	1,800		

Reponses of service departments and D and E are apportioned as under:

	P1	P2	P3	S1	S2
S1	30%	40%	20%	-	10%
S2	10%	20%	50%	20%	-

[Ans.: Hourly rate of overhead : P1 = Rs.1.66; P2 = Rs.1.04; P3 = Rs.0.96]

3. A factory has two service departments viz. A & B and three production departments Viz. X, Y and Z. The overhead cost distribution for the month of March 2003 is as follows:

	Rs.
Production department X	16,000
Production department Y	14,000
Production department Z	10,000
Service department A	4,680
Service department B	6,000
	50,680

The expenses of Service departments and charged on percentage as follows:

	X	Y	Z	A	B
A	20%	40%	30%	-	10%
B	40%	20%	20%	20%	-

You are required to use simultaneous equation method for secondary distribution.

[Ans.: Simultaneous Equation method : X Rs.6,000; Y = Rs.6,600; Secondary Distribution of Overheads : X Rs.19,840; Y Rs.17,720; Z Rs.13,120]

4. A factory has two production departments and two service departments. The following figures have been extracted from the books of the respective departments.

	Production Departments		Service Departments	
	P Rs.	Q Rs.	R Rs.	S Rs.
Area (Sq. Meters)	1,500	1,100	900	500
No. of Employees	40	30	20	10
Total Wages	8,000	6,000	3,000	3,000
Value of plant	16,000	12,000	8,000	4,000
Lighting units	5,000	3,000	1,500	500

The following figures of actual costs were taken from the financial books.

		Rs.
Supervision	:	3,000
Repairs P & M	:	1,200
Light	:	1,000
Employer 's contribution to ESI	:	200
Rent	:	800
Depreciation on plant	:	2,000
Insurance (Stock)	:	800
Power		1,000
Canteen expenses	:	100

Apportion the above costs to various departments on most equitable basis and draw an overhead analysis sheet.

[Ans.: Primary Distribution of Overhead : P Rs.4,300; Q Rs.3,070; R Rs.1,680; S Rs.1,050]

5. Overhead costs are as follows.

Production Departments	A : Rs.45,000 B : Rs.38,000
Service Departments :	M : Rs.26,000 N : Rs.28,000

Service departments costs are to be allocated to production departments as follows :

	Production Depts.		Service Departments	
	A	B	M	N
Service Department M	40%	40%	-	20%
N	35%	35%	30%	-

Compute overheads of production departments

[Ans.: Secondary Distribution of Overheads : A Rs.72,000; B Rs.65,000]

6. The following information relates to Bharathi Industries for month of July 2005, in a production department.

Material consumed Rs.27, 000.

Direct Wages Rs.22, 500

Hours of machine operation 15,000 hrs.

Labour hours worked 18,000 hrs.

Overhead charged to the department Rs.18, 000.

On one order carried out in the department during the period, the relevant data were:

Materials used Rs.3, 000; Direct Wages Rs.1, 600; Machine hours 1200hrs; Labour hours 1600 hrs.

Prepare comparative statement of cost in this order using:

- Direct Material percentage method.
- Direct labour cost rate method.
- Direct labour hour rate method.
- Machine hour rate method.

[Ans.: (a) Rs.2,000 (b) Rs.1,280; (c) Rs.1,600; (d) Rs.1,440]

7. The fixed costs and variable costs per month for a machine are respectively Rs.18,-00 and Rs.15,000. The number of hours per month are 200 out of which 20 are required for maintenance and another 30 are required for set up on the average. A job required 10 hours for set up besides 30 hours for actual operation. What is the amount, which should be charged to the cost of the job in respect of the machine?

[Ans.: Machine Hour Rate Rs.220 per hour]

8. Compute the machine hour rate from the following

A machine costing Rs.10,000 is expected to run 10 years at the end of which period the scrap value is likely to be Rs.900

Repairs during the whole life of the machine are expected to be Rs.1,800. The machine is expected run 4380 hours per year on an average. Its electricity consumption is 15 units per hour. The rate per unit being 5 paise.

The machine occupies one fourth of the area of the department and has two points out of a total of 10 for lighting.

The foreman has to devote about one sixth of his time to the machine. The monthly rent of the department is Rs.300

The lighting charges amount to Rs.80 per month

The foreman is paid a monthly salary of Rs.960.

Insurance is 1% per annum of the machine value.

Consumable stores Rs.9 per month.

[Ans.: Machine Hour Rate Rs.1.74]

5.9 SUGGESTED READINGS

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4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
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Chapter - 6

Reconciliation of Cost and Financial Accounts

Objectives

This lesson helps you in

- Understanding the need for reconciliation of cost and Financial Accounts.
- Knowing the reasons for disagreement in profit between financial accounting and cost accounting.
- Understanding the procedure of reconciliation

Structure :

- 6.1 Need for Reconciliation
- 6.2 Objects of Reconciliation
- 6.3 Reasons for disagreement in profit
- 6.4 Effect of various items on profit
- 6.5 Procedure of Reconciliation
- 6.6 Memorandum Reconciliation Account
- 6.7 Questions
- 6.8 Exercises
- 6.9 Suggested Readings

6.1 NEED FOR RECONCILIATION :

When cost and financial books are maintained separately in an undertaking the profits shown by two sets of books will not agree with each other due to several reasons. When two profit figures vary, the management cannot make a wise decision. Therefore, a reconciliation is necessary between the profit of the two sets of books to identify the reasons for difference and to ensure arithmetical accuracy and reliability of cost and financial data.

6.2 OBJECTS OF RECONCILIATION :

The following are the two objectives of reconciliation of cost and financial books.

1. To find out the reasons for the difference in profit or loss in cost and financial books.
2. To check the arithmetical accuracy and reliability of cost as well as financial data.

6.3 REASONS FOR DISAGREEMENT IN PROFIT :

Since the cost and financial accounts relate to the same facts and are largely based upon identical sources of information, there should normally be no difference in the profit figures of the two. In fact, there will hardly be any discrepancy between the direct materials, direct labour and direct charges allocated to costs as shown by the financial books. These can be easily identified with the jobs or processes on account of which they are expended and are accordingly charged. On cost discrepancies would, however, often arise in respect of works, office and administrative on cost, and selling and distribution on cost. Then, there are some other possible reasons too for variation in profit between the two sets of accounts.

6.3.1. Items shown in financial accounts only :

1. There are some items which are taken only in financial accounts but not in cost accounts. They are :

a. Purely Financial Charges :

- i. Loss on sale of capital assets and loss on stamp duty and cost of issue of shares and debentures
- ii. Discount on issue of shares and debentures
- iii. Interest on bank loans and Mortgages
- iv. Fines and Penalties
- v. Goodwill and preliminary expenses written off
- vi. Underwriting expenses
- vii. Donations and charities

b. Purely Financial incomes :

- i. Profit on sale of capital assets and Investments
- ii. Share transfer fees received on transfer of shares
- iii. Interest received on bank deposits and loans etc
- iv. Rent Receivable

- v. Dividends

c. Appropriation of profits :

- i. Income Tax
- ii. Dividends paid
- iii. Transfer to Reserves and Provisions
- iv. Transfer to sinking funds.

6.3.2 Items shown only in Cost Accounts :

There are certain items which are incurred in cost accounts but not in financial accounts. For example, notional charges such as rent on owned building, Interest on capital etc.

6.3.3. Under or over absorption of overheads :

In cost accounts overheads are absorbed on predetermined basis, whereas in financial accounts the actual expenses are shown. As a result of this, some differences arise between the overhead estimated in cost books and expenses actually incurred in financial books. Under absorption of overheads in cost books will result in increase in profit and over absorption will decrease to profit of cost accounts.

6.3.4. Valuation of Stock :

In financial accounts stock is valued at cost or Market price whichever is less. But in cost accounts stock is valued at cost only. This creates the difference in profits shown by the two sets of books. The over valuation of closing stock will increase the profits of cost accounts and that of opening stock will decrease in profits of cost accounts.

6.3.5. Abnormal Losses :

In financial accounts abnormal losses are taken into consideration whereas in cost accounts such losses are not considered. This results in increase in cost profits.

6.3.6. Depreciation :

The methods in charging depreciation is different in two sets of books. In financial books depreciation may be charged at straight line or diminishing balances method. But in cost

accounts machine hour rate method may be adopted. This leads to differences in profit in financial and cost books.

6.4 EFFECT OF VARIOUS ITEMS ON PROFIT :

The effect of various items discussed above on the profit balances revealed by cost and financial books is given in the following table.

Causes of Differences	Effect on Profits as per cost accounts	Effect on Profits as per financial books
1. Expenses or losses included in financial accounts only.	Increase	Decrease
2. Pure Financial charges	Increase	Decrease
3. Incomes and gains credited in financial accounts only	Decrease	Increase
4. Items shown in Cost accounts only	Decrease	Increase
5. Under-recovery of overheads in cost accounts	Increase	Decrease
6. Over-recovery of overheads in cost accounts	Decrease	Increase
7. Valuation of Stock :		
a. Over valuation of opening stock and under valuation of closing stock in Cost Accounts	Decrease	Increase
b. Under valuation of opening stock and overvaluation of closing stock in cost Accounts.	Increase	Decrease
8. Depreciation Methods :		
a. Excess depreciation in cost books	Decrease	Increase
b. Excess Depreciation in financial books	Increase	Decrease

6.5 PROCEDURE OF RECONCILIATION :

The cost and financial accounts are reconciled by preparing a reconciliation statement or Memorandum Reconciliation Account. The following steps should be taken to proper the Reconciliation Statement.

1. Ascertain the points of differences for disagreement of profit between the two sets of accounts.

2. Prepare the reconciliation statement in the following format with the help of causes of differences and their effect on profits :

Format
Reconciliation Statement of
Cost and Financial Books

	Rs.	Rs.
Profit as per Cost Accounts (or) Loss as per financial accounts		XXX
Add:		
i. Incomes and gains shown in financial accounts but not in cost accounts	XXX	
ii. Expenses shown in cost accounts but not in financial accounts i.e., Rent on owned premises, interest on capital etc.	XXX	
iii. Over absorption of overheads in cost accounts		
a. Factory overheads	XXX	
b. Office and administration overheads	XXX	
c. Selling and distribution overheads	XXX	
iv. Under valuation of closing stock in cost accounts	XXX	
v. Over valuation of opening stock in cost accounts	XXX	XXX
		XXX
Less:		
i. Incomes shown in cost accounts but not in financial accounts	XXX	
ii. Expenses shown in financial accounts but not in cost accounts	XXX	
iii. Under absorption of overheads in cost accounts	XXX	
iv. Over valuation of closing stock in cost accounts	XXX	
v. Under valuation of opening stock in cost accounts	XXX	XXX
Profit as per financial accounts (or) Loss as per cost books		XXX

3. After making all the above additions and deductions the resulting figure will be profit as per financial accounts.

Note : If Profit as per financial accounts or loss as per cost accounts is taken as the base :

In this case the reverse procedure has to be followed. The items which are added in the above instance will be deducted and the items deducted above shall be added back.

6.6 MEMORANDUM RECONCILIATION ACCOUNT :

Reconciliation can also be done by preparing a Memorandum Reconciliation Account. The base profit is credited to this account. Items to be added are credited and those to be deducted are debited. The credit balance shown by this account is the intended profit. The specimen form of Memorandum Reconciliation Account is given below.

Memorandum Reconciliation Account

Dr.	Rs.	Cr.	Rs.
To Financial expenses :		By Profit as per cost accounts	
		Financial Income :	
Discount	XXX	Rent	XX
Fine and Penalties	XXX	Interest	XX
Bank Interest	XXX	Dividend	XX
Underwriters commission	XXX	Profit on sale of assets	XX
Donations	XXX		XXX
		Items charged in Cost Accounts :	
Goodwill written off	XXX	Interest on own capital	XXX
Under absorption of overheads	XXX	Rent on own building	XXX
Under valuation of opening stock in cost accounts	XXX	Over absorption of overheads	XXX
Intended profit as per financial accounts	XXX	Over valuation of Opening stock in cost accounts	XXX
		Under valuation of closing stock in Cost Accounts	XXX
	XXX		XXX

6.6.1 When the causes for differences in profits of Cost and Financial Books are given :

Illu. 1: As per Cost Accounts, the net profit is Rs.30,390. But the financial accounts show different profit. On scrutiny the following reasons are found :

- a. Works overheads under recovered in cost books Rs.640.
- b. Opening stock was over valued in financial books Rs.380.

Find out the profit as per financial Accounts.

SOLUTION :

Reconciliation Statement of Cost & Financial Accounts

Particulars	Amount Rs.	Amount Rs.
Net profit as per Cost Books		30,390
Add:		NIL
		30,390
Less : Under Recovery of works overheads in Cost books	640	
Overvaluation of Opening Stock in Financial Books	380	1,020
Net profit as per Financial Books		29,370

Illu. 2: From the following data, find out the profit or loss as per financial accounts by preparing Reconciliation Statement.

(i) Net loss as per cost accounts	Rs.	35,500
(ii) Works overhead under-recovered in cost accounts	Rs.	650
(iii) Depreciation over charged in cost accounts	Rs.	250
(iv) Office overheads recovered in excess	Rs.	340

SOLUTION :

Reconciliation Statement of Cost & Financial Accounts

Particulars	Amount Rs.	Amount Rs.
Net loss as per Cost Accounts		35,500
Add: Under recovery of works overheads in Cost accounts		650
		36,150
Less: Depreciation overcharged in Cost Accounts	250	
Office Overheads recovered in excess	340	590
Net loss as per Financial Books		35,560

Illu. 3: The profit as per Cost Accounts is Rs.86,250

The following points are formed out on comparison between cost Accounts and Financial Accounts.

	Cost Accounts	Financial Accounts
(a) Opening Stock :		
Materials	10,300	10,500
Work in progress	8,000	8,500
(b) Closing Stock :		
Materials	15,000	14,200
Work in progress	6,000	5,600

- c. Dividend and interest received Rs.600.
 - d. Loss on sale of investments Rs.1,000
 - e. Rs.1,500 interest charged by bank but not considered in Financial Accounts and also in Cost Accounts.
 - f. Goodwill Rs.2,500 and preliminary expenses Rs.3,000 have been written off during the year.
 - g. Overheads incurred Rs.40,600 but overheads absorbed amounted to Rs.38,500.
- Find out profit as per Financial Accounts by Reconciliation Statement.

SOLUTION :

Reconciliation Statement of Cost & Financial Accounts

Particulars	Amount Rs.	Amount Rs.
Net profit as per Cost Accounts :		86,250
Add: Dividends and Interest received shown only in Financial books	600	600
		86,850
Less: Under valuation of opening stock in Cost books :		
Materials = (10,500 – 10,300)	200	
Work – in – Progress = (8,500 – 8,000)	500	700
Overvaluation of Closing Stock in Cost Books :		
Materials = (15,000 – 14,200)	800	

Work – in – progress = (6,000 – 5,600)	400	1,200	
Loss on the sale of investments shown in Financial Books		1,000	
Expenses written off in Financial Books (Preliminary Expenses 3,000 + Goodwill 2,500)		5,500	
Under absorption of overheads in Cost Books (40,600 – 38,500 = 2,100)			10,500
Net Profit as per Financial Books			76,350

Note : Item “e” does not affect the Profit balances of Cost and Financial Books. Hence the item is deleted.

Illu. 4: From the following figures, prepare a Reconciliation Statement and find out profits as per Financial Accounts :-

	Rs.
Net profit as per costing Books	17,24,000
Works overhead under recovered in cost books	31,200
Administration overhead recovered in excess	17,000
Depreciation charged in Financial records	1,12,000
Depreciation recovered in costing	1,25,000
Interest received but not included in costing	80,000
Obsolescence loss charged in financial records	57,000
Income Tax provided in financial books	4,03,000
Bank interest credited in financial books	7,500
Stores Adjustments (credited in financial books)	4,750
Depreciation of stock charged in financial books	67,500

SOLUTION :

Reconciliation Statement of Cost & Financial Accounts

Particulars	Amount Rs.	Amount Rs.
Net Profit as per Costing Books		17,24,000
Add: Administration overheads recovered in excess in Cost Books	17,000	
Over recovery of Depreciation in Cost Books (1,25,000		

- 1,12,000)	13,000	
Interest received but not included in costing	80,000	
Bank Interest credited in Financial Books	7,500	
Stores Adjustment credited in Financial Books	4,750	1,22,250
		18,46,250
Less: Works overheads under recovered in Cost Books	31,200	
Obsolescence loss charged in Financial Records	57,000	
Income Tax provided in financial books	4,03,000	
Depreciation Stock charged in Financial Books	67,500	5,58,700
Net profit as per Financial Records		12,87,550

6.6.2 When Profit and Loss Account and causes of differences are given :

Illu. 5 : S. V (P) Ltd. has furnished the following information from the financial books for the year ended 31st March 2005. Trading and Profit and Loss Account for the year ended 31st March 2005.

	Rs.		Rs.
To Opening Stock (500 units at Rs.35 each)	17,500	By Sales (10,250 units)	7,17,500
To Materials consumed	2,60,000	By Closing Stock (250 units @ Rs.50 each)	12,500
To Wages	1,50,000		
To Gross Profit	3,02,500		
	7,30,000		7,30,000
To Factory overheads	94,750	By Gross Profit	3,02,500
To Administrative overheads	1,06,000	By Interest	250
To Selling Expenses	55,000	By Rent received	10,000
To Bad debts	4,000		
To Preliminary expenses	5,000		
To Net Profit	48,000		
	3,12,750		3,12,750

The cost sheet shows the cost of materials as Rs.26 per unit and the labour cost as Rs.15 per unit. The factory overheads are absorbed at 60% of labour cost and administrative overheads at 20% of the factory cost. Selling expenses are charged at

Rs.6 per unit. The opening stock of finished goods is valued at Rs.45 per unit. You are required to prepare :

- (a) A statement showing profit as per cost accounts for the ended 31st March 2005.**
- (b) Statement showing the reconciliation of profit disclosed accounts with the profits shown in the financial accounts.**

SOLUTION :

(a) Statement of Cost and Profit for the year ended 31st March 2005

Particulars	Amount Rs.	Amount Rs.
Materials : (10,000 units @ Rs.26 per Unit)		2,60,000
Wages : (10,000 Units @ Rs.15 per Unit)		1,50,000
Prime Cost		4,10,000
Factory Overheads : (60% of Labour Cost)	(1,50,000 x 60/100)	90,000
Factory Cost		5,00,000
Administrative Overheads : (20% of Factory Cost)	5,00,000 x 20/100	1,00,000
Cost of Production	10,000 Units	6,00,000
Add : Opening Stock : 500 units @ Rs.45 each	500 Units	22,500
	10,500 Units	6,22,500
Less : Closing Stock : 250 Units @ Rs.60 each	250 Units	15,000
Cost of goods Sold	10,250 Units	6,07,500
Add: Selling Expenses : (Rs.6 per unit) = (10,250 units x 6.00)		61,500
Cost of Sales		6,69,000
Profit		48,500
Sales		7,17,500

(b) Reconciliation Statement of Cost & Financial Books

Particulars	Amount Rs.	Amount Rs.
Net Profit as per Cost Accounts :		48,500
Add: Over Recovery of selling overheads in Cost Books (61,500 – 55,000)	6,500	
Over valuation of Opening Stock in Cost Books (22,500 – 17,500)	5,000	
Interest credited in Financial Books	250	
Rent received credited in Financial Books	10,000	21,750
		70,250
Less: Under recovery of factory overheads in Cost Books (94,750 – 90,000)	4,750	
Under recovery of Office overheads in Cost Books (1,06,000 – 1,00,000)	6,000	
Over valuation of Closing Stock in Cost Books (15,000 – 12,500)	2,500	
Items of expenses taken in Financial Books :		
Bad debts	4,000	
Preliminary Expenses	5,000	22,250
Net Profit as per Financial Books		48,000

Illu. 6 : During the year ended 31-3-2005 a company 's profit as per Financial Books was Rs.16,624. Prepare a Reconciliation statement arrive at the profit as per cost accounts using the additional information given :

	Rs.		Rs.
To Opening Stock	2,47,179	By Sales	3,46,500
To Purchases	82,154	By Closing Stock	75,121
To Direct wages	23,133	By Sundry Income	316
To Factory overhead	20,826		
To Administration expenses	9,845		
To Selling Expenses	22,176		
To Net Profit	16,624		
	4,21,937		4,21,937

The costing records show :

- (a) Closing stock Rs.78,197
- (b) Direct wages Rs.24, 867
- (c) Factory overheads absorbed Rs.19,714
- (d) Administration expenses calculated at 3%, on sales.
- (e) Selling expenses are absorbed at 5% on Sales.

SOLUTION :

Reconciliation Statement of Cost & Financial Books

Particulars	Amount Rs.	Amount Rs.
Net Profit as per Financial Books		16,624
Add: Under valuation of Closing stock in Financial Books (78,197 – 75,121)	3,076	
Over charge of Factory Overheads in Financial Books (20,826 – 19,714)	1,112	
Financial Books (3,46,500 x 5/100 = 17,325) (22,176 – 17,325)	4,851	9,039
		25,663
Less: Under charge of Direct Wages in Financial Books (24,867 – 23,133)	1,734	
Under absorption of administration expenses in Financial Books (3,46,500 x 3/100 = 10,395) (10,395 – 9,845)	550	
Sundry Income shown in Financial Books	316	2,600
Net profit as per cost Books		23,063

Illu. 7 : From the following Profit and Loss Account draw up Memorandum Reconciliation Statement showing the profit as per cost accounts.

Profit and Loss Account 31-12-2006

	Rs.		Rs.
To Office Salaries	11,282	By Gross Profits	54,648
To office expenses	6,514	By Dividend received	400
To Salesmen's salary	4,922	By Interest on bank deposit	150

To Distribution expenses	2,990		
To Loss on sale of Machinery	1,950		
To Fines	200		
To Discounts	100		
To Net Profit	17,936		
	55,198		55,198
To Income tax	8,000	By Net Profit	17,936
To Reserves	1,000		
To Dividends	4,000		
To Balance b/d	4,936		
	17,936		17,936

SOLUTION :**Reconciliation Statement**

Particulars	Amount Rs.	Amount Rs.
Profit as per cost accounts		19,636
Less: Items not provided in cost account :		
Loss on sale of machinery	1,950	
Discount on debentures	100	
Fines	200	2,250
		17,386
Add : Items not taken in cost accounts :		
Interest on bank deposit	150	
Dividend received	400	550
Profit as per financial books		17,936

Memorandum Reconciliation Account

	Rs.		Rs.
To Income not credited in cost accounts :		By Profit and Loss a/c	4,936
To Dividend received	400	By Items charged only in financial accounts :	
To Interest on bank deposit	150	By Discount on debentures	100
To Profit as per cost a/c	19,636	By Fines	200

		By Loss on sale of machinery	1,950
		By Income –tax	8,000
		By Reserve	1,000
		By Dividend	4,000
	20,186		20,186

If items charged to the profit and loss appropriation account are excluded the memorandum reconciliation statement appears are indicated below

Memorandum Reconciliation Statement

	Rs.		Rs.
To Income not credited in cost accounts :		By Profit and Loss a/c	17,936
To Dividend received	400	By Items charged only in financial accounts :	
To Interest on bank deposit	150	By Discount on debentures	100
To Profit as per cost a/c	19,636	By Fines	200
		By Loss on sale of Machinery	1,950
	20,186		20,186

6.6.3 Preparation of Cost Sheet and Profit and Loss account for Identification of differences in Profits and preparation of Reconciliation Statement :

Illu. 8: From the following particulars prepare a statement conciling the profit shown by Cost and Finance Accounts.

	Rs.
Opening stock of materials	1,44,000
Opening stock of finished goods	2,88,000
Purchase of materials	8,64,000
Closing stock of raw materials	2,16,000
Closing stock of finished goods	72,000
Wages	3,60,000

Factory on Cost 20% on prime cost

Office on cost 80% on factory on cost

Selling Price 20% above the cost price

Actual work expenses Rs.2,27,150

Actual Office expenses Rs.1,85,950.

SOLUTION :

Cost Sheet

Particulars	Amount Rs.	Amount Rs.
Opening Stock of Materials	1,44,000	
Add: Purchase of Materials	8,64,000	
	10,08,000	
Less : Closing stock of Materials	2,16,000	
Value of Materials Consumed		7,92,000
Direct Wages		3,60,000
Prime cost		11,52,000
Add : Factory on Cost (20% on Prime Cost) (11,52,000 x 20/100)		2,30,400
Factory Cost		13,82,400
Office on Cost :80% on Factory on Cost [2,30,400 x 80/100]		1,84,320
Cost of Production		15,66,720
Add : Opening Stock of finished goods		2,88,000
		18,54,720
Less : Closing Stock of Finished goods		72,000
Total Cost		17,82,720
Add: Profit		3,56,544 (Bal. Fig)
Sales (20% above the cost price)		21,39,264

Profit & Loss Account

Dr.

Cr.

Particulars	Rs.	Particulars	Rs.
To Opening Stock of Materials	1,44,000	By Sales	21,39,264
To Opening stock of Finished Goods	2,88,000	By Closing Stock:	

To Purchases	8,64,000	Materials	2,16,000	
To Wages	3,60,000	Finished Goods	72,000	2,88,000
To Works expenses	2,27,150			
To Office Expenses	1,85,950			
To Net Profit	3,58,164			
	24,27,264			24,27,264

Reconciliation Statement of Cost and Financial Account Profits

Particulars	Amount Rs.
Profit as per Cost Books	3,56,544
Add: Over absorption of works expenses in cost books (2,30,400 – 2,27,150)	3,250
	3,59,794
Less: Under absorption of Office Expenses in Cost Books (1,85,950 – 1,84,320)	1,630
Net profit as per Cost Books	3,58,164

Working Notes :

	Rs.
Sales = 20% above the cost Price :	
Cost Price	17,82,720
Add: Profit 20% on cost	3,56,544
Sales or selling price	21,39,264

Illu. 9 : The following figures have been extracted from the financial accounts of a manufacturing firm for the first year of its operations :

	Rs.
Direct material consumption	50,00,000
Direct wages	30,00,000
Factory overheads	16,00,000
Administration overheads	7,00,000
Selling and Distribution overheads	9,60,000
Bad debts	80,000
Preliminary expenses used then off	40,000

Dividends received	1,00,000
Interest on deposit received	20,000
Sales 1,20,000 units	1,20,00,000
Closing stock :	
Finished stock – 4,000 units	3,20,000
Work in progress	2,40,000

The cost accounts for the same period reveal that the direct material consumption was Rs.56,00,000, factory overhead is recovered at 20% on prime cost; administration overhead is recovered at Rs.6 per unit of production and selling and distribution overheads are recovered at Rs.8 per unit sold.

You are required to ascertain the profit as per cost and financial accounts and reconcile the difference in the profits so arrived.

SOLUTION :

Profit & Loss Account

Dr.		Cr.	
Particulars	Rs.	Particulars	Rs.
To Materials	50,00,000	By Sales (1,20,000 Units x 100)	1,20,00,000
To Wages	30,00,000	By Closing Stock :	
To Factory overheads	16,00,000	Finished Stock (4,000 Units)	3,20,000
To Administration Overheads	7,00,000	Work – in – progress	2,40,000
To Selling & Distribution overheads	9,60,000	By Dividend received	1,00,000
To Bad debts	80,000	By Interest on deposits	20,000
To Preliminary Expenses	40,000		
To Net Profit	13,00,000		
	1,26,80,000		1,26,80,000

Particulars	Amount Rs.	Amount Rs.
Direct Materials		56,00,000
Direct Wages		30,00,000

Prime Cost		86,00,000
Add: Factory Overheads: (20% on Prime Cost)	(86,00,000 x 20/100)	17,20,000
		1,03,20,000
Less: Closing Stock of Work-in-progress		2,40,000
Factory Cost		1,00,80,000
Add: Office Overheads : (Rs.6 per unit of Production)	(1,24,000 x 6.00)	7,44,000
Cost of Production	1,24,000 Units	1,08,24,000
Less: Closing Stock of Finished Goods		
1,24,000 units = Rs.1,08,24,000		
4,000 Units Cost = ? (1,08,24,000 / 1,24,000 x 4,000)	4,000 units	3,49,161
Cost of goods Sold	1,20,000 Units	1,04,74,839
Add: Selling Expenses :(Rs.8 per unit sold)	(1,20,000 x 8)	9,60,000
Cost of Sales		1,14,34,839
Profit = (Sales – Cost of Sales)		5,65,161
Sales		1,20,00,000

Note: No. of Units Produced = Sales 1,20,000 Units + Closing stock 4,000 Units = 1,24,000 Units.

Reconciliation Statement of Cost and Financial Books

Particulars	Amount Rs.	Amount Rs.
Net Profit as per Cost Accounts		5,65,161
Add :		
1. Over valuation of Materials in Cost Accounts (56,00,000 – 50,00,000)	6,00,000	
2. Over absorption of Factory of Overheads in Cost Accounts (17,20,000 – 16,00,000)	1,20,000	
3. Excess of Administration Overheads in Cost Accounts (7,44,000 – 7,00,000)	44,000	
4. Dividends received not shown in Cost Accounts	1,00,000	
5. Interest on Deposits shown in financial accounts	20,000	8,84,000
		14,49,161
Less :		

1. Over valuation of Closing Stock in Cost Accounts (3,49,161 – 3,20,000)	29,161	
2. Bad debts shown in Financial Accounts	80,000	
3. Preliminary Expenses written off Financial Accounts	40,000	1,49,161
Net Profit as per Financial Accounts		13,00,000

Illu. 10: The following costs were incurred in a factory during the year 2006.

	Rs.
Materials	1,00,000
Direct Labour	50,000
Factory Expenses	46,000
Administrative expenses	37,000
Selling and distribution expenses	26,000
Total	2,59,000
Sales value	2,60,000

Works over-heads are recovered at 50% of labour cost, Administrative over-heads at 20% of works cost and selling and distribution over-heads at 10% of cost of goods sold. Costing stock represents 10% of the output and is valued in financial accounts on the basis of works-cost. Administrative over-heads included a fine of Rs.500. prepare a reconciliation Statement.

SOLUTION :

Profit & Loss a/c for the year 1996

Dr.

Cr.

Particulars	Rs.	Particulars	Rs.
To Materials	1,00,000	By Sales	2,60,000
To Direct Labour	50,000	By Closing Stock	19,600
To Factory expenses	46,000		
To Administrative Expenses	36,500		
To Fines	500		
To Selling & Distribution Expenses	26,000		
To Net Profit (Bal. Fig)	20,600		
	2,79,600		2,79,600

Note : Closing stock represents 10% of the Output and is valued on the basis of work cost.

Works Cost = Materials + Direct Labour + Factory Expenses

$$= 1,00,000 + 50,000 + 46,000 = \text{Rs.}1,96,000$$

$$\text{Closing Stock} = 1,96,000 \times \frac{10}{100} = \text{Rs.}19,600$$

2. Cost Sheet for the year 1996

Particulars	Amount Rs.	Amount Rs.
Materials		1,00,000
Direct Labour		50,000
Prime Cost		1,50,000
Works Overheads : (50% of Labour)	(50,000 x 50/100)	25,000
Works Cost		1,75,000
Add: Administrative Overheads : (20% of Works cost)	(1,75,000 x 20/100)	35,000
Cost of Production		2,10,000
Less: Closing Stock of Finished Goods (10% of Output)	(2,10,000 x 10/100)	21,000
Cost of Sales		2,07,900
Profit = (Bal. Fig)		52,100
Sales		2,60,000

Reconciliation Statement of Cost and Financial Books

Particulars	Amount Rs.	Amount Rs.
Profit as per Financial Books		20,600
Add :		
1. Over charge of Overheads in Financial Books		
a. Factory Overheads (46,000 – 25,000)	21,000	
b. Administrative Overheads (36,500 – 35,000)	1,500	
c. Selling & Distribution overheads (26,000 – 18,900)	7,100	
2. Items of 'Fines' shown in Financial Books	500	
3. Under valuation of Closing stock in Financial Books (21,000 – 19,600)	1,400	31,500
Profit as per Cost Books		52,100

6.7 QUESTIONS

1. Why is it necessary to reconcile the profits as shown by the Cost and Financial accounts? Explain the reasons for the difference in profit also.
2. Explain how will you reconcile cost accounts with financial accounts
3. Discuss the main sources of difference between profit shown by financial accoutns and profit shown by cost accounts.
4. Why is reconciliation of cost and financial accounts necessary? State the possible reasons for differences between profits shown by both the accounts.
5. Explain the importance of reconciling cost and financial accounts.
6. Write short notes on Memorandum of Reconciliation account.

6.8. EXERCISES :

1. Find out the Profit as per Financial records from the following data : -
 - (i) Profit as per cost records Rs.70,500.
 - (ii) Factory overheads over absorbed in cost accounts Rs.10,500.
 - (iii) Administrative overheads under recovered in cost accounts Rs.5,200.
 - (iv) Bad debts and Preliminary expenses written off in financial accounts only Rs.7,345.

[Ans : Rs.68,455]

2. Compute the Profit as per cost books from the following :
 - (i) Profit as per Financial Books Rs.15,000.
 - (ii) Factory overheads, over absorbed in cost books Rs.5,000.
 - (iii) Value of opening stock as per financial books is Rs.7,000 while the same item is Rs.10,000 in cost books.
 - (iv) Value of closing stock in financial books is Rs.12,000 while the same item is Rs.15,000 in cost books.

[Ans : Rs.10,000]

3. The net profit shown by financial accounts of a company were Rs.70,200 whereas the profits disclosed by company's cost accounts for the period were Rs.1,14,640. On reconciling the figures, the following differences were noted :

	Rs.
(a) Directors fee not charged in cost of accounts	2,600

(b)	A provision for bad debts	2,280
(c)	Bank interest	120
(d)	Income tax	33,200

(e) Overheads in cost accounts were estimated at Rs.30,000. The charges shown by the financial accounts was Rs.33,280.

(f) Work was started during the year on a new factory and expenditure of Rs.64,000 was incurred.

Depreciation of 5% was provided in financial accounts.

Prepare a statement reconciling the figures shown by the cost and financial accounts.

4. The Mysore Company Ltd. showed a net loss of Rs.2,08,000 as per financial accounts for the year ended 31-12-2006. The cost accounts, however, disclosed a loss of Rs.1,64,000 for the same period. From the following information, prepare a reconciliation statement.

	Rs.
Factory overheads under recovered	3,000
Administration overheads over recovered	2,000
Depreciation charged in financial accounts	60,000
Depreciation recovered in cost accounts	65,000
Interest on investment not included in cost accounts	10,000
Income tax Provided	60,000
Transfer fees in financial books	1,000
Store adjustment (credit in financial books)	1,000

5. Prepare a Reconciliation statement from the following information.

	Rs.
Net loss as per cost accounts	35,500
Works overheads under recovered in cost accounts	650
Depreciation over charged in cost accounts	250
Office overheads recovered in excess	340
Interest on investments	1,500
Goodwill written off in financial books	800
Income tax paid	8,000
Stores adjustment (credit in financial books)	100

Depreciation of stock charged in financial books	1,350
--	-------

[Ans : Net loss as per Financial Accounts : Rs.44,110]

6. The following is the trading and profit and loss account of a company for the year ended 31st December, 2006 :

	Rs.		Rs.
To material consumed	70,000	By Sales 3,000 units	1,50,000
To Direct wages	35,000	By Stock of finished goods	5,000
To Works overhead	20,750	By Dividend received	1,000
To Administration expenses	11,000		
To Selling expenses	11,250		
To Preliminary expenses	400		
To Bank charges	100		
To Net profit	7,500		
	1,56,000		1,56,000

The cost records show the following :

- (a) Works overheads are charged at 60% of wages.
 - (b) Administrative expenses are charged at 10% of prime cost.
 - (c) Selling expenses are charged at Rs.3 per unit sold.
- (i) Statement of cost and profit as per cost records and
 - (ii) A statement reconciling the profit disclosed by cost accounts

[Ans : Profit as per cost Accounts Rs.9,500]

7. Modern Company Limited furnishes the summary of trading and profit & Loss account for the year ended 31st December 2006 :

	Rs.		Rs.
To Raw materials	1,39,600	By Sales (12,000 units)	4,80,000
To Direct wages	76,200	By Finished Stock (200 units)	8,000
To Production Over heads	42,600	By Work in Progress :	
To Administration overheads	39,100	Materials	28,200
To Selling and distribution overheads	42,700	Wages	11,796
To Preliminary expenses		Production Overheads	7,999

written off	2,200		
To Goodwill written off	2,501		
To Dividend (Net)	3,000		
To Income Tax	4,100		
To Net profit	1,89,994		
	5,41,995		5,41,995

The Company manufactures a standard unit. Scrutiny of Cost records for the same period show that :

- Factory overheads have been allocated to the production at 20 per cent on Prime Cost;
- Administration Overheads have been charged at Rs.3 per unit on units produced; and
- Selling and distribution expenses have been charged at Rs.4 per unit on units sold.

You are required to prepare reconciliation statement.

[Ans : Profit as per cost Accounts Rs.1,88,493]

8. Following is the trading and profit and loss account of PQR co. Ltd. for the year ending 31-12-2006.

	Rs.		Rs.
To Materials	27,400	By Sales (1,200 units)	60,000
To Wages	15,100	By Finished stock (40 units)	1,600
To Factory expenses	8,300	By Work-in-progress	
To Office expenses	3,824	Materials	640
To Selling expenses	4,500	Wages	360
To Goodwill	420	Factory expenses	200
To Net Profit	3,256		
	62,800		62,800

In Cost Accounts :

- Factory expenses have been allocated to the production at 20% on prime cost.
- Office expenses at Rs.5 per unit on units produced.
- Selling expenses at Rs.6 per unit to units sold.

Prepare cost sheet and reconciliation statement.

[Ans : Net loss as per Cost Accounts Rs.1,394]

9. The Trading and Profit and Loss account of X company was as follows on 31.3.2006 :

	Rs.		Rs.
To Purchases	21,000	By Sales	69,000
To Direct wages	10,000	By Closing stock	1,000
To Manufacturing Expenses	12,000	By Profit on sale assets	2,500
To Distribution expenses	2,000		
To Administration Expenses	5,000		
To Depreciation	1,000		
To Selling Expenses	6,000		
To Net Profit	15,500		
	72,500		72,500

As per Cost Accounts, Profit was Rs.16,900. The following information was available in the Cost Accounts.

10. From the following particulars prepare (a) a profit and loss account (b) a statement showing the cost of manufacture and the percentage of each item of cost to total cost, calculating factory on cost at 25% on prime cost and office on cost at 75% on factory on cost (c) a statement reconciling the profit shown by cost accounts with that shown by the profit and loss account. The selling price is fixed at cost plus 25%.

	Rs.
Stock on 1 st January 2006	
a. Raw materials	4,000
b. Finished articles	8,000
Works expenses	7,750
Purchase of raw materials	24,000
Wages	10,000
Sales	65,000
Office expenses	6,100
Stock on 31 st December, 2006	
a. Raw Materials	6,000
b. Finished articles	2,000

[Ans : Profit as per cost accounts Rs.13,000; Financial books Rs.13,150]

11. Sigma Electronic Corporation manufactures two types of Television sets 'Satyam' and 'Nityam'. From the following information obtained from the Corporation, prepare a statement showing total cost. Profit and sales of T.V. sets and per T.V. set sold. There is no opening or closing stock.

	Satyam Rs.	Nityam Rs.
Materials	1,80,000	6,40,000
Labour	80,000	3,60,000
Selling price per T. V. set	4,400	4,500

Works overheads are charged at 80% on labour and office overheads at 20% on works cost. 120 Satyam and 450 Nityam Television sets were produced and sold.

Find out profit as per financial accounts, assuming that the actual works expenses amounted to Rs.4,10,000 and office expenses to Rs.2,95,000. Reconcile the profit shown by cost and financial records.

[Ans : Profit : Cash books Rs.6,18,600; Financial Books Rs.5,88,000]

12. M/s. Vijetha Co. Ltd., manufacturers two types of fans 'Vinaya' and 'Vidhya'. From the following particulars you are required to prepare : (a) a statement showing total cost and profit on two types of fans, (b) profit and loss account (c) reconciliation statement reconciling the profit as per cost accounts and profit as per financial accounts of the company :

	Vinaya Rs.	Vidya Rs.
Materials	90,000	1,20,000
Labour	60,000	80,000

Works overhead is charged at 80% on labor and office overhead taken at 20% on works cost. There is no opening or closing stock.

Vinaya fans sold during the period are 400 at Rs.685 each and Vidhya fans sold are 500 at Rs.720 each. The actual works expenses are Rs.96,500 and office expenses Rs.98,980.

[Ans : (a) Profit as per Cost Books Rs.94,600; (b) Profit as per Financial Accounts : Rs.1,03,520]

13. Ashoka Engineering Company manufacturers two sizes of a machine components, Size A and Size B. the following data refer to the year ended 31st March 2005.

	Size A	Size B
Production	125 Units	400 Units
Sales	120 Units	360 Units
Wages cost per unit	Rs.40	Rs.30
Material cost per unit	Rs.15	Rs.12
Sale price per unit	Rs.125	Rs.90

All expenses other than wages and materials are analysed under 'works overheads' which during the year amounted to Rs.9,000 and 'office overheads' which amounted to Rs.10,000.

In fixing the selling price it was estimated that works overhead should be taken at 50% on wages on office overhead expenses at 33 1/3% on works cost.

You are required to compute the following.

- The total cost of each unit on the basis of the above overhead percentages;
- The net profit for the year shown by the financial accounts, valuing unsold stocks at actual material and wages cost plus works overheads at 50% on wages; and
- The reconciliation of net profit in (b) above with estimated total net profit based on cost figures.

[Ans : (a) Profit as per Cost accounts Rs.8,040; profit as pr financial accounts Rs.7,380].

6.9 SUGGESTED READINGS

- Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
- Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
- Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.
- Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
- Ramachandran, Accounting for Management, Scitech Publications (India) Pvt. Ltd., 2003
- Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter - 7

Integrated Accounting

Objectives :

After reading this lesson you should be able to

- Know the meaning and benefits of integrated accounting
- Understand the features of Integral accounting
- Journalise the transaction while preparing the ledger and trial balance.

Structure :

7.1 Introduction

7.2 Benefits

7.3 Features of Integral Accounting

7.4 Third Entry Method

7.5 Questions

7.6 Exercises

7.7 Suggested Readings

7.1 INTRODUCTION :

Integral Accounting is a system of recording financial and costing transactions in one self-contained ledger, called the Integrated Ledger. It implies maintenance of only one set of books for both financial and cost accounts. Since both financial as well as cost accounts use the data from the same records relating income and expenditure it would be useful to combine both and avoid problems of integration such as: unnecessary clerical effort, wastage of time, duplication of effort etc.

7.2 BENEFITS :

The following benefits accrue from integral accounting :

1. There is no need to prepare the reconciliation statement. Unnecessary wastage of time and effort could thus be avoided.
2. The system is simple and economical. Clerical cost can be reduced considerably. On comparative terms, integral accounting requires only fewer records and accounts.
3. Quick reports can be prepared without much difficulty.
4. There is no possibility of over looking an item of expense.
5. It facilitates the introduction of mechanised accounting.
6. Accounting procedures can be simplified.
7. It makes the General Ledger self balancing. This helps in having automatic check on the accuracy of accounts.
8. Various sections in the Accounting Department can be coordinated smoothly.

7.3 FEATURES OF INTEGRAL ACCOUNTING :

Under the integral accounting all the accounts are maintained in the general or integral ledger. The cost ledger control account is not maintained. Broadly speaking, the integral accounting consists of a main ledger plus the following subsidiary ledgers.

1. **Stores Ledger** : It includes accounts relating to each item in stores.
2. **Work-in-progress or Job Ledger** : It has individual job accounts.
3. **Stock Ledger** : It shows accounts relating to finished products.
4. **Overhead Ledger** : It contains accounts of factory, office and selling expenses.
5. **Creditor's or Bought Ledger** : This ledger shows the Suppliers' Accounts.
6. **Debtor's or Sales Ledger** : It has only Customers' Accounts.

There will be the General Ledger in which the Control Account for each of the above subsidiary ledgers is kept. These control accounts are :

Stores Ledger Control Account

Work-in-progress Ledger Control Account

Finished Stock Ledger Control Account

Wages Control Account

Production or Works Overhead Control Account

Administrative Overhead Control Account

Selling and Distribution Overhead Control Account

Total Creditors or Bought Ledger Control Account

Total Debtors or Sales Ledger Control Account.

Besides, it also includes accounts not covered by the Subsidiary Ledgers, e.g., Capital Account, reserve and provisions etc.

7.4 THIRD ENTRY METHOD:

An account named "Cost Ledger Control Account" is maintained in the financial records and, whenever, any expenditure relating to costs is incurred cost ledger control Account is debited in addition to the usual account (to be debited). There will be no double entry for the cost ledger control account. The cost is further analysed into third entry – accounts (which are not art of a double entry system) in respect of materials, factory overhead, administration overhead etc. The total of these accounts are finally transferred to Finished Goods Account, Profit and Loss Account etc., the double entry being in the cost control account. For instance, when materials are purchased, the entry will be:

Materials Account..... Dr.
 Cost Ledger Control Account.....Dr,
 To Bank or Cash

Similarly for Depreciation of Equipment

Depreciation Account.....Dr
 Cost Ledger Control Account.....Dr,
 To Furniture Account

Journal : Entries Non- Integral Accounting and Integral Accounting

1. For Purchase of Materials:

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
Purchases a/c Dr. To Bought Ledger Control (or Creditors) a/c	Stores Ledger Control a/c Dr. To General Ledger Adjustment a/c	Stores Ledger Control a/c Dr. To Budget Ledger Control (or Creditors) a/c

2. For issue of Materials :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No Entry	Work-in-progress Ledger Control a/c Dr. To Stores Ledger Control a/c	Work-in-progress Ledger Control a/c Dr. To Stores Ledger Control a/c

3. For Payment of wages :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
Wages a/c Dr. To Cash To Insurance To Tax	Wages a/c (or Wages Control a/c Dr. To General Ledger Adjustment a/c	Wages a/c (or Wages Control a/c) Dr. To Cash

4. For Analysis and distribution of wages :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No Entry	Work-in-progress a/c Dr. (for direct labour) Factory Overhead Control a/c Dr. (for factory Indirect labour) Adm. overhead control a/c Dr. (for office indirect labour) S. & D. Overhead Control a/c Dr. (for Selling and distribution indirect labour) To Wages Control a/c	Wages a/c (or Wages Control a/c) Dr. Factory Overhead a/c Dr. Administration Overhead a/c Dr. S. & D. Overhead a/c Dr. To Wages Control a/c

5. For Payment for indirect expenses :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
Expenses a/c Dr. To Cash To Creditors	Factory Adm. / S. & D. Overhead a/c Dr. To General Ledger Adj. A/c	Factory /Office/ Selling & Distribution overhead a/c Dr. To Cash To Creditors

6. For Recording of Factory Overheads (at pre-determined rates)

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No entry	Work-in-progress control a/c Dr. To Factory overhead control a/c	Work-in-progress Control a/c Dr. To Factory Overhead

		Control a/c
--	--	-------------

7. For Factory Overheads Over-absorbed :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No entry	Factory overhead Control a/c Dr. To Costing P & L a/c (or alternatively the balance may be carried forward)	Factory Overhead a/c Dr. To P & L a/c

8. For Jobs Completed :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No entry	Stock Ledger Control a/c Dr. To Work-in-progress Ledger Control a/c	Stock Ledger Control a/c Dr. To Work-in-progress Ledger Control a/c

9. For Interest paid :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
Interest a/c Dr. To Cash	No Entry	Interest A/c Dr. To Cash

10. For Rent of own premises :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No entry	Works overhead a/c Dr. To General Ledger Adj. A/c	Works Overheads a/c Dr. To Rent (notional) a/c

11. For Abnormal idle time :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
No Entry	Costing P & L a/c Dr. To Wages a/c (or alternatively the balance may be carried forward)	Profit & Loss a/c Dr. To Wages a/c

12. For Sales (Credit) :

Non-integral Accounting		Integral Accounting
Financial A/c's	Cost A/c's	
Sales Ledger Control (or Debtors) a/c Dr. To Sales a/c	General Ledger Adjustment A/c Dr. To Cost of Sales a/c	Sales Ledger Control (Debtors) A/c Dr. To Sales a/c

Illu.1 : Journalise the following transactions under the integral accounting method :

	Rs.
Wages paid (30% indirect)	12,000
Raw materials purchases	20,000
Direct materials issued to production	15,000
Wages charged to production	9,500

Solution :**Journal Entries**

Date	Particulars		L. F.	Debit Rs.	Credit Rs.
	Wages Control a/c Factory overhead Control a/c To Bank (Payment of Wages)	Dr. Dr.		8,400 3,600	12,000
	Stores Ledger Control a/c To Sundry Creditors (Purchase of materials)	Dr.		20,000	20,000
	Work-in-progress Control a/c To Stores Ledger Control a/c (Material issued to production)	Dr.		15,000	15,000
	Work-in-progress a/c To Wages Control A/c To Factory Overhead Control a/c (Direct and indirect wages charged to production)	Dr.		9,500	8,400 1,100

Illu. 2: From the following particulars pass the journal entries under the integral accounting system :

- (a) Issued materials Rs.3,00,000, of which Rs.2,80,000 (Standard Rs.2,40,000) is direct materials.
- (b) Net wages paid Rs.70,000. Deductions being Rs.12,000 (standard Rs.75,000).
- (c) Gross salaries payable for the period is Rs.26,000 (standard Rs.25,000). Deductions Rs.2,000.
- (d) Sales (credit) Rs.8,00,000.
- (e) Discount allowed Rs.5,000.
- (f) Salaries and Wages allocation: Rs.60,000 direct (standard Rs.62,000) and out of the balance 50% production 30% Administration and 20% Selling and Distribution Overheads.

Solution :

Journal Entries

Date	Particulars		L. F.	Debit Rs.	Credit Rs.
(a)	Work-in-progress a/c Production overheads a/c Materials price variance a/c To Raw Materials a/c To Stores & Spars a/c (For the issue of materials)	Dr. Dr. Dr.		2,40,000 20,000 40,000	2,80,000 20,000
(b)	Wages control a/c Wages rate variance a/c To Cash a/c To Expense creditors a/c	Dr. Dr.		75,000 7,000	70,000 12,000
(c)	Salaries Control a/c Salaries rate variance a/c To Salaries payable a/c To Expense Creditors a/c (The provision for salaries payable)	Dr. Dr.		25,000 1,000	24,000 2,000
(d)	Debtors a/c To Sales a/c (For the discount sales for the period)	Dr.		8,00,000	8,00,000
(e)	Discount a/c	Dr.		5,000	

	To Debtors a/c (For the discount sales for the period)				5,000
(f)	Work-in-progress a/c	Dr.		62,000	
	Production overhead a/c	Dr.		20,000	
	Administration overhead a/c	Dr.		12,000	
	Selling & Distribution Overhead a/c	Dr.		8,000	
	To Wages Control a/c				75,000
	To Salaries control a/c				25,000
	To Wages efficiency variance a/c				2,000
	(For the allocation of wages and Salaries)				

Illu. 3 : Journalise the following transactions assuming that cost and financial accounts are integrated :

	Rs.
Raw materials purchased	1,50,000
Direct materials issued to production	1,12,500
Wages paid (30% indirect)	90,000
Wages charged to Production	75,000
Manufacturing expenses incurred	63,000
Manufacturing overhead charged to production	69,000
Selling and distribution cost paid	15,000
Finished product at cost	1,50,000
Sales	2,25,000
Receipts from customers	52,500
Paid to creditors	82,500
Closing stock	-

Solution :

Journal Entries

Date	Particulars		L. F.	Debit Rs.	Credit Rs.
	Stores Ledger Control a/c	Dr.		1,50,000	
	To Sundry Creditors a/c (Raw materials bought)				1,50,000
	Work-in-progress a/c	Dr.		1,12,500	
	To Stores Ledger Control a/c				1,12,500

	(Materials issued for Production)				
	Wages Control a/c	Dr.		63,000	
	Factory Overhead Control a/c	Dr.		27,000	
	To Bank a/c				90,000
	(wages paid)				
	Work-in-progress Control a/c	Dr.		75,000	
	To Factory Overhead Control a/c				22,500
	To Wages Control a/c				52,500
	(Wages charged to production)				
	Factory overhead Control a/c	Dr.		63,000	
	To Bank a/c				63,000
	(Manufacturing expenses incurred)				
	Work-in-progress Control a/c	Dr.		69,000	
	To Factory Overhead control a/c				69,000
	(Overhead charged to production)				
	Selling & Distribution Control a/c	Dr.		15,000	
	To Bank a/c				15,000
	(Selling & Distribution cost paid)				
	Finished Stock Control a/c	Dr.		1,50,000	
	To Work-in-progress Control a/c				1,50,000
	(Production cost of finished goods)				
	Cost of sales a/c	Dr.		1,65,000	
	To Finished Stock Ledger Control a/c				1,50,000
	To S & D Overhead Control a/c				15,000
	(Cost of products sold)				
	Sundry Debtors a/c	Dr.		2,25,000	
	To Sales a/c				2,25,000
	(Amount of sales)				
	Bank a/c	Dr.		52,500	
	To Sundry Debtors a/c				52,500
	(Amount received from debtors)				
	Sundry Creditors a/c	Dr.		82,500	
	To Bank				82,500
	(Amount paid to Creditors)				

Illu. 4 : As at September 30, 1989 the following balance existed in a company's integrated standards cost and financial accounts :

Balance Sheet Account :

	Rs.
Capital and reserve	3,00,000
Creditors and accruals	88,000
Fixed assets	1,40,000
Raw Materials in stores and process	80,000
Direct wages in process	20,000
Factory overhead in process (at Standard)	10,000
Finished stock	90,000
Debtors	1,00,000
Cash at Bank	10,000

Trading Accounts :

	Rs.
Budgeted Sales	5,85,000
Sales variance	12,000 (Debit)
Standard factory cost of sales	4,93,000
Material variance	5,000 (Credit)
Direct wages variance	7,000 (Debit)
Factory overhead variance	2,000 (Debit)
Administration and selling overhead	14,000

During October, the following transactions took place :

	Rs.
Budgeted Sales	1,05,000
Actual Sales	98,000
Cash received from Debtors	95,000
Cash paid to Creditors	63,000
Cash paid direct wages	23,000
Raw-materials purchased	40,000 (actual cost)
Excess materials issued	1,000 (at standard)

Factory expenses incurred	17,000
Administration and selling expenses incurred	3,000
Output finished (at standard cost) Materials	50,000
Direct wages	26,000
Factory overhead	13,000
Standard factory cost of actual sales	82,000
The standard cost of material purchased	42,000

The closing valuation of work-in-progress account (which are debited at actual cost and credited at standard) are:

	Rs.
Direct wages (at standard)	1,50,000
Factory overhead (at Standard)	1,30,000

You are required to :

- (a) Write up and close off the ledger accounts.
- (b) Prepare a trial balance of the closing balances, and
- (c) Prepare a profit and loss account and a balance sheet.

Solution :

Capital on Reserve Account

		Rs.			Rs.
Oct. 31	To Balance c/d	3,00,000	Oct. 1	By Balance b/d	3,00,000
		3,00,000			3,00,000
			Nov. 1	By Balance b/d	3,00,000

Creditors and Accrual

		Rs.			Rs.
Oct. 31	To Bank	63,000	Oct. 1	By Balance b/d	88,000
	To Balance c/d	85,000		By Purchase Materials	40,000
			Oct 31	By Factory Overhead a/c	17,000
				By Administrative & Selling Overhead a/c	3,000
		1,48,000			1,48,000

Fixed Assets

		Rs.			Rs.
Oct. 1	To Balance b/d	1,40,000	Oct. 31	By Balance c/d	1,40,000
		1,40,000			1,40,000
Nov 1	To Balance b/d	1,40,000			

Raw Materials in Stores and Process Account

		Rs.			Rs.
Oct. 1	To Balance b/d	80,000	Oct. 31	By Material Variance a/c	1,000
Oct 31	To Creditors Account	40,000		By Finished Stock a/c	50,000
	To Material Variance	2,000		By Balance c/d	71,000
		1,22,000			1,22,000
Nov 1	To Balance b/d	71,000			

Direct Wages in Process Account

		Rs.			Rs.
Oct. 1	To Balance b/d	20,000	Oct. 1	By Finished Stock a/c	26,000
Oct 31	To Bank	23,000		By Direct wages Variance a/c	2,000
				By Balance c/d	15,000
		43,000			43,000
Nov 1	To Balance b/d	15,000			

Factory Overhead in Process Account

		Rs.			Rs.
Oct 1	To Balance b/d	10,000	Oct. 31	By Finished Stock a/c	13,000
Oct 31	To Creditors	17,000		By Factory Overhead variance a/c	1,000
				By Balance c/d	13,000
		27,000			27,000

Nov 1	To Balance c/d	13,000			
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Finished Stock Account

		Rs.			Rs.
Oct 1	To Balance b/d	90,000	Oct. 31	By Cost of Sales a/c	82,000
	To Raw Material in Process a/c	50,000		By Balance c/d	97,000
Oct 31	To Wages in Process a/c	26,000			
	To Overhead in process a/c	13,000			
		1,79,000			1,79,000
Nov 1	To Balance b/d	97,000			

Debtor's Account

		Rs.			Rs.
Oct 1	To Balance b/d	1,00,000	Oct 31	By Bank	95,000
Oct 31	To Sales (Actual)	98,000		By Balance c/d	1,03,000
		1,98,000			1,98,000
Nov 1	To Balance b/d	1,03,000			

Cash at Bank Account

		Rs.			Rs.
Oct 1	To Balance b/d	10,000	Oct. 31	By Creditors	63,000
Oct 31	To Debtors	95,000		By Wages	23,000
				By Balance c/d	19,000
		1,05,000			1,05,000
Nov 1	To Balance b/d	19,000			

Budgeted Sales Account

		Rs.			Rs.
Oct. 31	To Balance c/d	6,90,000	Oct. 1	By Balance b/d	5,85,000
			Oct 31	By Debtors Actual Sales	98,000

				By Sales Variance a/c	7,000
		6,90,000			6,90,000
			Nov 1	By Balance b/d	6,90,000

Sales Variance a/c

		Rs.			Rs.
Oct 1	To Balance b/d	12,000	Oct. 31	By Balance c/d	19,000
Oct 31	To Budgeted Sales a/c	7,000			
		19,000			19,000
Nov 1	To Balance b/d	19,000			

Standard Factory Cost of Sales Account

		Rs.			Rs.
Oct. 1	To Balance b/d	4,93,000	Oct. 1	By Balance c/d	5,75,000
Oct 31	To Finished Stock a/c	82,000			
		5,75,000			5,75,000
Nov 1	To Balance b/d	5,75,000			

Material Variance Account

		Rs.			Rs.
Oct. 31	To Raw Material Excess Issued	1,000	Oct. 1	By Balance b/d	5,000
	To Balance c/d	6,000	Oct 31	By Purchase Materials	2,000
		7,000			7,000

Direct Wages Variance Account

		Rs.			Rs.
Oct. 1	To Balance b/d	7,000	Oct. 31	By Balance c/d	9,000
Oct 31	To Direct Wages a/c	2,000			
		9,000			9,000
Nov 1	To Balance b/d	9,000			

Factory Overhead Variance Account

		Rs.			Rs.
Oct. 1	To Balance b/d	2,000	Oct. 31	By Balance c/d	3,000
Oct 31	To Factory Overhead a/c	1,000			
		3,000			3,000
Nov 1	To Balance b/d	3,000			

Administrative & Selling Overhead Account

		Rs.			Rs.
Oct. 1	To Balance b/d	14,000	Oct. 31	By Balance c/d	17,000
Oct 31	To Creditors a/c	3,000			
		17,000			17,000
Nov 1	To Balance b/d	17,000			

Trial Balance

	Debit Rs.	Credit Rs.
Capital and Reserve Account		3,00,000
Creditors and Accruals Account		85,000
Fixed Assets Account	1,40,000	
Raw Materials in Store and in Process	71,000	
Direct Wages in Process Account	15,000	
Factory Overhead in Process Account	13,000	
Fixed Stock Account	97,000	
Debtors Account	1,03,000	
Cash at Bank Account	19,000	
Budgeted Sales Account		6,90,000
Sales Variance Account	19,000	
Standard Factory Cost of Sales Account	5,75,000	
Material Variance Account		6,000
Direct Wages Variance Account	9,000	
Factory Overhead Variance Account	3,000	
Administration and Selling Overhead Account	17,000	
	10,81,000	10,81,000

Profit and Loss Account
(for the month of October)

	Rs.		Rs.
To Cost of Sales	5,75,000	By Budgeted Sales	6,90,000
To Sales Variance	19,000	By Material Variance	6,000
To Wages Variance	9,000		
To Factory Overhead Variance	3,000		
To Administration and Selling Overhead	17,000		
To Net Profit	73,000		
	6,96,000		6,96,000

Balance Sheet
(as at 31st December)

Liabilities		Rs.	Assets		Rs.
Capital and Reserve	3,00,000		Fixed Assets		1,40,000
Profit	73,000	3,73,000	Finished Stock	97,000	
Creditors		85,000	Materials	71,000	
			Labour	15,000	
			Overhead	13,000	1,96,000
			Debtors		1,03,000
			Cash at Bank		19,000
		4,58,000			4,58,000

7.5 QUESTIONS

1. Write Short note on Integrated Accounts
2. State the advantages of Integrated accounts
3. Explain the basic requirements of an integrated system of accounting
4. What is Integrated Accounting? Briefly describe the merits of integration
5. What is Integrated Accounting? What are its advantages?
6. Distinguish between integral and non-integral system of accounting
7. State the essential pre requisites of integrated accounting system.

7.6 EXERCISES

1. From the following figures ascertained from Costing Records and Financial Books of a Factory, you are required to pass necessary entries in the cost journal (assume that a system of maintaining control accounts prevails in the organisation)

	Rs.
Purchases	3,90,000
Carriage Inward	5,850
Stores issued	3,58,800
Productive wages	3,46,320
Unproductive Labour	1,21,680
Works on cost	3,48,400
Materials used in repairs	3,120
Cost of completed jobs	12,80,630

2. Journalise the following transactions assuming that cost and financial accounts are integrated :

	Rs.
Raw Materials purchased	20,000
Direct materials Issued to production	15,000
Wages paid (30% in direct)	12,000
Wages charged to production	9,500
Manufacturing expenses incurred	8,400
Manufacturing overhead charged to production	9,200
Selling and distribution costs	2,000
Finished Product (at cost)	20,000
Sales	29,000
Closing stock	NIL
Receipts from debtors	6,900
Payments to Creditors	11,000

3. Journalise the following transactions in the integrated books of accounts :

	Rs.
(i) Credit purchase	12,00,000
(ii) Production wages paid	7,00,000
(iii) Stocks issued to production orders	8,00,000
(iv) Work expenses charged to production	4,50,000
(v) Finished goods transaction from production orders	18,00,000
(vi) Administration expenses charged to production	1,50,000
(vii) Work expenses outstanding	1,20,000
(viii) Work expenses paid	4,60,000

4. From the following figures ascertained from the records of Deena pains Ltd., for the year ended 30th June 1998. You are required to pass necessary entries and to prepare the Ledger Accounts and the Trial Balance.

	30th June 1997	30th June 1998
	Rs.	Rs.
Work in progress Accounts balance	1,40,000	89,100
Stock of finished goods balance	1,36,750	1,31,400
Stores on hand balance	84,200	1,31,400
Purchases		4,50,000
Carriage inwards		6,300
Store issued		4,05,000
Productive wages		3,70,200
Unproductive wages		1,21,600
Works on cost		3,68,400
Material used in repair		4,100
Cost of completed jobs		13,90,000
Cost of finished goods sold		13,85,000
Selling expenses		28,000
Office administration		70,000
Works on cost allocated to work-in-progress		4,95,000
Office on cost allocated to work-in-progress		68,900
Cost ledger Control a/c balance		3,60,950

[Ans.: Work in progress a/c (Dr.) Rs.89,100; Stores ledger control a/c (Dr.) Rs.1,31,400; Cost Ledger control a/c (Cr.) Rs.3,62,450; Work in progress control

a/c Rs.89,100; Stock of Finished goods control a/c (Dr.) Rs.1,41,750; Works on Cost Suspense a/c (Cr.) Rs.900; Office on cost suspense a/c Rs.1,100; Suspense account Total Rs.3,63,350]

5. M/s Essbee Ltd., maintain integrated accounts of cost and financial accounts. From the following detail write up control accounts in the general ledger of the factory and prepare a trial balance.

	Rs.
Share capital	3,00,000
Reserve	2,00,000
Sundry Creditors	5,00,000
Plant and machinery	5,75,000
Sundry debtors	2,00,000
Closing stock	1,50,000
Bank and cash balance	75,000
Transactions during the year were as follows :	
Stores purchased	10,00,000
Stores issued to production	10,50,000
Stores in hand	95,000
Direct wages incurred	6,50,000
Direct wages charges to production	6,00,000
Manufacturing expenses incurred	3,00,000
Manufacturing expenses charged to production	2,75,000
Selling and distribution expenses	1,00,000
Finished stock production (at cost)	18,00,000
Sales at selling prices	22,00,000
Costing stock	95,000
Payment to creditors	11,00,000
Receipts from debtors	21,00,000

[Ans.: Trial Balance Total Rs.31,00,000]

7.7 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
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Chapter - 8

Job Order Costing

Objectives :

After reading this lesson you should be able to

- Understanding the meaning of Job costing
- Know the procedure should be following in job costing
- Understand the merits and limitations of job order costing

Structure :

8.1 Introduction

8.2 Procedure for costing

8.3 Merits of Job Costing

8.4 Limitations of Job Costing

8.5 Questions

8.6 Exercises

8.7 Suggested Readings

8.1 INTRODUCTION :

Job costing is a method of costing applied in industries where the work is undertaken according to customer's special requirement or against a customer's order, Job costing is employed in "Jobbing type" industries such as automobile garages, printing presses, engineering workshops. Plating shops, furniture making and other similar manufacturing units. Thus, Job Costing method is used by industries which manufacture products or render services against specific orders as distinct from industries with continuous production for stock and sale.

Job Costing is one of the most simple costing methods, although it often entails considerable clerical effort and can be expensive in this respect. Where a specific job can become the unit of cost, and prime cost, direct expense and overhead can be directly allocated.

The main purpose of job costing is to ascertain profit or loss on each job undertaken. Costs are estimated before accepting a job and actual costs are compared with the estimated costs. This helps to ascertain whether (a) the estimating was correct and (b) cost incurred is reasonable. This helps in improving efficiency in operation as well as in revising estimates for future quotation.

8.2 PROCEDURE OF JOB ORDER COSTING :

The following is the costing procedure :

1. **Job Order Number** : Since Job costing accumulates costs by specific jobs, a number must be assigned to each job.
2. **Production order** : It is a writing order to the foreman to proceed with a job. It gives the foreman instructions relating to the job and also authorises him to start the work.
3. **Job Cost Sheet** : Costs for each job are accumulated on job cost sheets. The various elements of cost are treated as shown below :
 - (i) **Direct Materials** : Materials are issued to the job on the basis of Bill of Materials or Stores Requisitions. These two documents provide the necessary cost information as regards the cost of direct materials issued to specific jobs. Summaries of these documents are prepared on Materials Analysis sheet which provide material cost figures for each job. Materials specially purchased for a job are directly charged to that job.
 - (ii) **Direct Labour** : The information regarding direct labour cost of different jobs can be drawn from Time sheet and job cards. Each job must be charged with the direct labour cost incurred the total being debited to the control account. Wages paid to indirect labour form a part of factory overhead.
 - (iii) **Direct Overhead** : Overheads are usually charged at predetermined rates. Separate charges are made for factory, administration and selling and

distribution overheads. The total cost of a job consists of prime cost plus all overhead. There are two alternative cost compilations. Prime cost plus works overhead will give a factory cost of each job and this is acceptable to many firms. To obtain the total cost and ascertain the net profit or loss on each job, however, all the administrative, selling and distribution overhead must be added to the factory cost, involving absorption of all overhead into work-in-progress Account. Whichever method is used will depend upon the circumstances.

Job sheet has to be designed to suit the needs of the organisation. The entries in this sheet are made from the Bill of Materials, Material Requisitions, Job cards and the Applied Overhead Account.

The cost sheets are maintained by the cost office. When the job is finished, the total cost for the job is ascertained and transferred to finished stock account or the cost of goods sold account if the job is delivered to customer.

Proforma Cost Sheet :

A proforma of job cost sheet is given below : -

Proforma Job Cost Sheet

Job No.....

No.....

Customer

Date Commenced.....198

Date completed.....198

Direct Material			Direct Labour			Overhead	
Date	Ref.	Amount Rs.	Date	Ref.	Amount Rs.	Date	Amount Rs.
Total							

Summary

	Estimated Cost Rs.	Actual Cost Rs.	Difference Rs.
Direct Material			
Direct Labour			
Direct Expenses			
Manufacturing Overhead			
Total : (a+ b + c + d)			

Units Produced

Estimated Cost

Cost Per unit Rs.....

Variance \pm

4. **Completion of Job** : When the work on a job is completed, a completion report is sent to costing department. The cost under each element of cost is ascertained and totalled to compute the total cost of the job concerned.

5. **Profit or loss on each Job** : The total cost of each job is compared against its price to determine the profit or loss on each job.

8.3 MERITS OF JOB COSTING :

The main advantage of Job costing is that management can detect which jobs are profitable and which are not. While making cost estimates for similar jobs in future, cost records of earlier jobs can be conveniently taken into consideration. The following are the advantages of job costing to management : -

- (i) It provides a detailed analysis of cost of materials, labour and overheads. This cost is available daily weekly or as often as required. This helps the management to know the trend of costs and to control the efficiency of operations, materials and machines by suitable comparisons.

- (ii) It enables the management to detect which jobs are more profitable than others, which are less profitable and which are incurring losses.

- (iii) It provides a basic for estimating the cost of similar jobs taken up in future. It also helps in future production planning.

- (iv) The adoption of predetermined overhead rates in job costing necessitates the application of a system of budgetary control of overheads with all its advantages.

- (v) Spoilage and defective work can be easily identified and responsibility may be fixed on departments or individuals. This helps the management to take effective steps in reducing these to the minimum.

- (vi) If estimates have been prepared in advance, actuals can be compared with estimates for controlling costs.
- (vii) In case of Government contracts on cost plus basis, it provides cost data which determines contract price.

8.4 LIMITATIONS :

The main drawback of job costing is that it involves a great deal of clerical work in connection with estimation of costs, daily recording of material, labour and overheads cost, etc. Moreover, job costing is a historical costing method and does not provide for control of costs unless it is along used with Standard Costing System. The limitations of job costing are as follows : -

- (i) It involves a great deal of clerical work in recording daily the cost of materials issued, cost of labour engaged and overheads chargeable to each job. This adds to the cost and it becomes quite expensive.
- (ii) With the increase in clerical work, the charges of errors also increase.
- (iii) Job costing is an actual costing or historical costing method. It does not provide for the control of cost unless it is used with estimated or standard costing system.
- (iv) Determination of predetermined overhead rates may involve budgeting or overhead expenses. But the scheme of budgetary control may not be complete as it may not be extended to labour, material and selling and distribution expenses.

**Illu.1 : Prepare cost Sheet of the Job No. 375 from the following information:
Materials issued Rs.6, 000, wages Rs.4, 600, Direct expenses Rs.500. Works on cost is estimated at 60% of wages, office on cost is estimated at 12 ½% on works cost.**

Solution :

Cost sheet of Job No. 375

Particulars	Rs.
Materials	6,000.00
Wages	4,600.00
Direct expenses	500.00
Prime Cost	11,100.00
(+) Works on cost 60% wages (4,600 x 60/100)	2,760.00
Works cost	13,860.00
(+) Office on cost (13,860 x 12.5 /100): 12 ½ % on works cost	1,732.50.00
Cost of production	15,592.50

Illu.2 : The information given below relates to Job No.707:

Material: Rs.4,010

Wages: Dept. A – 60 hours @ Rs.3 per hour

B – 40 hours @ Rs.2 per hour

C – 20 hours @ Rs.5 per hour

Overhead expenses are as follows:

Variable: Dept. A – Rs.5,000 for 5000 labour hours

B – Rs.1,500 for 1500 labour hours

C – Rs.2,000 for 500 labour hours

Fixed = Rs.20,000 for 10,000 working hours.

Calculate cost of job No.707 and its sale price to give a profit of 25% on sale price.

Solution :

Cost sheet for the year ending 30th March 1996

	Rs.	Rs.
Direct Material		4,010.00
Direct Wages:		
Department A – 60 hours x Rs.3.00	180.00	
Department B – 40 hours x Rs.2.00	80.00	
Department C – 20 hours x Rs.5.00	100.00	360.00
		4,370.00
Overheads:		
Variable -		
Department A = 5,000 / 5,000 x 60 =	60.00	
Department B = 3,000 / 1,500 x 40 =	80.00	
Department C = 2,000 / 500 x 20 =	80.00	220.00

Fixed 20,000 / 10,000 x 120	240.00	460.00
Total Cost		4,830.00
Profit 25% on selling price 4,830 x 25/75		1,610.00
		6,440.00

Illu.3 : The standard hours of Job X is 100 hours. The job has been completed by Amar in 60 hours, Akbar in 70 hours and Anthony in 95 hours. The bonus system applicable to the job is as follows:

Percentage of time saved to time allowed:

	Bonus
Savings up to 10%	10% of time saved
From 11% to 20%	15% of time saved
From 21% to 40%	20% of time saved
From 41% to 100%	25% of time saved

The rate of pay is Rs.1 per hour.

Required: Calculate the total earnings of each worker and also the rate of earnings per hour.

Solution :

Earning = Time taken x Hourly rate + time saved x Bonus rate x Hourly rate.

Amar

Standard time = 100hrs.

Time taken = 60 hrs.

Time saved = 40hrs

% of time saved to standard time = $40/100 \times 100 = 40\%$

\therefore Bonus rate = 20% of time saved

Time wages = 60hours x Re.1.00 60.00

Bonus = 40hours x 20/100 x Re.1.00 8.00

68.00

Rate of earning per hour = $68.00/60\text{hours} = \text{Rs.}1.13\text{ps.}$

Akbar

Standard time	=	100hrs
Time taken	=	70 hrs

Time saved	=	30hrs.

% of time saved to standard time = $30/100 \times 100 = 30\%$

∴ Bonus rate = 20% of time saved

	Rs.
Time wages = 70hours x Re.1.00	70.00
Bonus = 30hours x 20/100 x Re.1.00	6.00

	76.00

Rate of earning per hour = $\text{Rs.}76/70\text{Hours} \times \text{Re.}1.09$	

Anthony

Standard time	=	100 hrs.
Time taken	=	95hrs.

Time saved	=	5 hrs.

% of time saved to standard time = $5/100 \times 100 = 5\%$

∴ Bonus rate = 10% time saved

Time wages = 95hours x Re.1.00	95.00
Bonus 5hours x 10/100 x Re.1.00	0.50

Total Earnings	95.50

Rate of earning per hour = $95.50 / 95\text{hours} = 1.01$

8.5 QUESTIONS

1. Explain job costing.
2. What is Job Costing? In which type of industries this system would be suitable? Give a specimen of cost sheet.

3. What is Job costing? What are its uses and limitations

8.6 EXERCISES :

1. The costing records of Ramana Engineering Company for Job No.777 reveals Materials Rs.6, 015:

Wages: Dept. X: 100Hrs @ Rs.4.50 per hour

Dept. Y: 65 Hrs @ Rs.3.00 per hour

Dept. Z: 35 Hrs. @ Rs.7.50 per hour

Overhead Expenses for these three Departments were estimated as follows:

Variable overheads: Dept. X: Rs.10, 000 for 2,500 labour hours

Dept. Y: Rs.6, 000 for 2,000 labour hours

Dept. Z: Rs.4, 000 for 500 labour hours

Fixed Overheads: Estimated at Rs.40, 000 for 10,000 Normal working hrs. You are required to calculate the cost of Job No.777 and calculate the price to give a profit of 20 percent on selling price.

[Ans.: Prime Cost Rs.6,922.50; Total Cost Rs.8,597.50; Profit Rs.2,149.38]

2. Find the price to be quoted for the following job. Direct labour Rs.1, 200; Chargeable expenses Rs.100. Direct materials Rs.1, 500, Works overhead is 50% of prime cost and office overhead is 10% of works cost 25% of profit on selling price is expected.

[Ans.: Prime Cost Rs.2,800; Works cost Rs.4,200; Total Cost Rs.4,620; Net Profit Rs.1,540]

8.7 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
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Chapter - 9

CONTRACT COSTING

Objectives :

This lesson helps you in

- Understanding the features of contract costing
- Knowing the procedure of recording costs in addition to the understanding of escalation clause
- Prepare contract cost accounts

Structure :

9.1 Introduction

9.2 Features of Contract Costing

9.3 Procedure of Recording Costs

9.4 Escalation Clause

9.5 Cost Plus contracts

9.6 Questions

9.7 Exercises

9.8 Suggested Readings

9.1 INTRODUCTION :

Contract Costing is a method of costing applied to ascertain the cost of each contract and profit earned or loss sustained on each contract. It completely resembles job costing. A job is a small contract whereas contract is a big job. The cost unit is much bigger in size in contract costing than in job costing. But the principles in maintaining the accounting are the same for job and contract costing.

Contract costing is employed to ascertain the cost of constructing a building, a bridge, a road, or a ship or machinery. Contract Costing does not require a complicated or elaborate

system of accounting. Usually a firm undertakes one or two contracts at a time for execution. A separate account is kept in respect of each contract and all expenses such as direct materials, direct wages and expenses are debited to the contract account. Thereby, it is possible to ascertain the cost of each contract and profit & Loss there on. Costing does not require separate set of books if financial books are suitably modified and arranged.

9.2 FEATURES OF CONTRACT COSTING :

The chief features of contract costing are :

1. Work is generally carried out at a site other than the contractor's own premises.
2. Most of the items of cost are directly chargeable to individual contracts. It, therefore obviates the possibility of under-or over-absorption of many items of cost. Of course, general overhead expenses are to be apportioned to or absorbed by individual contracts on a suitable basis. But as these general overhead expenses form only a small part of total cost of contracts, the incidence of under-or over-absorption of general overhead expenses is very negligible.
3. More often than not, each contract is dissimilar to the other. That is, output from one job is quite different from the output from another job.

Contract Account (Proforma)

Dr.		Cr.		
Particulars	Amount Rs.	Particulars		Amount Rs.
To Direct Materials	XXX	By Materials returned		
To Direct labour	XXX	By Materials transferred		XXX
To Direct expenses	XXX	By Materials at site		XXX
To Indirect Expenses (Overheads)	XXX	By Price of Plant	XXX	
To Plant and Machinery	XXX	Less: Depreciation	XXX	XXX
To Sub Contract Cost	XXX	By Plant & Machinery returns		XXX
To Extra Work done	XXX	By Loss due to damage of Materials		XXX
To Provision for Contingencies	XXX	By Work-in-progress :		
To Opening Work-in-	XXX	Work Certified value	XXX	

progress				
To Profit on Contract (Bal. Fig)	XXX	Work Uncertified value	XXX	XXX
		By Contractee a/c (Contract Price)		XXX
	XXX			XXX

A Contract Account is debited with those expenses which are shown on the debit side of the contract account as above and credited with the items shown on the credit side of the above account.

9.3 PROCEDURE OF RECORDING COSTS :

Each contract is given a distinguishing number. This number is of vital importance from the stand point of estimating, collecting and analysing costs. To this number will be recorded all costs incurred. Total costs of a contract include :

1. **Materials** : Materials received from the stores or purchased from the markets or transferred from other contracts will appear on the debit side of contract account. Materials returned to stores or transferred to other contracts will be shown on the credit side of the account. The value of the materials on site at the end of the year will be recorded on the credit side. If the materials are sold at the contract site, the contract account is credited with the sale value of materials. If the materials on the contract are lost or destroyed by fire, the contract account is credited and profit and loss account is debited with the cost of such loss.

Sometimes, the contractee himself supplies certain materials for the contract. Such materials are not debited to the contract account but shown in a separate memorandum record outside the accounts.

2. **Direct Labour Or Wages** : The wages to the labourers working at the site of the contract are treated as direct wages and debited to the contract account. When supervisors are engaged for two or more contracts, their wages must be apportioned on equitable basis. Wages accrued or outstanding at the end will also be debited to contract account.

- 3. Direct Expenses :** The expenses incurred for a particular contract are the direct expenses and are chargeable to that contract for which they are incurred,
- 4. Overheads or Indirect Expenses :** The indirect expenses, incurred in common for two or more contracts are the overheads. These overheads are apportioned to the contracts on an appropriate basis as a percentage of material or labour.
Ex : Salaries of Managers, architects, supervisors, engineers etc.
- 5. Plant & Machinery :** When a new plant or old plant is issued to a contract, the cost or book value of the plant is debited to the contract. The plant is revalued at the end of the year and credited to the contract with revalued (depreciated) value.; If the plant is used only for a short period, the contract account should be debited with the amount of depreciation of the plant. When a portion of the Plant and Machinery is returned to stores, the contract is to be credited with the depreciated value of that part.
- 6. Sub Contract Costs :** The cost of sub contract is directly charged to the main contract.
- 7. Certification of work done :** Money will be paid by the contractee on uncompleted contract on the basis of the certificate of the architect or the surveyor appointed by the contractee. A retention money of say 10% is held back for one year after the contract is completed to cover any defect which may be found within a year.
- 8. Profit on uncompleted Contracts :** On account of hazards involved in contract work it is an accepted principle that no profit should be taken on an – completed contract, except in the case of very long contracts when a conservative amount may be taken as profit. The profit in such cases is usually determined by the following formula :

$$\text{Profit taken into account} = \frac{2}{3} \times \text{National Profit} \times \frac{\text{Cash received}}{\text{Work Certified}}$$

For large contracts when successful completion is will in sight, the following formula is sometimes used for determination of profit to be taken into account.

$$\text{Profit taken into account} = \text{National Profit} \times \frac{\text{Work certified}}{\text{Contract price}}$$

- 9. National Profit :** National Profit = Value of work certified by architect – Cost of work certified.

10. Cost of Work Certified : This can be calculated as : Total cost put into work – cost of work not certified.

11. Value of work in progress : This is to be shown in the balance sheet.

Cost of work certified + Cost of work not certified + Profit taken into account – Cash received.

9.4 ESCALATION CLAUSE :

In a long – term contract the terms of the contract may include an Escalation clause under which the settled contract price is subject to enhancement in the following circumstances :

- (i) When the market prices of materials used for the contract work are, in future, higher than the prevailing market prices.
- (ii) When the quantities of materials used for the contract are higher than the estimated quantities on account of the fact that (a) due to the heavy nature of the contract, a reasonably correct estimate of quantities cannot be laid down unless the work has sufficiently progress and (b) inferior grades of materials are only available in future, giving rise to high quantities of scraps and spoilage.
- (iii) When labour rates increase in future, and
- (iv) When labour usage cannot be correctly estimated on account of the very nature of the contract.

An escalation clause is meant for safeguarding the interest of the contractor against unforeseen rise in costs. It however does not give any benefit to the contract if costs in future are lower than the estimated costs.

Since benefits arising from unforeseen events should not be enjoyed by the contractor alone, sometimes a reverse clause is incorporated providing that when costs in future are lower than the estimated costs, the contract price benefits to the contractee.

9.5 COST PLUS CONTRACTS :

In case of cost-plus contract, the contractor is usually entitled to a stipulated amount of profit in addition to actual cost of manufacture or cost of rendering the service. What should

constitute cost is generally spelled out in the contract and the amount of profit to be added to the actual cost is also laid down either in the form of fixed amount or of a percentage on actual cost or on the capital employed. The customer or the contractee usually reserves the right of cost audit. Generally, the contract includes a clause for cost escalation and de-escalation. Cost – plus contracts are generally entered into for executing special type of work or for rendering special type of service which is not usually undertaken by the contractor concerned so that it is not possible to estimate the cost of work with a reasonable degree of accuracy at the time of entering into the contract. when prices are subject to wide and unpredictable fluctuations rendering cost – estimate almost impossible, cost – plus contracts may be entered into. Examples of Cost – Plus contracts are : construction work during war, production of newly designed ship or component parts of aircraft, etc.

Cost – Plus contracts are advantageous both for the contractor and the contractee in as much as neither of them stands to lose – the contractor generally receive a reasonable profit in addition to his cost while the contractee can ensure a fair price of the contract by being entitled to verify the books and documents of the contractor.

Advantage to the Contractor on account of Cost – Plus contracts is that there is no risk of loss arising from changing prices, wrong preliminary estimates and underestimated quotation. The disadvantages to the contractor are as follows :

- (1) The profit earned is usually low.
- (2) The books and records cannot be confidentially maintained.

The following are the advantages of the Contractee from Cost – Plus Contract :

- (i) The contract can be settled at a reasonable price.
- (ii) No time is lost in bargaining :
- (iii) Benefits of falling prices accrue to the contractee.

The following are the disadvantages to the contractee.

- (i) When the contract price is determined by adding a percentage of the prime cost, there is a tendency on the part of the contractor to incur higher prime costs, so that the percentage, which includes his profit, may be high.
- (ii) The final contract price to be paid is uncertain.

Illu.1 : Prepare Contract Account from the following information:

Certified work Rs.3,00,000; Expenses on contract Rs.2,00,000; Contract price Rs.5,00,000.

Solution :

Dr.		Contract Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
To Expenses	2,00,000	By Work in progress			
To Notional profit c/d	1,00,000	Certified work		3,00,000	
	3,00,000			3,00,000	

Illu.2 : A construction company has undertaken to construct a bridge. The following particulars relate to this bridge for the year ended 31st December, 2000.

<i>Materials</i>	<i>Rs.</i>
Direct purchase	50,000
Issued from stores	10,000
Wages for labour	45,000
<i>General plant in use:</i>	
Written down value	1,00,000
Depreciation thereon	10,000
Direct expenses	3,500
Share of general overhead	2,000
Materials on hand at December 31st	1,000
Materials lost by fire	500
Salvage value there of	150
Wages accrued at December 31st	5,000
Direct expenses accrued at December 31st	500
Value of work certified	1,59,000
Costs of uncertified work	4,500

The value of the contract is Rs.2, 15,000 and it is the practice of the contractee as per terms of the contract to retain 10% of work certified.

From the above particulars prepare the contract account, arrive at the cost of work –in-progress and show how the various items would appear in the Balance Sheet.

Solution :**Contract Account for the year ended 31st, December 2000**

Dr.			Cr.		
31-12-2000			31-12-2000		
To Purchase of materials		50,000	By Materials in hand		1,000
To Issue of materials from stores		10,000	By Profit & Loss a/c		
To Wages	45,000		Materials lost	500	
Add: Accrued wages	5,000	50,000	(-) Salvage	150	350
To General plant		1,00,000	By Plant	1,00,000	
To Direct expenses	3,500		(-) Depreciation	10,000	90,000
Add: Accrued exp.	500	4,000	By Work in progress:		
To Share of general overheads		2,000	Work certified	1,59,000	
To Wages accrued		5,000	Work Uncertified	4,500	1,63,500
To Direct expenses accrued		500			2,54,850
To Notional profit c/d		38,850	By Notional Profit		38,850
		2,54,850			
To Profit & Loss a/c					
(38,850 x 2/3 x 90/100)		23,310			
To work in progress (1/3) Reserve		15,540			
		38,850			38,850

Work in Progress Account

Dr.			Cr.	
31-12-2000		Rs.	31-12-2000	Rs.
To Contract a/c:			By Reserve b/d	15,540
Work certified	1,59,000		Balance c/d	1,47,960
Uncertified	4,500	1,63,500		
		1,63,500		1,63,500

Balance Sheet as at 31st, December 2002

Dr.			Cr.	
Liabilities	Rs.	Assets		Rs.
Wages accrued	5,000	Materials in hand		1,000
Direct expenses accrued	500	Plant in hand		90,000
Profit & Loss a/c:		Work in progress:		
Profit on contract	23,310	Work Certified	1,59,000	

(-) loss due to fire	350	22,950	Work Uncertified	4,500	
				1,63,500	
			(-) Reserve	15,540	
				1,47,960	
			(-) Advance	1,43,100	
			(1,59,000 x 90/100)		4,860

Illu.3 : A company of contracts began to trade on 1st January 1996. During 1996, the company was engaged on only one contract of which the contract price was Rs.5,00,000.

Of the Plant and Materials charged to contract, plant costing Rs.5,000 and material costing, Rs.4,000 were lost in an accident.

On 31st December 1996 Plant costing Rs.5,000 was returned to stores, cost of work uncertified, but finished Rs.2,000 and material costing Rs.4,000 were in hand on site. Charge 10% depreciation on plant. Prepare contract a/c and balance sheet from the following.

Particulars	Debit Rs.	Credit Rs.
Share capital		1,20,000
Creditors		10,000
Cash received (80% of work certified)		2,00,000
Land and Buildings	43,000	
Bank balance	25,000	
Charged to contract:		
Materials	90,000	
Plant	25,000	
Wages	1,40,000	
Expenses	7,000	
	3,30,000	3,30,000

Solution :

Dr.		Contract Account		Cr.	
		Rs.			Rs.
1996			1996		
Dec. 31	To Materials	90,000	Dec 31	By P & L a/c:	
"	To Wages	1,40,000	"	Plant	5,000
"	To Expenses	7,000	"	Less: dep. 5,000 x 10/100	500
"	To Plant	25,000	"	By Materials	4,000

				By Plant returned	5,000	
				Less: dep. 5,000 x 10/100	500	4,500
				By Plant site	15,000	
				Less: Dep. 15,000 x 10/100	1,500	13,500
				By Materials on site		4,000
				By work-in-progress:		
				Certified: 2,00,000 x 100/80		2,50,000
"	To Notional profit	20,500		Uncertified		2,000
		2,82,500				2,82,500
"	To P & L a/c 20,500 x 2/3 x 80/108	10,933	"	By Notional profit		20,500
"	To Work in progress (Reserve)	9,567				
		20,500				20,500

Balance Sheet as an 31-12-1996

Liabilities		Rs.	Assets		Rs.
Share capital		1,20,000	Land & Buildings		43,000
Creditors		10,000	Bank balance		25,000
P & L a/c:			Plant returned		4,500
Contract account	10,933		Contract Account:		
Less: loss due to accident	8,500	2,433	Plant at site		13,500
			Material on site		4,000
			Work in progress:		
			Certified	2,50,000	
			Uncertified	2,000	
				2,52,000	
			Less: Reserve	9,567	
				2,42,433	
			Less: advance	2,00,000	42,433
		1,32,433			1,32,433

Illu.4 : A firm of building contractors began to trade on 1st April, 1998. The following was the expenditure on the contract for Rs.3, 00,000.

Material issued to contract Rs.51, 000; Plant used for contract Rs.15, 000; Wages incurred Rs.81, 000; Other expenses incurred Rs.5, 000.

Cash received on account to 31st March 1999, amounted to Rs.1, 28,000 being 80% of the work certified. Of the plant and materials charged to the contract, plant which cost, Rs.3, 000 and materials which cost Rs.2, 500 were lost. On 31st March 1999 plant which cost Rs.2, 000 was returned to stores, the cost of work done but uncertified was Rs.4, 000 and materials costing Rs.2, 300 were in hand on site.

Charge 10% depreciation on plant, and take to the profit and loss account 2/3 of the profit received. Prepare the contract account, contractee's account and Balance sheet from the above particulars.

Solution :

Contract Account

Dr.		Cr.		
Particulars	Rs.	Particulars	Rs.	Rs.
31-3-99		31-3-99		
To Materials issued	51,000	By Profit & Loss a/c		
To Wages incurred	81,000	Plant lost	3,000	
To Plant used	15,000	Materials lost	2,500	5,500
To Other expenses	5,000	By Plant returned	2,000	
To Notional Profit c/d	30,600	Less: Depreciation 10%	200	1,800
		By Plant in hand	10,000	
		Less: Depreciation 10%	1,000	9,000
		By Materials in hand		2,300
		By Work-in-progress		
		Certified (1,28,000 x 100/80)		1,60,000
		Uncertified		4,000
	1,82,600			1,82,600
To Profit & Loss a/c (30,600 x 2/3 x 80/100)	16,320	By Notional profit b/d		30,600
To Reserve for work-in-progress	14,280			
	30,600			30,600

Contractee 's Account

31-3-99		31-3-99	
To Balance c/d	1,28,000	By Cash	1,28,000
	1,28,000		1,28,000
		By Balance b/d	1,28,000

Balance Sheet of a firm as on 31st March, 1999

Liabilities	Amount Rs.	Assets	Amount Rs.
P & L a/c	16,320	Plant at site	9,000
Less loss of Plant & Machinery	5,500	Materials at site	2,300
	10,820	Work-in-Progress	
		Work certified	1,60,000
		Work uncertified	4,000

			1,64,000	
		Less: Reserve	14,280	
			1,49,720	
		Less: Advance	1,28,000	21,720

Illu.5 : The following information relates to a building contract for Rs.10, 00,000

	<i>Rs.</i>
Materials issued	3,00,000
Direct wages	2,30,000
Direct expenses	22,000
Indirect expenses	6,000
Work certified	7,50,000
Work uncertified	8,000
Materials at site	5,000
Plant issued	14,000
Cash received from contractor	6,00,000

The value of plant at the end of the year Rs.7, 000.

Prepare Contract account.

Solution :

Contract Account

Dr.		Cr.	
<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Materials issued	3,00,000	By Materials at site	5,000
To Direct wages	2,30,000	By Value of plant at the end	7,000
To Direct expenses	22,000	By Work certified	7,50,000
To Indirect expenses	6,000	By Work uncertified	8,000
To Plant issued	14,000		
To Notional profit c/d	1,98,000		
	7,70,000		7,70,000
To P & L a/c (2/3)	1,05,600	By Notional profit b/d	1,98,000
To Reserve a/c	92,400		
	1,98,000		1,98,000

Note: 75% of the contract work is completed. Hence 2/3 of notional profit is to be transferred to profit & Loss Account and 1/3 to reserve a/c.

$$\text{Profit} = \text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$$

= Rs.1, 05,600

Transfer to Reserve A/c = Rs.1,98,000 – Rs.1,05,600 = **Rs.92,400**

$$= 1,98,000 \times \frac{2}{3} \times \frac{6,00,000}{7,50,000}$$

Illu.6 : The following information is supplied regarding a contract which is incomplete on 31st March 2003. Cost incurred: -

	Rs.
Fabrication cost to date:	
Direct Materials	5,60,000
Direct Labour	1,80,000
Overheads	1,50,000
	8,90,000
Erection cost to date	30,000
	9,20,000
Contract price	16,38,000
Cash received on account	12,00,000

Technical estimate of work completed to date:

Direct Materials	80%
Direct Labour and overheads	75%
Erection	25%

You are required to prepare a statement indicating:

- (a) the estimated profit on the completion of the contract
- (b) the estimated profit to date on the contract.

Solution :

Statement showing the estimated profit to date and on Completion of contract No.

Cost elements	% completion	Cost to date	% completion	Further cost	Total Cost
		Rs.		Rs.	Rs.
Fabrication costs:					
Direct material	80	5,60,000	20	1,40,000	7,00,000
Direct labour	75	1,80,000	25	60,000	2,40,000

Overheads	75	1,50,000	25	50,000	2,00,000
Fabrication costs		8,90,000		2,50,000	11,40,000
Erection costs	25	30,000	75	90,000	1,20,000
Total		9,20,000		3,40,000	12,60,000
Estimated profit		2,76,000		1,02,000	3,78,000
		11,96,000		4,42,000	16,38,000

Estimated profit to date has been calculated as follows:

$$= \frac{\text{Profit on the whole contract} \times \text{Cost incurred so far}}{\text{Total contract cost}}$$

$$= \frac{3,78,000 \times 9,20,000}{12,60,000}$$

$$= \text{Rs.2,76,000}$$

(or)

$$\text{Estimated profit on the whole contract} \times \frac{\text{Cash received}}{\text{Contract price}}$$

$$= 3,78,000 \times \frac{12,00,000}{16,38,000}$$

$$= \text{Rs.2,76,923}$$

Illu.7 : Prepare contract account from the following information:

	Rs.
Materials issued from the stores	2,00,000
Purchase of materials	1,60,000
Plant given to the contract	50,000
Establishment expenses	40,000
Materials returned to stores	10,000
Wages paid	1,40,000
Wages accrued	20,000
Direct expenses	6,000
Indirect expenses	14,000

Materials transferred to other contract Rs.30, 000

Closing balances of materials Rs.40, 000

Depreciation of plant 20%

Contract price Rs.10, 00,000

Certified work Rs.5, 00,000

Uncertified work Rs.50, 000

Cash received Rs.4, 00,000

Solution :

Particulars	Rs.	Rs.	Particulars	Rs.	Rs.
To Materials		2,00,000	By Material returns		10,000
To Purchase of material		1,60,000	By Material transfer		30,000
To Plant		50,000	By C. S. of material		40,000
To Establishment expenses		40,000	By Plant	50,000	
To Wages	1,40,000		(-) Depreciation	10,000	40,000
(+) Wages O.S.	20,000	1,60,000	By Work-in-progress		
To Direct expenses		6,000	Certified work	5,00,000	
To Indirect expenses		14,000	Uncertified work	50,000	5,50,000
To Notional profit c/d		40,000			
		6,70,000			6,70,000
To Costing P & L a/c		21,333	By Notional profit b/d		40,000
To WIP (Reserve)		18,667			
		40,000			40,000

Transfer of notional profit to profit & Loss Account : (2/3)

$$\text{Notional Profit} \times \frac{2}{3} \times \frac{\text{Cash received}}{\text{Work certified}}$$

$$40,000 \times \frac{2}{3} \times \frac{4,00,000}{5,00,000} = \text{Rs.}21,333$$

$$\text{Transfer to WIP (Reserve)} = \text{Rs.}40,000 - 21,333 = \text{Rs.}18,667$$

Illu.8 Compute a conservative estimate of profit on a contract (which has been 80% complete) from the following particulars:

Total expenditure to date	85,000
Estimated further expenditure to	
Complete the contract	17,000
Contract price	1,53,000

Work certified	1,00,000
Work not certified	8,500
Cash received	81,600

Computing the profit from contract by at least 4 methods.

Solution :

Total estimated profit

	Rs.
Total expenditure to date	85,000
Estimated expenditure to complete remaining work	17,000
Total estimated expenditure	1,02,000
Total estimated profit (Bal. Fig.) (1,53,000 – 1,02,000)	51,000
Contract price	1,53,000

Profit to be taken & to P & L a/c:

$$(1) \text{ Total estimated profit} \times \frac{\text{work certified}}{\text{Contract price}}$$

$$= 51,000 \times \frac{1,00,000}{1,53,000}$$

$$= \text{Rs.}33,333/-$$

$$(2) \text{ Total estimated profit} \times \frac{\text{work certified}}{\text{contract price}} \times \frac{\text{Cashreceived}}{\text{Workcertified}}$$

$$= 51,000 \times \frac{1,00,000}{1,53,000} \times \frac{81,600}{1,00,000} = \text{Rs.}27,200$$

$$(3) \text{ Total estimated profit} \times \frac{\text{Cost of work done to date}}{\text{Total estimated expenditure}}$$

$$= 51,000 \times \frac{85,000}{1,02,000} = \text{Rs.}42,500$$

$$(4) \text{ Total estimated profit} \times \frac{\text{Cost of work done to date}}{\text{Total estimated expenditure}} \times \frac{\text{Cashreceived}}{\text{workcertified}}$$

$$= 51,000 \times \frac{85,000}{1,02,000} \times \frac{81,600}{1,00,000} = \text{Rs.}34,680$$

9.6 QUESTIONS

A. Short Answer Questions

1. What are the important characteristics of contract costing?
2. What are various types of contract costing?
3. What is work certified?
4. What is work uncertified?
5. What is Notional Profit?
6. How do you calculate work in progress?
7. What is Escalation clause?
8. What are cost plus contracts?

B. Essay Type Questions

1. Explain how the profit on uncompleted contract should be determined.
2. What is the relevance of Escalation clause provided in contracts?
3. Discuss the treatment of profit on incomplete contracts in contract a/c
4. Discuss briefly the principles to be followed while giving credit for profit on incomplete contract.
5. Give your views regarding justification in charging profit on incomplete contracts and explain methods of charging profit on incomplete contracts.
6. What do you understand by cost plus method of contracts?

9.7 EXERCISES :

1. Prepare Contract account from the following information:

Contract price Rs.10,00,000

Expenses on contract Rs.4,00,000

Certified work Rs.8,00,000

[Ans.: Notional Profit Rs.4,00,000]

2. Calculate the amount of profit to be transferred to profit and loss account from the following particulars related to a contract.

Contract price Rs.16,00,000

Cash received from the contractee (being 70% of work certified) Rs.4,90,000

Cost of work uncertified Rs.60,000

Total expenditure incurred on the contract Rs.6,40,000

[Ans.: Notional profit Rs.1,20,000]

3. Naveen undertook a contract for the construction of houses on 1-1-1991. The contract price was Rs.22, 50,000. The following details are available for 1991:

	Rs.
Materials purchased	3,60,000
Materials issued from stores	45,000
Labour	1,35,000
Plant Installed at site	1,80,000
Direct Expenses	90,000
Establishment expenses	22,500
Materials returned to stores	22,500
Materials on hand at the end	9,000
Plant in hand at the end	1,35,000
Wages outstanding	27,000
Work uncertified	95,400
Cash received (80% of the work certified)	9,00,000

Prepare the contract account.

[Ans.: Notional Profit Rs.5,27,400; Amount transfer to reserve = Rs.2,46,120]

4. Prepare Contract Account from the following data:

	Rs.
Materials	24,300
Wages	18,000
Special Plant	13,300
Stores issue	4,800
Loose tools	2,500
Tractor services	5,700
Contract price	67,000

The contract has taken 26 weeks for its completion. Charge depreciation @ 25% on special plant. Material returned to stores Rs.660 and Loose tools Rs.1, 600. The value of

Tractor was Rs.32, 500. Charge depreciation at the rate of 20 percent, office expenses are to be provided at 10 percent on works cost.

[Ans.: Profit Rs.1,423]

5. The following was the expenditure on a contract for Rs.6, 00,000 commenced in February 2004.

Materials Rs.1, 20,000; Wages Rs.1, 64,400; Plant Rs.20, 000; Other expenses Rs.8, 600; Cash received on account to 31-12-04 amounted to Rs.2, 40,000 being 80% of work certified. The value of materials in hand at 31-12-04 was Rs.10, 000; work uncertified was valued as Rs.3, 000; Plant is to be depreciated at 10%. Prepare contract account.

[Ans.: Notional Profit Rs.18,000]

6. From the following particulars relating to a contract, prepare a) Contract account, b) Contractee's Account and also show the relevant entries in the Balance Sheet.

	Rs.
Materials sent to site	85,349
Labour engaged on site	74,375
Plant installed at cost	15,000
Direct expenditure	4,126
Establishment charges	3,167
Material returned to store	549
Work certified	1,95,000
Cost of work not certified	4,500
Materials on hand (Dec.31)	1,883
Outstanding wages (Dec.31)	2,400
Value of plant (Dec.31)	11,000

The contract price has been agreed at Rs.2, 50,000, Cash has been received from the contractee amounting to Rs.1, 80,000.

[Ans.: Notional Profit Rs.28,515]

7. A company of builders having an authorised capital of Rs.1,00,000 divided into 1000 ordinary shares of Rs.100 each, commenced operations on 1st January 2003 and during the year was engaged in a contract, the contract price of which was Rs.4,00,000. The trial balance extracted from their books on 31st December 2003 was as follows:

	Rs.	Rs.
Share capital (80% paid up)		80,000

Sundry creditors		8,000
Land and Buildings at cost	34,000	
Cash at Bank	9,000	
Materials	80,000	
Plant	15,000	
Wages	1,05,000	
Expenses	5,000	
Cash received being 80% of work certified.		1,60,000
	2,48,000	2,48,000

Of the plant and materials charged to the contract, plant costing Rs.2,000 and materials costing Rs.2,000 were destroyed by an accident. On 31st December 2003 plant which cost Rs.4,000 was returned to stores, value of materials on site was Rs.4,000, cost of work done but not certified was Rs.2,000. Charge depreciation on plant @ 10%. Prepare contract account for the year and Balance sheet on 31st December 2003.

[Ans.: Profit Rs.16,700; Balance Sheet Total Rs.92,907]

8. The following is the Summary of the entries in a contract ledger as on 31st December, 2003. Prepare Contract account.

	Rs.		Rs.
Materials purchased	45,000	Establishment charges	8,000
Materials from stores	7,000	Plant	34,200
Wages	18,000	Scrap sold	1,820
Direct expenses	7,000	Cost of sub-contract	7,500

You are supplied with the following information :

1. Outstanding on 31st December are wages Rs.900 and direct expenses Rs.1,200
2. The value of materials used since certification is Rs.2,200
3. Depreciation on Plant till 31st December is Rs.8,600
4. Materials on hand on 31-12-2003 Rs.10,000
5. The total contract price is Rs.1,50,000
6. Rs.75,000 had been certified by the architect and the contractee pays 75% of work certified.

[Ans.: Net Loss Rs.14,180]

9. Sri Mohan Rao undertook a contract for Rs.15,00,000 on an arrangement that 80% of the value of the work done as certified by the architect of the contractee, should be paid immediately and the remaining 20% be retained until the contract was completed.

In 1999, the amounts expended were :

	Rs.
Materials	1,80,000
Wages	1,70,000
Carriage	6,000
Cartage	1,000
Sundry expenses	3,000

The work was certified for Rs.3,75,000 and 80% of this was paid as agreed.

In 2000, the amount expended were :

	Rs.
Materials	2,20,000
Wages	2,30,000
Carriage	23,000
Cartage	2,000
Sundry expenses	4,000

3/4th of the contract was certified as done by 31st December and 80% of this was received accordingly. The cost of uncertified work was ascertained at Rs.20,000.

In 2001, the amount expended were :

	Rs.
Materials	1,26,000
Wages	1,70,000
Cartage	6,000
Sundry expenses	3,000

On 30th June, 2001, the whole contract was completed.

Prepare contract account and contractee account in the books of Mr. Mohan Rao

[Ans.: Notional Profit 1999 : Rs.15,000; 2000 Rs.3,02,000; 2001 Rs.1,90,333]

10. From the following data, prepare contract account, contractee's account balance sheet as on 31st December 2004.

	Rs.
Work certified	2,86,000
Cash received from contractee	2,60,000
Materials sent to site	1,29,000
Labour engaged on site	1,09,600
Plant installed at site	22,600
Value of plant on 31-12-04	16,400
Work not certified	6,800

Establishment charges	6,500
Direct expenditure	4,800
Wages due	3,600
Closing materials	2,800
Materials returned to stores	800
Direct expenses due	200
Contract price	4,00,000

[Ans.: Notional Profit Rs.36,500]

11. A building contractor having undertaken construction work at a contract price of Rs.2,50,000. Began the work on 1st January, 2004. The following are the particulars of the contract upto 31st December 2004.

	Rs.
Materials sent on site	85,349
Labour engaged on site	74,375
Plant installed at site	15,000
Direct expenditure	3,167
Establishment charges	4,126
Materials returned to stores	549
Work certified by Architects	1,95,000
Cost of work not yet certified	4,500
Materials on hand on 31 st December, 2004	1,883
Wages accrued due at 31 st December, 2004	2,400
Direct expenses accrued 31 st December, 2004	240
Value of plant at 31 st December, 2004	11,000
Cash received from contractee	1,80,000

You are required to take credit for $\frac{2}{3}$ rd of the profits earned on the work certified by the architects but only to the extent of work paid. Prepare the account.

[Ans.: Notional Profit Rs.28,275]

9.8 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
3. Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.

4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
5. Ramachandran, Accounting for Management, Scitech Publications (India) Pvt. Ltd., 2003
6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter - 10

OPERATING COSTING

Objectives :

After going through this lesson you should be able to

- Know the meaning, definition and features of operating costing
- Discuss the applicability of operating costing
- Classify the costs
- Understand the method of costing for transportation organisations

Structure :

10.1 Introduction

10.2 Features of Operating Costing

10.3 Applicability of Operating Costing

10.4 Transport Costing

10.5 Questions

10.6 Exercises

10.7 Suggested Readings

10.1 INTRODUCTION :

Operating cost refers to the cost of providing a service. Operating costing is therefore, a technique of costing applied to the companies, which render services such as Gas and Electricity Boards, Transport Undertakings, Canteen, Boiler House and Hospitals. The unit of cost in such companies is not the job, product or process but the services rendered to the consumer. The main problem in operating cost method is the selection of a unit of cost. In most cases a composite unit is used. In transport costing for example, cost may be computed as per passenger kilometer, similarly, in Hospital costing bod-day may be a unit

and in power house costing power per unit of Kwh may be considered per tonne-kilometre or per hour.

10.1.1 Definition :

The ICMA terminology defines operating cost as “the cost of providing a service” and operating costing as “that form of operation costing which applies where standardised services are provided either by an undertaking or by a service cost – centre within an undertaking. The method may be used where the service is not completely standardised but it is convenient to regard it as such, and to calculate average costs per period in relation to the standard unit of measurement. From these definitions it is clear that the cost of providing a service is known as operating cost and the method employed to ascertain the cost of such service is known as operating costing.

10.2 FEATURES OF OPERATING COSTING :

The basic features of operating costing are listed below :

1. Uniformity of service to all the customers.
2. Involves fixed and variable costs. The distinction is necessary to ascertain the cost of service and the unit cost of service.
3. Service undertakings do not produce physical articles for stock and sale. But services are sold to consumers.
4. It is not concerned with accounting for inventories, other than those for miscellaneous supplies. There is nothing like finished services inventory similar to finished goods inventory.
5. The cost unit may be simple in certain cases, and composite or compound in other cases like transport undertakings.
6. Total costs are averaged over the total amount of service rendered.
7. It can be applied to the services within the organisation as well as extending services to the community at large.
8. Documents like the daily log sheet, operating cost sheet, boiler house cost sheet, canteen cost sheet etc. are used for the collection of cost data.

10.3 APPLICABILITY OF OPERATING COSTING :

Operating costing is applied to those organisations which render service externally (i.e., to public at large) or internally (i.e., to various departments of the same organisation). Some examples of service rendered to outsiders are electricity supply, water supply, gas supply, boarding and lodging and so on. While services such as repairs and maintenance, purchasing and storage, internal transport, etc. constitute services rendered internally. There is a point of difference in respect of accounting of services rendered. Whereas the objective of accounting external service is to know the total cost of manufacturing and profit on provision of such service, the object of internal service is to facilitate apportionment of service departments cost to various other departments.

Operating costing is applied to the following undertakings :

1. Transport undertakings such as Roadways, Railways, Tramways and Airways.
2. Municipal services such as supply of water, street lights, etc.
3. Steam and electricity undertakings.
4. Hotels covering boarding and lodging.
5. Hospitals.
6. Educational institutions
7. Public libraries.
8. Service departments in big factories.
9. Cinemas
10. Distribution of gas, air compressor, air-conditioning.
11. Sports and recreational clubs.
12. Services such as supply cranes, road roller, water pumping, fire extinguishers, etc.

10.3.1 Classification of costs :

In operating Costing, costs are classified and compiled as follows :

- (i) **Fixed Costs** : These are constant costs and are incurred irrespective of the extent of service rendered. In transport companies, wages of drivers and conductors, garage rent, establishment costs of head office, taxes, license, insurance etc. are fixed costs.
- (ii) **Maintenance costs** : Those are of semi – fixed nature and include spare parts, repairs and maintenance, tyres and tubes etc. in transport companies.

- (iii) **Operating or variable costs** : These are running costs or variable costs. In transport companies, variable costs are petrol or diesel oil, lubricating oil, wages of drivers (if payment is according to distance or trips) etc.

In Operating costing, a distinction between fixed cost and variable cost is important as the economies and scale of operations considerably affect the cost per unit of service rendered. This is because fixed costs in such undertakings constitute a major portion of the total cost. The cost per unit of service produced will, therefore, vary with increase or decrease in the number of units of service produced. If, for example, buses in a transport company run capacity packed, the number of passengers will be larger and total cost remaining virtually the same, the cost per passenger will be lower.

10.4 TRANSPORT COSTING :

The records are designed to show the total cost of operating each vehicle, and then to apply this cost to particular units e.g. per tonne, per kilometer run, per tonne kilometer or per hour worked. These units have to be chosen with care, because, when materials are being carried which vary in bulk, weight and type, to cost per tonne, per kilometer run, or per tonne-kilometer is somewhat suitable. The costs incurred are generally divided into the following heads : -

- (i) **Fixed charges** : Standing or fixed costs are incurred irrespective of the mileage run. For example, salary of supervisors, vehicle tax, licence fee, insurance etc.
- (ii) **Maintenance charges** : These are semi – variable expenses such as tyres and tubes, garage rent, repairs, painting, overhauling etc.
- (iii) **Operating and Running Expenses** : These include petrol and oil, wages of driver, cleaner, conductor, depreciation etc. These are generally variable expenses i.e. varying with the mileage.

10.4.1 Selection of Cost Units :

In transport costing the cost unit is the passenger Kms or passenger miles or tonne kilometres. Such units take into account both the passengers or weight of goods carried and

distance run. The general procedure to be followed for the ascertainment of cost unit is given below.

1. Passenger Kilometers Covered :

No. of Buses x No. of days x No. of trips x Distance per Trips x Capacity x Normal Passengers Travelling

2. Tonne Kilometers Carried :

No. of vehicles x Tonnes Carried x Distance in kms x No. of trips x No. of days x % of vehicles run on an average x Capacity used.

Ascertainment of Costs : Total of fixed, maintenance and running charges are collected and allocated under respective heads and these charges are divided by the total units like passenger kilometers covered or tonne kilometers covered to get the average unit cost.

10.4.2 Recording of Cost under Transport Costing :

Two important documents are used under transport costing. They are as follows :

(1) Daily report sheet or log sheet : This document is used when a owner owns a fleet of vehicles. This report is prepared either by a driver, foreman or a clerk at the garage or depot. The purpose of this document is to enable the accumulation and control of cost. This document contains particulars about each journey made by the vehicle. These particulars enable the owner to utilise the vehicle without allowing for idle running capacity. Besides this, the data in this report also enables to apportion expenses to other vehicles. A proforma of this document is shown below :

Daily Report sheet or log sheet

Vehicle No.....

No. of sheet

Route.....

Date.....

Driver.....

Starting time.....

Trip No.	From	To	Passenger / or Goods		Distance	Time	
			Out	Enroute		Out	In

Employees Name :

Delays :

Supplier :

Driver.....

Loading.....

Petrol

Cleaner.....

Traffic.....

Oil.....

Conductor.....

Accident.....

Greese.....

Mechanic.....

Breakdown.....

Tyre.....

(2) Operating cost sheet or cost summary performance statement : This document helps in calculating cost per carrying passenger or goods for one kilometer. The cost of operating the vehicles help the owner in the following ways :

- (a) To avoid waste of oil, fuel, etc.,
- (b) To know the efficiency by comparing with other vehicles.
- (c) Facilitates in quoting hire charges.
- (d) Cost of idle vehicle and lost running time can be known.
- (e) Helps in apportioning overheads to other departments.
- (f) Helps in controlling cost by comparing operating cost of one year with previous year.

The operating cost sheet is prepared on a periodical basis. The information for this purpose is collected from log sheets.

A specimen of this document is shown below :

Cost Summary and performance statement

Registration No.....

Month ended.....

Capacity.....

Monthly charges

A – Operating charges	B – Maintenance charges	C – Fixed charges
(1) Petrol.....	(1) Tyres.....	(1) Insurance
(2) Oil.....	(2) Repairs.....	(2) Interest.....
(3) Grease.....	(3) Overhead.....	(3) Depreciation.....
(4) Driver.....	(4) Garage.....	(4) Tax, licence.....
(5) Assistant.....	(5) Garage.....	(5) Others.....
Total		

Monthly Cost Sheet

1. Total Capital cost

Performance Record

2. Days operated
3. Days idle
4. Days maintained
5. Total hours operated
6. Total kilometers covered
7. Total trips made

Performance averages

8. Average kilometers per day maintained $6 \div 4$
9. Average kilometers per day operated $6 \div 2$
10. Average kilometers per trip $6 \div 7$

Costs for the month

11. Total expenses for the month (A + B + C)
12. Cost per day operated $11 \div 2$
13. Cost per day maintained $11 \div 4$
14. Cost per kilometer operated $11 \div 6$
15. Cost per hour $11 \div 5$

10.4.3 Units of Costs in Transport Costing :

To measure the efficiency of running vehicles different cost units are used. Important among those are :

- (1) **The tonne – kilometer** : These are of two types :

(a) The absolute tonne – kilometer : It refers to unit cost of carrying one tonne of goods over a distance of 1 Kilometer. Expressed in the form of formula :

Absolute tonne km. – Weight Carried x kilometer run for each section of the trip

(b) Commercial tonne – kilometer : This unit is used to overcome the limitation of calculating the unloaded capacity at various distance covered. This method is based on the assumption of an average, wherein it is assumed that the vehicle runs with half load throughout the distance covered (after having unloaded part of the goods at different places). Expressed in the form of formula :

$$\text{Commercial tonne kilometer} = \frac{\text{Tonnage loaded on lorry} + \text{Distance travelled}}{2}$$

(2) The kilometer run : This unit is used to know the performance of vehicles, where carrying of goods is not involved. The cost of transporting the staff of a company can be related to this unit of cost.

(3) Cost per hour : This unit is used when vehicles are hired out to customers at a certain rate per hour. This unit covers all the costs of operating the vehicle along with a profit margin. The hour of this purpose is taken as “hired – out hour”.

Illu.1 : Calculate the monthly passenger kilometers from the following details.

No. of vehicles run : 2

No. of trips per day : 2

Capacity of the vehicle : 50 passengers

Capacity utilisation = 80%

No. of days in a month : 25 days

Distance covered between the two places – 100kms.

Solution :

Calculation of Total Passenger Kilometers :

No. of Vehicles Run = 2

No. of Trips per day = 2

Capacity of the vehicle = 50 passengers

Capacity utilisation = 80%

No. of days in a month = 25.

Distance covered = 100kms

Passenger kms per month :

$$2 \text{ vehicles} \times 2 \text{ trips} \times 50 \text{ passengers} \times 80/100 \times 100\text{kms} \times 25 \text{ days} \\ = 4,00,000\text{kms}$$

No. of passenger Kilometres = 4,00,000kms.

Illu.2 : A transport company operates the following buses in Hyderabad city.

	Carrying Capacity
10 Buses	50 passengers per bus
15 Buses	40 Passengers per bus

On an average, each bus makes 10 trips a day covering a distance of 8kms. in each trip and 75% of seats are occupied. Calculate effective passenger kms. for the month of December 1994.

Solution :

Calculation of Effective Passenger Kms. for the month of December, 1994 :

- I. 10 Buses x 50 passengers x 75/100 x 10 trips x 8kms. x 31 days
- II. 15 Buses x 40 passengers x 75/100kms x 10 trips x 8 kms. x 31 days.

	Kms.
I. 10 x 50 x 75/100 x 10 x 8 x 31	9,30,000
II. 15 x 40 x 75/100 x 10 x 8 x 31	11,16,000
Total effective passenger kms.	20,46,000

Illu.3 : A 40 seater tourist bus operates in a month as follows :

	Capacity	From	To	Distance kms.
First 10 days	Full	Hyderabad	Kazipet	160
Next 15 days	75%	Hyderabad	Khammam	250
Next 5 days	60%	Hyderabad	Kodangal	100

The total expenses are Rs.3,77,000. Ascertain the cost of running on passenger kilometre.

Solution :

Calculation of Total no. of Passenger Kms. :

First 10 days	10 days x 160kms x 40seats	=	64,000
Next 15 days	15 days x 250kms x 40seats x 75/100	=	1,12,500
Next 5 days	5 days x 100kms x 40seats x 60/100	=	12,000

	Total No. of passenger kms.		1,88,500

Total expenses = Rs.3,77,000

$$\text{Cost per Passenger kilometre} = \frac{\text{Rs.3,77,000}}{1,88,500\text{kms}} = \text{Rs.2.00}$$

Illu.4 : Lucky Transport operating 5 ton capacity truck 25 days in a month, between Begumpet and Bhongir (50 km), 2 trips on both the directions a day, supplies the following data :

Cost of truck with 15 yrs life Rs.90,000

Diesel oil per trip (both the directions) Rs.30

Repairs and maintenance Rs.500 p.m.

Wages Rs.750p.m.

Insurance Rs.4,800 p.a.

Taxes Rs.7,200 p.m.

Calculate cost per ton kilometer.

Solution :

Operating Cost Statement of Lucky Transport Company

Particulars	Rs.	Cost per month Rs.
I. Standing Charges :		
(i) Wages	750.00	
(ii) Insurance = 4,800 / 12	400.00	
(iii) Taxes = 7,200 / 12	600.00	1,750.00

II. Running Charges :		
(i)	Depreciation 90,000 / 15yrs x 1/12	500
(ii)	Diesel Oil (25 days x 2 trips x Rs.30)	1,500
(iii)	Repairs & Maintenance	500
	Grand Total (I + II)	4,250

Total Tonne kms :

(50kms x 2 x 2 trips x 25 days x 5 tons) 25,000 tonne kms.

$$\text{Cost per Ton km.} = \frac{\text{Total Operating Cost}}{\text{Total tonne Kms}} = \frac{4,250}{25,000} = 0.17\text{ps.}$$

Working Note :

Total Tonne Kms :

Distance x No. of Trips x No. of days in a month x Ton Capacity

Illu. 5 : Himalaya Transport Co. Supplies the following details in respect of a truck of 5 tonne capacity.

	Rs.
Cost of Truck	90,000
Estimated Life	10 years
Diesel, oil, grease	Rs.15 per trip each way
Repairs & Maintenance	Rs.500 per month
Drivers Wages	Rs.500 per month
Cleaner's wages	Rs.250 per month
Insurance	Rs.4,800 per year
Taxes	Rs.2,400 per year
General Supervision charges	Rs.4,800 per year

The truck carries goods to and from the city covering a distance of 50km each way.

On outward trip freight is available to the extent of full capacity and on return 20% of capacity.

Assuming the truck runs on an average 25 days a month, workout :

(a) Operating cost per tonne km

(b) Rate per trip the company should charge if a profit of 50% on freight is to be earned.

Solution :**(a) Operating cost statement**

Particulars	Per month Rs.	Per tonne km Rs.
I. Fixed Costs :		
Driver's wages	500	
Cleaner's wages	250	
Insurance	400	
Taxes	200	
General Supervision	400	
	1,750	0.23
Fixed cost per tonne km = $1,750 / 7,500 = 0.233$		
II. Running Costs :		
Diesel Oil, grease etc $750 \div 7,500$		0.10
Repairs & Maintenance $500 \div 7,500$		0.07
Depreciation $750 \div 7,500$		0.10
Operating Cost per Tonne Km.		0.50

(b) Freight Rate :

Cost per tonne km	0.50
Profit per tonne km	0.50

Freight rate per tonne km	1.00

Freight per trip both ways 300 tonnes km @ Re.1 = Rs.300.

Working Notes :

(1) Tonne – Km per month = 6 tonnes x 50km x 25 days = 7,500

(2) Tonne Capacity per both trips :

	Tonnes
Outward Trip Capacity	5
Return Trip capacity ($5 \times 20/100 = 1$)	1

	6

10.5 QUESTIONS :

- Write short note on Operating Costing.
- Define Operating costs. To what industries in this method of costing applicable.

3. What do you understand by operating cost? Describe its essential features and state where it can be usefully implemented.
4. Explain the steps involved in operating costing.

10.6 EXERCISES :

1. Kakatiya Transport Company operates 2 buses in a 30kms. Route. Each bus makes 3 round trips a day and the capacity of each bus is 60 passengers. They operated on an average 25 days carrying 80% of the capacity.
Calculate total passenger Kilometers.

[Ans : 4,32,000 Passenger Kilometres]

2. Distance between two places = 80kms.
Passengers run 45
No. of trips (Daily) 4
No. of vehicles run 4
Working days in a month 25
Find out passenger Kilometers per month.

[Ans : 14,40,000 Passenger Kilometres]

3. Calculate the Passengr-kilometres covered by a fleet of 4 taxis run by CNN Travels from Hyderabad to Bhongir (45kms.) and back 4 trips each a day with 5 passengers on an average on each vehicle, for the month of March 92.

[Ans : 2,23,200 passenger Kilometres]

4. A transport company is running two buses two places 100kms. Apart, Seating capacity of each bus is 50 passengers. The total standing and running charges increased by the company in a month were Rs.40,000.

Actual passengers travelled were 80% of the capacity. The buses ran on all the days. Each bus made to and fro trip. Find out the cost per passenger – km.

[Ans : 4,80,000 Passenger Kilometers; Cost per Passenger kms. = 0.083ps.]

5. Maruthi Travels, a transport company, is running a fleet of six buses between two towns 75kms apart. Seating capacity of each bus is 40 passengers. The following particulars are available for the month of June :

	Rs.
(a) Wages of drivers, conductors	3,600
(b) Salaries of office staff	1,500
(c) Diesel oil	10,320
(d) Repairs and maintenance	1,200
(e) Taxation, insurance etc.	2,400
(f) Depreciation	3,900
(g) Interest	3,000

Actual passengers carried were 80% of the seating capacity. All the buses ran all the days of the month. Each bus made one round trip per day.

Find out the cost per passenger kilometer.

[Ans : Cost per Passenger 0.03ps]

6. From the following data relating to a vehicle, compute the cost per running kilo metre:

Kms run (Annual) 20,000;

Kms run per litre 25;

Estimated life of vehicle 1,20,000kms;

Cost of vehicle Rs.30,000;

Road licence (annual) Rs.1,000;

Insurance (Annual) Rs.800;

Garage rent (Annual) Rs.500;

Supervision (Annual) Rs.1,500;

Driver's wage per hour Rs.5;

Cost of petrol per litre Rs.2;

Repairs and maintenance per Kilometre Rs.1.50;

Tyre cost per km 0.75 paise.

You are required to charge interest on the cost of vehicle at 5% per annum. The vehicle runs 25kms. per hour.

7. From the following data. Calculate cost per kilometer of a vehicle :

	Rs.
Value of vehicle	15,000
License fee per year	500
Insurance per year	100
Garage rent per year	600
Driver's wages per month	200
Cost of petrol per litre	0.80
Kilometers per litre	8
Maintenance cost per kilometer	0.20
Estimated life	1,50,000 (km)
Estimated annual distance covered	6,000 (km)

[Ans : Cost per km Rs.1.00]

8. From the following data calculate the cost per running k.m. of a vehicle :

	Rs.
Cost of vehicle	75,000
Garage rent p.a.	1,200
Insurance p.a.	2,500
Life tax	3,500
Driver's wages p.m.	1,000
Cost of petrol	Rs.15 per litre
Tyre depreciation per km	20 paise
Estimated life	1.5lakhs km
Annual mileage	10,000km
Mileage per litre petrol	15km

[Ans : Cost per KM Rs.3.2933]

9. Mr. Reddy runs a tempo service in the town of Tirupathi and has two vehicles. From the following data, you are required to compute the cost of running km. :

	Vehicle A Rs.	Vehicle B Rs.
Cost of vehicles	25,000	15,000
Road license fee per year	750	750
Supervisions (yearly)	1,800	1,200

Driver's wages per year	4.00	4.00
Cost of fuel per litre	1.50	1.50
Repairs and maintenance per km	1.50	2.00
Tyres cost per km	1.00	0.80
Garage rent per year	1,600	500
Insurance yearly	850	850
Km run per litre	6	5
Km run during the year	15,000	6,000
Estimated life of vehicles (km)	1,00,000	75,000

Charge interest at 10% on the cost of vehicle. The vehicles run 20km. Hour on an average.

[Ans : Operation Cost per Km : A = Rs.3.70; B = 4.30]

10. A practising Chartered Accountant now spends Rs.0.90 per kilometre on taxi rate or his client's work. He is considering two alternatives, the purchase of a new small car an old bigger car. The estimated cost figures are :

	New Small Car Rs.	Old Bigger Car Rs.
Purchase price	35,000	20,000
Sale price after 5 years	19,000	12,000
Repair and servicing per annum	1,000	1,200
Taxes and Insurance per annum	1,700	700
Petrol consumption per litre	10k.	7km
Petrol price per litre	3.50	3.50

He estimates that he does 10,000km. Annually, which of three alternatives will be cheaper? If his practice expands and he has to do 19,000kms. per annum. What should be his decision ? At how many km. Per annum will the costs of two cars break even and why? Ignore interest and income tax.

[Ans : Old bigger car is the cheapest. If his practice expands, a new small car will be the cheapest. Break even point = 16,000kms.]

11. Iron ore is transported from two mines 'A' and 'B' and unloaded at points in a Railway station. A is at a distance of 10kms and B is at a distance of 15kms. from the railhead

points. A fleet of lorries of 5 tonnes carrying capacity is used for the transport of ore from mines. Records reveal that the lorries average a speed of 30kms. per hour when running and regularly take 10 minutes 30 minutes per load while at mine 'B' loading time average 20 minutes per load.

Driver's wages, depreciation, insurance and taxes are found to cost Rs.9 per hour operated. Fuel, oil, tyres, repairs and maintenance cost Rs.1.20 per km. Draw up a statement showing the cost per tonne-kilometre of carrying iron ore from each mine. If the coal is of equal quality and price at pit head, from which colliery should the purchases be made ?

[Ans : Cost per tonne-kilometre – Mine A Re.0.72 and Mine B Re.0.66; Mine A]

12. A transport undertaking maintains a fleet of lorries for carrying goods from Delhi to Meerut, 100kms. off. Each lorry which operates 25 days on an average in a month starts every day from Delhi with a load of 8 tonnes and returns from Meerut with a load of 4 tonnes.

- (i) Calculate the commercial tonne – kms. and cost per commercial tonne kms. when the total monthly charges for a lorry are Rs.24,000.
- (ii) What rate per tonne should the undertaking charge if it plans to earn a gross profit of 20% on the freightage ?

[Ans : (i) 30,000 tonne-kms. Re.0.80; (ii) Re.1.00]

10.7 SUGGESTED READINGS

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Chapter – 11

PROCESS COSTING

Objectives :

This lesson helps you in

- Understanding the process costing as a method of costing and its applicability
- Distinguish process costing with job costing
- Know the advantages and disadvantages of process costing
- Understand the procedure to be followed in process costing
- Know the types of process losses and wastage
- Discuss the method of accounting of by-products and joint products.

Structure :

11.1 Introduction

11.2 Applicability

11.3 Characteristics

11.4 Process Costing Vs. Job Costing

11.5 Advantages and Disadvantages

11.6 Process Costing Procedure

11.7 Process Losses and Wastage

11.8 By-Products and Joint Products

11.9 Questions

11.10 Exercises

11.11 Suggested Readings

11.1 INTRODUCTION

Processing Costing is a method of costing applied to industries where the materials has to pass through two or more process before being converted into a finished product. The different processes are in a sequential order so that the output of the earlier

stage becomes the input of the succeeding stage, and the output of the last stage becomes the finished product. Since the product passes through the various stages without any interruption for a long period, the production is said to be continuous and also in bulk.

In most businesses a product passes through several distinct stages of manufacture. These are called "processes". This method is suitable where production is of a repetitive type consisting of different distinctive processes, and the output of one process becomes input of the subsequent process.

11.2 APPLICABILITY :

Processing costing is suitable for certain mining, manufacturing and public utility industries like mines and quarries, cotton, wool and jute textiles, chemicals, soap making plastics, distillation processes, tanning, oil refining, screws, bolts and rivets, canning, food products, dairy, and electricity and gas undertakings. Industries applying process costing may be broadly classified as follows.

1. Single product plants like producing electric power, steam, gas, water, ice, bread, steel, cement, paper rubber etc. Where the entire plant or factory manufacturers through one or more processes, one single product, or the various departments of the factory are responsible for the manufacture of one product each.
2. Factories which manufacture different products in one and the same process but each product has a separate run, one at a time, e.g., bakeries, canning plants, flour mills etc. Costs are worked out separately for each such run.
3. Units in which different products are simultaneously produced from the same processes, eg., foundries laundries etc. Costs of the various products are computed on a weighted average basis, each product being given a weight factor according to its importance.

- Plants in which a particular standard or repetitive operation or process is carried out in one department or cost center, e.g., in mass production of automobile parts, electrical and mechanical equipment, screws, nuts and bolts, oil refineries etc.

11.3 CHARACTERISTICS

- The production is continuous and the end product is the result of a sequence of process.
- The products are homogeneous and standardised
- The products are not distinguishable in processing stage
- The finished product of one process is the raw material for the next process and this procedure continues until the final product arrives.
- The sequence of operations for processing the product is predetermined.

11.4 PROCESS COSTING VS. JOB COSTING :

Process Costing differs from Job Costing differences between process costing and job costing are as follows :

	Job Costing	Process Costing
1.	In Job costing production is by specific orders	Production is in continuous flow, the products being homogeneous.
2.	In this process, Costs are determined by jobs or batches of products	Costs are compiled on time basis i.e., for production for a given accounting period for each process or department
3.	The various jobs are separate and independent of each other	Being manufactured in a continuous flow products lose their individual entity.
4..	Unit cost of a job is calculated by dividing the total costs incurred into the units produced in the lot or batch.	The unit cost of a process, which is computed by dividing the total cost for the period into the output of the process during that period (after adjustment of the opening and closing work-in-process) is an average cost for the period.

5.	In Job costing, Costs are calculated when a job is completed.	Costs are calculated at the end of the cost period.
6.	There may or may not be any work-in-process at the beginning or end of an accounting period.	Production being continuous, there is usually some work-in-process at the beginning as well as at the end of the accounting period.
+7.	There are usually no transfers from one job to another unless it is the necessary to transfer surplus work or excess production.	As a period moves from one process to another transfers of costs from process to process are made.
8.	As each product unit is different and production is not continuous, more managerial attention is needed if proper control is to be exercised.	Process production is standardised and is more stable. Hence, control of process activities is comparatively easy.

11.5 ADVANTAGES AND DISADVANTAGES :

Process costing has the following advantages.

1. It is possible to determine process costs periodically at short intervals, when predetermined overhead rates are in use, it may be possible to complete unit costs weekly or even daily. This is not always possible under the job costing system, particularly when jobs run for long periods and there are not significant units of completed production during the various accounting periods, falling between the total period of the run of the jobs.
2. It involves less efforts and less clerical expenses as the accounting method is simpler than that in job costing.
3. Detailed costs, budgeted as well as actual, are made available for each process, operation, or department. Thus, managerial control is possible by evaluating the performance of each process etc.
4. Allocation of overhead to departments and process can be made fairly accurately on definite bases.
5. Price quotations may be made without difficulty as the material consumption and the various operations are more or less standardised.

6. It is easier to set effective and fairly stable standards in case of mass production or continuous repetitive production. Process costing situation are, therefore, more adaptable for installing standard costing procedures.

Disadvantages :

The disadvantages of process costing are as follows.

1. Being only average costs for the accounting period, process costs cannot be considered to be very accurate for the purpose of detailed analysis, evaluation, and control of individual performance efficiency on a day-to-day basis.
2. Costs obtained at the end of the accounting period are only historical and are not of much use for effective control unless standard process costs are used. This is no doubt true in respect of all other historical systems but the nature of process accounting with its departmental division makes this disadvantage more prominent.
3. When different products come out of one and the same process, the common costs are prorated to the various products. Such costs of individual products are not reliable as they may, at best, be taken to be only approximations.
4. For the purpose of calculating unit costs of continuous processes, work-in-progress is required to be determined at the end of an accounting period. This is done mostly on estimated basis which introduces further inaccuracies in costs.

11.6 PROCESS COSTING PROCEDURE :

The procedure for costing applicable to process very accounting to the requirements of production methods. The various situations and the methods of calculation of costs in respect of each of the situations have been discuss is the following sections.

1. **Single Process Production** : Single process is after involved in moulding, stamping of parts, simple assemblies, polishing, varnishing, or painting of components of products. The aggregate cost of material, labour and overhead incurred in an accounting period is divided into the units of output in that period in order to arrive at the cost per unit.
2. **Multi Process Production** : Where more than one process is involved, the output of one process being completely transferred to the next process. Separate control accounts are opened for each process. If the number of processes is large, a single process accounts is opened and subsidiary details for individual process are

maintained separately. In order to have effective control, work-in-process accounts may be maintained by the elements of costs, i.e., separate material in process, wages in process and factory overheads in process accounts may be opened to record the three elements of costs. When only a part of the output of a process is transferred to another process the total costs of the transferring process is apportioned between the units transferred and the units in stock, on the basis of cost per unit. The details of units of input and output and the units in process are obtained from the entries made in a form known as process production report.

3. **Transferred to the next process partly** : In this the output of a process will be partly transferred to the next process and partly retained in stock.
4. **Process consisting of opening and closing stock, fully completed** : This is similar to the position obtaining in situation III above. The cost per unit of the process is obtained by dividing the total cost, inclusive of the cost of opening stock, into the total units of output. The transfer made to other processes and units remaining in stock are priced at this unit rate.
5. **Process consisting of partially complete opening and closing stock** : Under the job cost system, work in progress or work in process is determined, either by taking physical stock of partly completed production or by a technical estimation of the extent to which a job has been processed, expressed as a percentage of the total or whole job. As the determination of work-in-process is required to be made more frequently in process costing after every accounting period instead of once in a financial year as in the case of jobs, the method of physical stock taking is expensive and so, not suitable in process costing. Technical estimation is, therefore, more appropriate and is commonly adopted for determining equivalent or effective units, discussed below. In some industries it is possible to determine the stage of completion of work in process fairly accurately on the basis of a process and the time actually taken for incomplete production. Where such an exact calculation is not possible, an average or estimate may be used. In some concerns, based on past experience, the work in process at the end of a period is roughly assessed, say as one third or one half complete.

Illu.1 : A product is made in three processes. In the month of October, 2006 1,000 units of finished products were produced.

	Process A	Process B	Process C
	Rs.	Rs.	Rs.

Materials	1,000	2,000	1,000
Labour	5,000	4,000	3,000
Direct Overheads	500	600	1,000

Total Indirect expenses Rs.6,000. These are to be apportioned on the basis of direct wages. Raw materials costing Rs.6,000 were introduced in process A. Ignore Closing stock. Prepare Process account.

Solution :

Finished goods = 1,000 units

Process A a/c

	Rs.		Rs.
To Materials	6,000	By Process B a/c Rs.15 per unit	15,000
To Other materials	1,000		
To Labour	5,000		
To Direct expenses	500		
To Indirect expenses	2,500		
	15,000		15,000

Finished goods = 1,000 units

Process B a/c

	Rs.		Rs.
To Process A a/c	15,000	By Process C a/c Rs.23.60 per unit	23,600
To Other materials	2,000		
To Labour	4,000		
To Direct expenses	600		
To Indirect expenses	2,000		
	23,600		23,600

Finished goods = 1,000 units

Process C a/c

	Rs.		Rs.

To Process B a/c	23,600	By Finished goods a/c Rs.30.10 per unit	30,100
To Other materials	1,000		
To Labour	3,000		
To Direct expenses	1,000		
To Indirect expenses	1,500		
	30,100		30,100

Notes : Indirect expenses are apportioned on the basis of direct labour (5:4:3)

11.7 PROCESS LOSSES AND WASTAGE :

In many manufacturing industries some loss is inevitable. This loss can be classified as (a) Normal (b) Abnormal.

11.7.1 Normal Process Loss :

Because of the nature of the raw materials, some loss is inherent and inevitable. This is known as normal loss. The percentage of such losses is anticipated from past experience by the management. Normal loss should be absorbed by good units arising out of the process. Thus, cost of spoiled and lost units is absorbed as an additional cost of good units produced in the process. However, any value realisable on the normal loss will be credited to the process account.

11.7.2 Abnormal Process Loss :

Any loss caused by unexpected or abnormal conditions such as substandard materials, carelessness, accident etc., or loss in excess of the anticipated normal process loss is regarded as abnormal process loss. Abnormal loss should not affect the normal cost of production. Therefore, it is valued just like good units and transferred to a separate account called Abnormal loss account. The valuation of Abnormal Process Loss should be done with the help of the following.

Value of Abnormal Loss :

Normal cost of Normal Production

Normal output

x Units of abnormal loss

All cases of abnormal process loss should be looked into carefully and suitable steps should be taken by management to prevent their recurrence in future. Where the

scrap arising out of abnormal loss possess some value, it should be credited to abnormal loss account and the balance ultimately transferred to Costing Profit & Loss Account.

11.7.3. Abnormal Gain/Effective :

When the actual process loss or wastage is less than the determined percentage of normal loss or wastage, the difference is known as abnormal gain or effective. Like abnormal loss, abnormal gain should not affect the cost of normal production. The abnormal gain is valued in the same manner as abnormal loss and credited to Abnormal Gain account.

11.7.4. Scrap and Defectives :

Scrap is the incidental residue from certain types of manufacture, usually of small amount and low value, recoverable without further processing. Scrap may be sold or reused. The amount realised from sale of scrap is credited to the process account.. Finished products that are not upto the predetermined standard, are known as defectives. If the defectives are sold, the amount realised is credited to process account. If the defectives are sought to be rectified by spending additional material, labour etc., the extra amount spent is treated as overheads. If the defective units (normal) are discarded the cost of output is increased (as in the case of normal loss). For abnormal defective units the loss is transferred to Costing Profit and Loss Account (like abnormal loss)

Illu.2 : A batch of 600 units was introduced in a process at Rs.20 per unit. 500 units were completed and transferred to the finished goods stores. The normal process loss was 20% of the input, and the scrap is normally sold to a contractor at Rs.3 each. The labour and overhead expenditure, incurred in the process amounted to Rs.600. You are required to calculate the value of Abnormal gain/ Abnormal loss.

Solution :

Process Account

	Units	Amount Rs.		Units	Amount Rs.
To Raw Materials	600	12,000	By Normal Loss	120	360
To Labour and overhead		600	By Transfer to next Process	500	12,750

To Abnormal gain	20	510			
	620	13,110		620	13,110

$$\begin{aligned}\text{Normal loss} &= 600 \times 20/100 = 120 \text{ units} \\ &= 120 \times 3 = \text{Rs.}360\end{aligned}$$

$$\begin{aligned}\text{Abnormal gain} &= \text{Actual output} - \text{Estimated output} \\ &= 500 - 480 \\ &= \mathbf{20 \text{ units}}\end{aligned}$$

$$\begin{aligned}\text{Cost per unit} &= \frac{\text{Total cost} - \text{Amount realised on scrap}}{\text{Estimated Production}} \\ &= \frac{12,600 - 360}{480} = \text{Rs.}25.50\end{aligned}$$

∴ Cost of 20 units = **Rs.510.00**

Illu.3 : In a process 150 units were introduced at a cost of Rs.2, 616. Additional expenses were Rs.404. 20% of units introduced normally are scrapped and sold at Rs.4 each. Actual output was 140 units. Prepare process a/c, Normal loss account and abnormal effective account.

Solution :

Dr.		Process Account		Cr.	
<i>Particulars</i>	<i>Units</i>	<i>Total Cost Rs.</i>	<i>Particulars</i>	<i>Units</i>	<i>Total Cost Rs.</i>
To Materials	150	2,616	By Normal Loss (20% of 150)	30	120
To Additional expenses		404	By Transferred to next process	140	3,383
To Abnormal gain	20	483			
	170	3,503		170	3,503

$$\begin{aligned}\text{Abnormal gain} &= \text{Actual output} - \text{Estimated output} \\ &= 140 - 120 = 20 \text{ units}\end{aligned}$$

Value of Abnormal gain =

$$= \frac{\text{Normal Cost of Normal Production}}{\text{Normal output}} \times \text{Abnormal gain in units}$$

$$= \frac{2,616 = 404 (-) 120}{120} \times 20$$

$$= \frac{3,020 - 120}{120} \times 20 = \text{Rs.}483.33$$

Illu.4 : The product of M/s. Naveen Traders Ltd. Passes through two processes, A and B. From the past experience, the percentage of loss is calculated on the input at 2% in process A and 5% in Process B. The loss of each process possesses a scrap value of Rs.10 per 100 units in process A and Rs.20 per 100 units in Process B. The following information is available for the year ended 31st March, 2001. 40,000 units of raw materials were introduced in process A at a cost of Rs.16, 000.

Solution :

Dr. Process A Account (Actual output: 39,000units) Cr.

Particulars	Qty.	Amount	Particulars	Qty.	Amount
	Units	Rs.		Units	Rs.
To Raw materials introduced	40,000	16,000	By Normal loss	800 (40,000x2%)	80 (800/100x10)
To Material consumed		8,000	By Abnormal loss	200	200
To Direct labour		12,200	By Transfer to Process A stock a/c Re.1.00	39,000	39,000
To Manufacturing expenses		3,080			
	40,000	39,280		40,000	39,280

Dr. Process A Stock a/c Cr.

Particulars	Qty.	Amount	Particulars	Qty.	Amount
To Stock on 1st April @ Re.0.90	4,000	3,600	By Stock on 31st March @Re.1	3,000	3,000
To Transfer from Process A a/c	39,000	39,000	By Transfer to Process B a/c	40,000	39,600
	43,000	42,600		43,000	42,600

Calculation of Abnormal loss/gain:

Quantity introduced in Process A	40,000 units
Less : Normal Loss	<u>800</u>
Expected Output	39,200

Less: Actual output

39,000
200 units

∴ Value of abnormal loss (Rs.) =

$$= \frac{\text{Cost of Normal output}}{\text{Normal output}} \times \text{Abnormal loss (units)}$$

$$\Rightarrow \frac{39,280 - 80}{40,000 - 800} \times 200 = \frac{39,200}{39,200} \times 200 = \text{Rs.}200$$

Dr.			Process B a/c (Actual output: 38,500 units)			Cr.		
Particulars	Qty.	Amount	Particulars	Qty.	Amount			
	Units	Rs.		Units	Rs.			
To Process A stock a/c	40,000	39,600	By Normal loss	2,000 (40,000x5%)	400 (2,000/100x20)			
To Material consumed		2,800	By Transfer to Process B stock a/c @ Rs.1. 50	38,500	57,750			
To Direct labour		14,000						
To Manufacturing expenses		1,000						
To Abnormal gain	500	750						
	40,500	58,150		40,500	58,150			

Dr.			Process B Stock a/c			Cr.		
Particulars	Qty.	Amount	Particulars	Qty.	Amount			
	Units	Rs.		Units	Rs.			
To Stock on 1st April @ Re.1.47	6,000	8,820	By Stock on 31st March @Re.1.50	8,000	12,000			
To Transfer from Process B a/c	38,500	57,750	By Finished stock a/c	36,500	54,750			
	44,500	66,750		44,500	66,750			

Calculation of Abnormal loss/gain:

Quantity introduced in Process	40,000 units
Less: Normal Loss	2,000

Expected output	38,000

	500 units

∴ Value of abnormal gain (Rs.) =

$$= \frac{\text{Cost of Normal output}}{\text{Normal Output}} \times \text{Abnormal gain (units)}$$

$$\Rightarrow \frac{57,400 - 400}{40,000 - 2,000} \times 500 = \frac{57,000}{38,000} \times 500 = 1.5 \times 500 = \text{Rs.}750$$

Normal Loss a/c

Dr.		Cr.	
<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Process a/c (30)	120	By Bank	120
	120		120

Abnormal gain a/c

Dr.		Cr.	
<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
To Normal loss (20 x 4)	80	By Process a/c (20 units)	483
To Costing P & L a/c	403		
	483		483

11.8 BY-PRODUCTS AND JOINT PRODUCTS**By-Products :**

By-Products are defined as 'any saleable or usable value incidentally produced in addition to the main product.' Thus, By-Products mean secondary products (in terms of sales value usually) arising in the course of manufacturing the main product(s). By-Products possess a lesser value when compared to main products. In Dairy industries butter or cheese is the main product, but butter milk is the by product. In an oil refinery petrol is the main product, while sulphur, chemical fertilisers, bitumen are the By-Products. By-Products may require further processing after being separated from the main product is called the 'split off point'. Till the split off point all expenses incurred are considered to be joint expenses.

The accounting methods of By-Products may be classified into (i) Non cost methods (ii) Cost Method.

Non Cost Methods :

- (i) **Other Income Method :** In this method the sales value of by product is credited to profit and loss account, treating it as miscellaneous income.

- (ii) **By-Products sales deducted from total cost** : Under this method the sales proceeds of the By-Products are treated as deductions from total costs. The sales value is deducted either from the production costs or cost of sales.
- (iii) **By product sales added to the main product sales** : In this case all costs incurred on main and By-Products are deducted from the combined sales for the main product and by product.
- (iv) **Crediting sales value less administration, selling and distribution expenses** : In this method, a portion of the administration, selling and distribution overhead incurred for disposing of the By-Products is deducted from the sale value for credit to process account.
- (v) **Crediting sales value less – the costs incurred on By-Products after split off point** : In certain cases it becomes necessary to perform some further operations on by-products after the split off point, in order to make it saleable. Credit is given to the process account for sale value less the cost after split off point.
- (vi) **Reverse Cost Method** : Under this method, an estimated profit from the sale of by-products, selling and distribution expenses and further processing costs after the split off point are deducted from the sale value of By-Products and the net amount is credited to the main product.

Cost Methods :

- (i) **Opportunity or replacement cost method** : This method is followed where By-Products are utilised by the factory itself as input material for some other process. The opportunity cost or replacement cost which otherwise would have been incurred if the By-Products were to be purchased from outside suppliers is taken as the basis for costing By-Products. The process account is credited with the value of By-Products so ascertained.
- (ii) **Standard Cost Method** : A standard cost is fixed on the basis of technical assessment for each by product and credit is given to the process account on this basis. Because of the stability of this method, effective control would be exercised on the cost of the main product.
- (iii) **Apportionment on a suitable basis** : Where by-products are of major importance, cost should be apportioned on the most suitable basis, i.e., physical measurement, market value etc.

Joint Products :

In some industries, two or more products of equal importance and value are produced, simultaneously in a process. Such products are called joint products. Motor spirit, kerosene oil, fuel oil, lubricating oil, wax, tar and asphalt are the examples of joint products produced from crude petroleum. Thus, joint products have the following features.

1. The products are the simultaneous outcome of the joint process and from the same raw materials.
2. The products have equal commercial value.
3. The products require further processing to finish them into more useful and valuable product.

The joint products cannot be identified as separate products upto a certain stage in manufacturing. This stage is known as the split off point (as indicated earlier). Costs incurred prior to this stage are joint costs, and costs there after are called subsequent costs. The cost before the separation stage has to be distributed to each product. There are various accounting methods adopted for this purpose.

- (i) **Average Unit Cost Method** : In this method, the total process costs (upto the point of split, off) are divided by the total weight or units produced to get average cost per unit of production. The process losses are borne by the joint products in the ration of their output weight units. This method can be applied where the joint products can be measured in terms of common unit such as lire, gallon, lb, kg etc. Where the end of products cannot be expressed in common unit, this method is not helpful.
- (ii) **Physical Unit Method** : A physical base, e.g., raw materials is the proportion used to apportion pre-separation point costs to joint products. In other words, the physical volume of materials found in joints products at the point of separation is found out and on that very basis the cost is apportioned. Process loss is borne by joint products in the ratio of their output weight. This method can be applied when physical units of production are similar or can be correlated by correlated by a factor or coefficients. This method may not be helpful where costs have no relationship to the output weight of individual products.
- (iii) **Survey Method** : In this method, all important factors such as volume, selling price, technical side, marketing process etc., affecting costs are ascertained by means of an extensive survey. Points values or percentages are given to individual products according to their relative importance and costs are apportioned on the

basis of total points. The ratio should be revised from time to time depending upon the factors affecting production and sales.

(iv) Market Value Method : This is the most popular method because it makes use of a realistic basis for apportioning joint costs. In this method joint costs are apportioned after ascertaining "what the traffic can bear". In other words, the products are made to bear a proportion of the joint cost on the basis of their ability to absorb the same. Market value means weighted market value i.e., units produced X price of a unit of joint product.

(a) Market value at the point of separation or relative market value method :

This method involves the following steps.

1. The physical output of each product i.e., multiplied with the market price at the split off point.
2. The resultant market value of all products are then added.
3. The percentage of the market value of each product to the total of the market values under (2) above is found out.
4. These percentages are used to allocate the total input cost among the joint products.

(b) Market Value after further processing :

Here the basis of apportionment of joint costs is the total sales value of finished products and involves the same principle as stated in (1) above.

(c) Net realisable value method :

From the sales value of the joint products (at finished stage) the followings are deducted.

1. estimated profit margins
2. selling and distribution expenses, if any and
3. past split off costs.

The resultant figures so obtained is known as net realisable value of joint products. Joint costs are apportioned in the ratio of net realisable values. This method is widely used in many industries.

Illu.5 : Three joint products are produced by passing chemicals through two consecutive processes. Output from process 1 is transferred to process 2 from which the three joint products are produced and immediately sold. Following are the particulars.

	Process I	Process II
Direct Material 2,500 Kg. At Rs.4 per kg.	10,000	
Direct labour	6,250	6,900
Overheads	4,500	6,900
Normal loss	10% of input	Nil
Scrap value per kg.	2.00	-
Output 2,300 kg.		

Joint products A 900 kg.

Joint products B 800 Kg.

Joint products C 600 kg.

Selling Prices of the output from process II

Joint product A – Rs.24 per kg.

Joint product B – Rs.18 per kg.

Joint product C – Rs.12 per kg.

No opening and closing stocks. You are required to prepare Process I a/c together with any loss or gain accounts and calculate the profit from each joint product by apportioning the total costs from Process II according to the market value.

Solution :

Dr.			Cr.		
Process A a/c					
Particulars	Kgs	Total	Particulars	Kgs.	Total
To Direct materials	2,500	10,000	By Normal loss a/c	250	500
To Direct labour		6,250	By Process II a/c	2,300	20,700
			Rate per kg.		
			$20,700/2,300 =$		
			Rs.900		
To Indirect expenses		4,500			
To Abnormal Profit	50	450			
	2,550	21,200		2,550	21,200

Abnormal profit = $20,750 - 500/2,500 - 250 \times 50 = \text{Rs.}450$

Dr.			Abnormal Profit a/c			Cr.		
Particulars	Kgs	Total	Particulars	Kgs.	Total			
To Process Loss a/c	50	100	By Process I a/c	50	450			
To Costing Profit & Loss a/c (Profit)	-	350						
	50	450		50	450			

Dr.			Normal loss a/c			Cr.		
Particulars	Kgs	Total	Particulars	Kgs.	Total			
To Process I a/c	250	500	By Abnormal profit	50	100			
			By Cash a/c	200	400			
	250	500		250	500			

Joint Costs	Rs.
Transfer from Process I 2,300 kgs.	20,700
Direct labour	6,900
Indirect expenses	6,900
Output = 2,300 kgs value	34,500

Classification of Joint Costs on the basis of Market value

Product Name	Output Kgs.	Selling expenses	Sales revenue	% of Sales revenue	Distribution ratio	Distribution of Joint Costs	
		Rs.	Rs.				Rs.
A	900	24	21,600	3	3/6	$34,5000 \times \frac{3}{6}$	17,256
B	800	18	14,400	2	2/8	$34,500x \frac{2}{6}$	11,500
C	600	12	7,200	1	1/6	$34,500 \times \frac{1}{6}$	5,750
			43,200				34,500

Profit Statement

	A	B	C	Total

		Rs.	Rs.	Rs.	Rs.
I	Sales	21,600	14,400	7,200	43,200
	Less : Joint Costs:				
	Transfer from Process I (3:2:1)	10,350	6,900	3,450	20,700
	Direct labour (3:2:1)	3,450	2,300	1,150	6,900
	Indirect expenses (3:2:1)	3,450	2,300	1,150	6,900
II.	Total Cost	17,250	11,500	5,750	34,500
III.	Profit (I 0- II)	4,350	2,900	1,450	8,700

11.9 QUESTIONS

A. Short Answer Questions

1. Normal Loss
2. Abnormal Loss
3. Abnormal Profit
4. Abnormal Loss
5. What is joint product?
6. What is By product?
7. Joint and By product.

B. Essay Questions :

1. Describe the salient features of process costing. In which industries it is relevant.
2. Discuss the methods to be adopted in the treatment of joint products and By-Products in process accounts.
3. State the different methods of allocating of joint costs.
4. Define joint products and By-Products and cite an example of each. Explain the various bases available for apportionment of joint costs to joint products.

11.10 EXERCISES :

1. The total processing cost of 10,000 units of a product is Rs.25, 000. The normal loss is 200 units and the output of the process is 9,750 units. Ascertain the value of Abnormal loss.

[Ans.: Value of Abnormal Loss Rs.128]

2. A Product passes through 3 processes A, B and C. The normal wastage of process A – 2%, B – 5%, C – 10%. Wastage of process realizes at Rs.5 per 100 units from A & B and Rs.20 per 100 units from C. The other expenses were as follows:

	A	B	C
	Rs.	Rs.	Rs.
Materials	6,000	4,000	2,000
Direct labour	8,000	6,000	3,000
Manufacturing expenses	1,000	1,000	1,500

2000 units have been introduced to Process A at 50 Paise per unit. The actual output of A – 19500 units, B – 18800 units and C – 16000 units. Prepare Process accounts.

[Ans.: Process A : Abnormal Loss 100 units, Rs.127; Process B : Abnormal gain : 275 units Rs.532; Process C Abnormal Loss : 920 units, Rs.2,309; Process C: Finished goods : 16,000 units, Rs.40,151]

3. A product passes through three distinct processes for completion. It is ascertained that wastage is incurred in each process as under :

Process A 20%; Process B 5% Process C 10%

The Wastage of Process A & B is sold at Rs.10 per 100 units and the Process C at Rs.80 per 100 units.

Following is the information regarding the production in March, 2003.

	Process A	Process B	Process C
	Rs.	Rs.	Rs.
Materials	12,000	8,000	4,000
Direct Labour	16,000	12,000	6,000
Machine Expenses	2,000	2,000	3,000
Other Factory Expenses	3,500	3,800	4,200

20,000 units have been issued to Process A at a cost of Rs.20,000. The output of each process is as under :

Process A – 19,500 units; Process B – 18,800 units; and Process C = 16,000 units. There is not stock of raw material or work-in-progress at the end of March. Prepare Process Cost Accounts.

[Ans.: Process A : Cost of Abnormal Loss Rs.273; Process B : Cost of Abnormal gain : Rs.1,171; Process C : Cost of Abnormal Loss Rs.5,206]

4. The products of a manufacturing passes through three processes A, B, C. From the following particulars, prepare process accounts, showing normal loss, abnormal loss and abnormal gain.

Particulars	Process A Rs.	Process B Rs.	Process C Rs.
Direct materials:	17,000	20,000	25,000
Direct wages	13,000	8,000	9,000
Production overheads	8,000	7,150	8,210
Output in units	4,750	4,200	3,750
Normal loss	5%	10%	15%
Value of scrap (per unit)	10	20	25

Input to process A (units) 5,000
 Input to Process A (Value) Rs.50,000

[Ans.: Process B : Value of Abnormal Loss Rs.1,950; Process C : Value of Abnormal Loss Rs.6,840]

5. Bright Chemicals Ltd., electrolysis common salt to obtain three joint products – caustic soda, chlorine and hydrogen. During a costing period the expenditure relating to the inputs for the common process amounted to Rs.3,50,000. After separation expenses amounting to Rs.1,60,000, Rs.75,000 and Rs.10,000 were incurred for caustic soda, chlorine and hydrogen respectively. The entire production was sold and Rs.3,75,000, Rs.2,50,000 and Rs.60,000 were realised for caustic soda, chlorine and hydrogen respectively. The selling expenses were estimated at 5% of realisation from sales. The management expected profit @ 15%, 10% and 5% respectively of realisation from sales of caustic soda, chlorine and hydrogen.

Draw a columnar statement showing the apportionment of joint costs and profitability of each product.

[Ans.: Profit : Caustic Soda Rs.44,000; Chlorine Rs.12,700; Loss : Hydrogen Rs.950]

6. X Ltd., manufactures product A which yields two By-Products B and C. In a period the amount spent up to the point of separation was Rs.20,600. Subsequent expenses were :

	A Rs.	B Rs.	C Rs.
Materials	300	200	150
Direct wages	400	300	200
Overheads	300	270	280
	1,000	770	630

Gross Sales value of product A, B and C was Rs.15,000, Rs.10,000, Rs.10,000 and Rs.5,000 respectively. It was estimated that the net profit as a percentage of sales in B and C would be 25% and 20% respectively.

[Ans.: Profit Rs.3,500; Joint Costs before separation : B Rs.6,730; C Rs.3,370]

11.11 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
3. Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.
4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
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6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter – 13

Standard Costing

Objectives :

After going through this unit you should be able to

- Understand the concept of standard costing
- Know the types of standards and process in setting standards
- Discuss the meaning and purpose of various analysis
- Analyse various types of variances viz., material variance, labour variance, and overhead variance.

Structure :

13.1 Introduction

13.2 Advantages of Standard Costing

13.3 Limitations of Standard Costing

13.4 Preliminaries to setting standards

13.5 Various analysis

13.6 Material Variance

13.7 Labour Variance

13.8 Overhead Variance

13.8 Sales Variances

13.10 Questions

13.11 Exercises

13.12 Suggested Readings

13.1 INTRODUCTION :

The word 'standard' means a criterion. Thus a standard cost is one which is predetermined and used as a criterion for measuring the efficiency with which actual cost has been incurred. Standard Cost has been defined by the Institute of Cost and

Management Accountant, London, as "a predetermined cost which is computed in advance of production on the basis of a specification of all the factors affecting costs and used in standard costing." The main object of standard cost is to look forward and assess what the cost should be as distinct from what the cost has been in the past.

Historical costing is the ascertainment of costs after they have been incurred. It is, thus a post mortem examination of the costs. It does not help in finding mistakes and locating, inefficiencies that may ultimately affect the profit figure. These deficiencies of historical costing are sought to be corrected through the introduction of standard costing in modern businesses.

13.1.1. Standard Cost and Historical Cost :

Standard cost is a predetermined cost which computed in advance of production on the basis of specification of all the factors affecting costs. It is a figure that represents an amount that can be taken as typical of the cost of an article. It is, according to Blocker and Wehmer, a common sense cost, reflecting the best judgement of management as to what costs ought to be if the plant is operated with the highest degree of efficiency. The standard cost may be (i) ideal (ii) normal/attainable and expected. The ideal standard costs refers to the estimate of cost under ideal conditions. It is computed on the basis that there is no scrap, no idling of machinery, break down and so on. Such a standard cannot be attained in actual practice. Expected standard cost, on the other hand, is based on the most likely attainable results. It shows what will happen in future. There is no inherent element of efficiency in such standard. Finally, the normal standard cost is based on the currently attainable standards. It is a desired attainable objective, a performance, a goal, a model. It is reflective of normal conditions, normal wastage, normal break down and normal mistakes. The term standard cost refers to the normal standard cost only and not the other two extremes.

Historical cost, on the other hand, is computed after the completion of production of goods and it has value only from a historical point of view. It will help in rectifying the past mistakes, and mending the ways of doing things at least in future. However, all such rectification measures can be initiated only after the damage has been done.

13.1.2. Characteristics of Standard Costing :

The main characteristics of standard costing system are summarised below.

- (i) Determination of the standard costs under each element of cost material, labour and overhead.
- (ii) Comparison of actual costs and standard costs. The difference between the two is technically known as `variance.
- (iii) Analysis of variances so that the reasons for the difference between standard cost and actual cost can be brought to light.
- (iv) Reporting of these variances to management so that steps can be taken to remedy these in future.

13.1.3. Application of standard costing system to various industries :

Standard Costing is a technique which can be useful employed in all types of industries job type and process. However, the maximum benefit from this system is obtained in industries manufacturing standardised products which are repetitive in nature. This implies that it is of maximum value to process industries so that standards once fixed can be used repeatedly. For example, cement, paper, chemicals etc.

It does not mean that standard costing cannot be used in job order type of industries. The only difficulty is that there the operation of the system becomes costly as standard cost has to be separately ascertained for each job,

13.2 ADVANTAGES OF STANDARD COSTING :

Standard costing is a dynamic instrument of measurement of performance, comparison and control. The advantages of standard costing may be stated thus :

1. **Cost Consciousness** : Standard costing infuses a strong sense of cost consciousness among executives, employees working at various levels. It forces them to keep activities along right tracks and check deviations as far as possible.
2. **Valuable Managerial Tool** : Standard Costing helps management in fixing prices, determining policies, ensuring cost control and effecting cost reduction. Comparison of actual performance with standards provide useful information for cost control and cost reduction.
3. **Motivation for Better performance** : Standard costing compels people, employees to direct efforts in the right way, leading to realisation of predetermined targets. As a result, they are forced to work with diligence, care and caution and deploy resources in

the most effective way. The presence of standard which are within their reach, and other follow-up activities compel them to be goal oriented. In short, they are motivated to perform well and earn rewards.

4. **Management by Exception** : Standard Costing helps in applying the principle of management by exception. Management need not trouble itself with respect to those activities that proceed according to predetermined plans. They do not have to bury themselves with routine checking, and wrestle with negligible deviations. They have to concentrate only on exceptional matters which may require their attention and remedial action.
5. **Optimal use of resources** : Standard costing helps in committing funds to the best possible advantage. Men, materials machines are marshalled in an appropriate manner, with a view to achieve the predetermined targets. Costing procedures are simplified to a large extent and this, in turn, contributes to saving in costs. Operations are scrutinized regularly so as to locate inefficiencies and initiate rectificational steps. All these things go a long way in making use of scarce inputs in an efficient and effective way.
6. **Inventory Valuation** : Inventories of raw materials, work in progress and finished goods can be valued at standard cost and this will in turn, reduce fluctuation of profits due to adoption of different methods for valuing inventory.
7. **Future Oriented** : Standard costing involves careful settings of targets, regular monitoring of performance, prompt detection of deviations, and adoption of remedial measures. The data generated in the process can be used to plan ahead with confidence. Tighter and more accurate budgets can be prepared in the coming years.

13.3. LIMITATIONS OF STANDARD COSTING :

Standard Costing is not always on the credit side of the ledger. It is plagued by several troubling limitations, as listed below :

1. **Difficulty in Fixing Standards** : It is not easy to set standards. Tight standards stifle executive freedom and loose standards do not motivate people to realise targets. This problem, however could be solved by fixing standards on the basis of a careful evaluation of all relevant factors influencing current as well as future performance.
2. **Outdated Standards** : Keeping of up-to-date standards is a vexing problem. They become outdated in the face of continual changes in technology, production methods, competitive conditions etc. This problem could be solved by undertaking revisions

after an optimum period. This, however, does not mean that standards have to be revised and modified continually which is a costly and inconvenient proposition.

3. **Unsuitable for Small Firms** : Fixing of standards is a demanding task. It requires a high degree of technical skill and competence. Small firms may, therefore, find it difficult to establish standard costing.
4. **Unsuitable for small Firms** : Standard costing may be found unsuitable and even costly in the case of industries dealing with non-standard products which keep on changing in accordance with customers' specifications.
5. **Variances cannot be explained properly** : The executives can only be held responsible for variances if such variances arise from actions which can be controlled by them. This means that for fixing responsibilities, variances have to be split into two portions; controllable and uncontrollable. This, however, is easier said than done.
6. **Operational Problems** : The success of standard costing is critically dependent on continued blessings and consistent support from top management. Any reluctance on the part of management to set the system in motion anywhere in between, would mean failure on various fronts. More importantly, staff may begin to look at the whole system, as an impersonal policeman, zealously guarding their territories. It means loss of freedom, rigid observance of rules and regulations, dictation from upstairs and a nauseating feeling of being regulations, dictation from 'upstairs' and a nauseating feeling of being cornered. These problems could be solved through persuasion and education. Every attempt must be made to sell the system to employees clarifying their doubts and emotional objections in a proper manner.

13.4 PRELIMINARIES TO SELLING STANDARDS :

The following preliminary steps must be taken before a standard costing system is established.

1. **Establishment of Cost Centres** : A cost centre is a location, person or item of equipment for which costs may be ascertained and used for the purpose of cost control. Thus, cost centres may be personal (those relating to persons) and Impersonal (relating to location, item of equipment or group of these). Cost centres have to be established in order to fix responsibility and define lines of authority in a clear manner.
2. **Classification and Codification of Accounts** : Accounts have to be classified with a view to facilitate collection and analysis. All items of expenses are classified under

appropriate account headings. Each such accounting head is assigned suitable code number. This helps in speedy collection and analysis of cost information.

3. Types of standards : The following types of standards are generally considered while establishing the standard costing system.

(a) Basic Standard : This is a standard which is established for use, unaltered over a long period of time. It is good for industries where the product costs and product prices continue to be unchanged, or where minor changes take place.

(b) Current standard : This is a standard which is established for use over a short period of time and is related to current conditions. Unlike basic standard, which is idealistic, a current standard is more realistic. Most companies, therefore, use current standards.

(c) Ideal Standard : An ideal standard is that standard which can be attained under the most favourable conditions possible. This is fixed with a very high degree of efficiency which is impossible to attain. As a result when costs are compared with this standard, large variances are bound to arise which will not reveal a true and fair picture of business operations.

(d) Expected Standard : This is a standard which is anticipated to be attained during a future specified budget period. While fixing this standard, conditions and circumstances in force within a particular industry are taken into account. Future changes that are likely to hit the industry are also given due weightage. This standard is, therefore, more realistic than the ideal standard.

(e) Normal standard : It is an average standard and is based on normal conditions which prevail over a long period of a trade cycle. For example, a period of say 3 years is taken and a forecast made of expected production and sales for three years. The standard costs are then assessed on an average basis and used during the above period. The whole exercise seems to be easy enough but in actual practice it is not possible to forecast future conditions with a reasonable degree of accuracy for a long period of time. Hence, normal standards are not generally used where cost control is the main purpose.

4. Setting the Standards : After selecting the standard the task of setting standards is given to a Standards Committee. The Standards Committee will generally consist of production manager, purchasing manager, personnel manager, production engineer, sales manager cost accountant and other functional heads, if any. Among these functional heads, the cost accountant is expected to play a major role, as he provides cost figures and coordinates the activities of the committee in an attempt to set the

standards as accurately as possible. IN the next step, the standard cost is determined for each and every element of cost separately. The term standard cost here refers to cost that should reasonably be incurred in the manufacture of a product.

13.5 VARIANCE ANALYSIS :

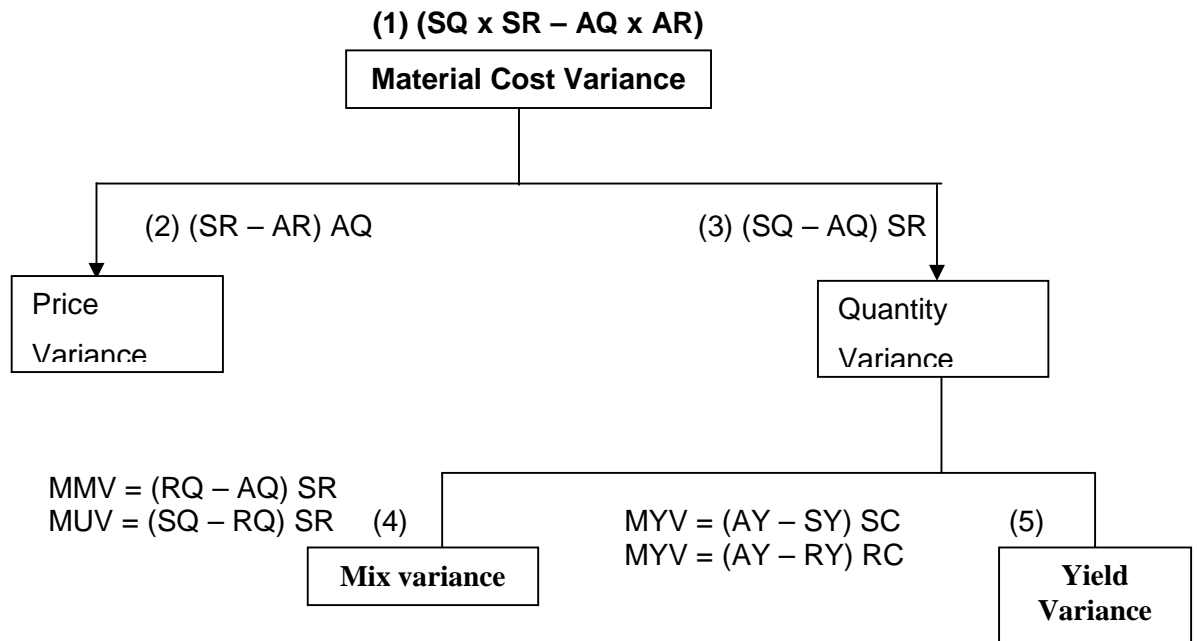
The most valuable contribution a standard costing system makes to the principle of “management by exception” is the presentation of variances. Variances highlight those situations where actual results are not as planned, whether better or worse. They represent the differences between the standard and actual for each element of cost and sometimes for sales. When actual results are better than expected a favourable variances arises, where they are not up to standard an adverse variance occurs. By reference to the variances, management can concentrate its efforts on the important items.

Variances help to pinpoint responsibilities, in that management can ascertain where the blame lies when results are poor. For example, an adverse Material Usage variance would indicate that an excess material cost was due not An increase in price but to inefficient use of materials. In this case responsibility could be placed on the supervisor in charge of the particular operation in which the inefficiency occurred. It may be discovered that the variance was caused by inefficient handling, the purchase of poor quality materials or the employing of trainees. The important point is that the reason for the variance must be found, explained and, where necessary corrective action taken.

Different variances are used in different industries and it is not possible to discuss them all here. Variances may be calculated in respect of the following.

1. Direct Material
2. Direct Labour
3. Variable overhead
 - (a) Based on units
 - (b) Based on standard hours
4. Fixed Overhead
5. Sales
8. Based on turnover
9. Based on profit

13.6 MATERIAL VARIANCE :



(1) Material cost variance : This is the difference between standard cost of standard quantity for Actual output and actual cost of actual Material used for actual output. The formula for this is :

$$MCV = SC - AC = SQ \times SR - AQ \times AR$$

Where : SC = Standard cost, AC = Actual cost, SQ = SQ for AY, SR = Standard Rate, AQ = Actual Quantity, AR = Actual Rate.

Importantly, SQ = SQ for AY

Where AY = Actual Yield (or) Actual output.

(2) Material Price Variance : From the above chart, it is understood that 2nd variance is price variance and this will also lead to MCV. This is a part of the MCV and arises due to the difference in standard price set and the actual price paid.

The formula is :

$MPV = (SR - AR) AQ$ where SR = Standard Rate, AR = Actual Rate and AQ = Actual Quantity of material.

(3) Material quantity variance : (MQV) It is also known as usage variance and it is a part of the MCV as per the above chart. This may arise due any of the reasons viz., workers of Materials, skill and efficiency of workers, changes in product

design etc. Mostly, it arises due to the difference in utilisation of raw materials. Its formula is : $MQV = (SQ - AQ) SR$ where $SQ = SQ$ for AY, $AQ =$ Actual Quantity, $SR =$ Standard Rate, $AY =$ Actual Yield.

(4) Material mix variance [MMV] : As per the chart of material variances, MMV is that portion of MQV due to changes in standard mix of materials and actual mix of the materials. It may be also due to subsequent shortage of raw materials. In this case, standard quantities are to be revised as per a formula and with these revised quantities the MMV is to be calculated. How do we revise the Quantity ?

For the sake of convenience, MMV is discussed in a phased manner. Some assumptions are made here. In the 1st phase, the following are the assumptions.

- (1) only mix ratio differs.
- (2) Total weights of the mixes are the same

MMV in this case uses the same formula used for MQV.

$$\therefore MMV = (SQ - AQ) SR$$

In the 2nd phase, the assumption are :

- (1) Mix compositions differ.
- (2) Total weights of the mixes are also different

MMV in this case is calculated with the following formula.

$MMV = (RSQ - AQ) SR$ where : $RSQ =$ Revised Standard Quantity, $AQ =$ Actual Quantity, $SR =$ Standard Rate.

$$RSQ = \text{Total weight of Actual Mix} \times \text{old standard ratio.}$$

Further, it is to be noted that MQV calculated as per the earlier said formula will be divided into two parts viz., (1) MMV (due to change in mix Ratio) and (2) MUV (due to efficiency (or) in efficiency in the utilisation of materials).

So, $MMV = (RSQ - AQ) SR$ and

$$MUV = (SQ - RSQ) SR$$

From the above it is to be noted that MQV must be equal to the total of MMV and MUV.

(5) **Material yield variance (MYV) : In all processing industries, material loss is inevitable.** So, while setting standards for material and output from materials, a provision is made for normal loss while abnormal loss is not provided for. Though a provision is made for normal loss in the Standard, some difference is bound to arise between standard output for the actual input and the actual output. Hence, need for calculation of yield variance arises. Thus, there is difference between standard yield and actual yield because of efficiency (or) in efficiency of workers, poor quality of materials, etc. As per the material variances. Chart given above, it is 5th variance which is a part of the MQV which is due to reasons said above. For the sake of convenience, it is sought to be handled in two situations. They are :

(1) (a) Mix varies , (b) Weights do not vary.

In the above case, the formula for MYV is $MY = (AY - SY) SC$, where : AY = Actual Yield, SY = Standard yield for actual input of material used, SC = Standard cost of unit.

(2) (a) Mix Varies, (b) Weights also vary.

In this case, since there is around change standards set are to be revised and Revised Mix is to be calculated and Revised yield also is to be found out. The earlier yield variance formula is expressed now in Revised Terms. The formula is:

$$MY = (AY - RY) RC$$

SC (or) RC calculation:

It is standard cost per unit of finished goods. It is calculated as per the following.

$$SC \text{ (pu) (or) RC} = \frac{\text{Total Standard cost}}{\text{Total input - Normal loss}} \text{ (or)}$$

$$\frac{\text{Normal cost of Normal output}}{\text{Normal output}}$$

Verifications (or) checking:

$$(1) MCV = MPV + MQV$$

- (2) MQV = Mix + Yield
 (3) MQV = Mix + usage
 (4) MQV = Mix + usage (or) yield
 (5) MUV = MYU

Illu.1 : 80Kg. of material A at a standard price of Rs.2 per kg and 40kgs. of material B at a standard price of Rs.5 per kg. Were to be used to manufacture 100kgs. of a chemical.

During a month, 70kgs. of material A priced at Rs.2.10per kg. And 50kgs. of Material B priced at Rs.4.50per kg. were actually used and the output of the chemical was 102 kgs.

Find out the material variance.

Solution :

Material	Standard cost of 100kg of output			Actual cost of 102kg of output		
	Qty.	Rate Rs.	Amount Rs.	Qty.	Rate Rs.	Amount Rs.
A	80kgs	2	160	70kgs	2.10	147
B	40kgs	5	200	50kgs	4.50	225
	120kgs		360	120kgs		372

Standard cost per kg. Of output = Rs.3.60
 Standard cost of 102kgs of output = 102 x Rs.3.60
 = Rs.367.20

Material cost Variance = Standard cost – Actual cost
 = 372 – 367.20 = Rs.4.80 (A)

Material Price variance = Standard Price – Actual price) x Actual Quantity
 A = (2 – 2.10) x 70 = Rs.7 (A)
 B = (5 – 4.50) x 50 = Rs.25 (F)
Total = Rs.18 (F)

Material Mix variance = (Revised Standard Quantity – Actual Quantity) x S.P.

A = (80 – 70) x 2 = Rs.20 (F)
 B = (40 – 50) x 5 = Rs.50 (A)

$$\text{Total} = \text{Rs.30 (A)}$$

Material Yield Variance = (Actual yield – Standard yield) x Standard output price =
 (102 – 100) x Rs.3.60 = Rs.7.20 (F)

Verification :

$$\begin{aligned} \text{MCV} &= \text{MPV} + \text{MMV} + \text{MYV} \\ &= \text{Rs.18 (F)} + \text{Rs.30 (A)} + 7.20 \text{ (F)} \\ \text{Rs.4.80 (A)} &= \text{Rs.4.80 (A)} \end{aligned}$$

Illu.2 : The standard cost of a chemical mixture is :

40% material A at Rs.20 per kg.

60% material B at Rs.30 per kg.

A standard loss of 10% expected in production. During a period there is used:

90kgs material A at cost of Rs.18 per kg

110kgs material B at cost of Rs.24 per kg.

The weight produced is 182kgs of good product.

Calculate :

- 1. Material price variance**
- 2. Material mix variance**
- 3. Material yield variance**
- 4. Material cost variance.**

Solution :

1. Material Price Variance = (SP – AP) x AQ

$$\text{Material A} = (20 - 18) \times 90 = \text{Rs.180 (F)}$$

$$\text{Material B} = (30 - 34) \times 110 = \text{Rs.440 (A)}$$

$$\text{Total} = \text{Rs.260 (A)}$$

2. Material Mix Variance

(SM – AM) x SP, where SM indicates Standard mix, AM actual mix, SP Standard price

$$\text{Material A} = (80 - 90) \times 20 = \text{Rs.200 (A)}$$

Material B	$= (120 - 110) \times 30$	$=$	Rs.300 (F)

	Total	$=$	Rs.100 (F)

3. Material yield Variance

(SY – AY) x SC where SY stands for standard yield, AY for actual yield, and SC for standard cost per unit.

$$(180 - 182) \times 28.8 = \text{Rs.57.6 (F)}$$

Note :

(a) 200 less 10% is the standard yield

(b) standard rate of standard mix	$=$	(80 x 20 + 120 x 30)
		5,200 + 180
	$=$	28.8 Approx.

4. Material Cost Variance :

Standard cost of material – Actual cost of material

$$(SP \times SQ - AP \times AQ)$$

Where SPO indicates standard price, SQ Standard quantity, AP actual price and AQ actual quantity.

$$(5,360 - 5,257.60) = \text{Rs.102.40 (A)}$$

Standard cost of material is calculated as follows :

Standard cost of standard output

A – 80kgs @ 20	$=$	Rs.1,600
B – 120kg @ Rs.30	$=$	Rs.3,600

200		5,200

Less : Wastage 10% - 20	$=$	5,200

180		-----

∴ Standard cost of material for an actual output of 182kg.

$$= \left(\frac{5,200 \times 182}{180} \right) = \text{Rs.5,257.70}$$

Verification :

Materials Cost Variance = Materials price Variance + Materials Mix Variance + Material Yield Variance

$$\text{Rs.102.40 (A)} = \text{Rs.260 (A)} + \text{Rs.100 (F)} + \text{Rs.57.60 (F)} = \text{Rs.102.40.}$$

Illu.3 : A company produces a product X and operates a system of standard costing. Details of information for the month of July , 2002 are as under :

Standard output from each ton of material	:	50 units
Standard price per ton	:	Rs.150
Actual usage	:	100 tons
Actual price per ton	:	Rs.200
Actual output	:	6000 units

Calculate material variances.

Solution :

(a) Material Price Variance (MPV) :

$$\begin{aligned} & \text{Actual Quantity (Standard Price – Actual Price)} \\ &= 100 [150 – 200] \\ &= \text{Rs.5,000 (Adverse)} \end{aligned}$$

(b) Material Usage Variance (MUV) :

$$\begin{aligned} & \text{Standard price [Standard quantity – Actual Quantity]} \\ &= 150 \left[\left(1 \times \frac{6000 \text{ units}}{50 \text{ units}} \right) - 100 \right] \\ &= 150 [120 – 100] \\ &= \text{Rs.3,000 (Favourable)} \end{aligned}$$

(c) Material Cost Variance (MCV) :

$$\begin{aligned} & \text{Standard cost of Material – Actual cost of Material} \\ &= [\text{Standard quantity for Actual output} \times \text{Standard price}] – \\ & \quad [\text{Actual quantity for Actual output} \times \text{Actual Price}] \\ &= [120 \times 150] – [100 \times 200] \\ &= 18,000 – 20,000 \\ &= \text{Rs.2,000 (Adverse)} \end{aligned}$$

Rectification / Verification :

$$\text{MCV} = \text{MPV} + \text{MUV}$$

$$\text{Rs.2,000 (Adverse)} = \text{Rs.5,000 (Adverse)} + \text{Rs.3,000 (Favourable)}$$

$$\text{Or, Rs.2,000 (Adverse)} = \text{Rs.2,000 (Adverse)}$$

Illu.4 : The standard cost of a certain chemical mixture is:

35% material A at Rs.25 per kg.

65% material B at Rs.36 per kg.

A standard loss of 5% is expected in production. During a period the following materials are used:

125kgs of material A at Rs.27 per kg; and

275kgs of material B at Rs.34 per kg.

The actual output was 365kg.

Calculate :

- 1. Material cost variance**
- 2. Material price variance**
- 3. Material mix variance**
- 4. Material yield variance**

Solution :

Basic Calculations :

Material	Standard			Actual		
	Kg.	Rate Rs.	Amount Rs.	Kg.	Rate Rs.	Amount Rs.
A	140	25	3,500	125	27	3,375
B	260	36	9,360	275	34	9,375
	400		12,860	400		12,725

$$\text{Standard output} = 400 - 5\% = 380\text{kg.}$$

$$\text{Actual Output} = 365\text{kg.}$$

$$\text{Standard cost per kg. Of output} = \text{Rs.12,860} \div 380\text{kg.} = \text{Rs.33.84}$$

Computation of variances :

1. Material cost variance	= Standard cost of actual output – Actual cost		
	= (365 x 33.84) – 12,725	=	Rs.373 (A)
2. Material price variance	= (SP – AP) x AQ		
A	= (25 – 27) x 125	=	Rs.250 (A)
B	= (34 – 36) x 275	=	Rs.550 (F)
		=	----- 300 (F) -----
3. Material mix variance	= (RSQ – AQ) X SP		
A	= (140 – 125) x 25	=	375 (F)
B	= (260 – 275) x 36	=	540 (A)
		=	----- 165 (A) -----
4. Material yield variance	= (AY – SY) x Standard cost per kg of output		
	= (365 – 380) x 33.84	=	Rs.508 (A)

Verification :

MCV	= MPV + MMV + MYV
373 (A)	= 300 (F) + 165 (A) + 508 (A)

Illu. 5: Pragati Company manufactures a product P by mixing three raw materials. For every 100kg of output, 125kg of raw material input are used. In April 1997, there was an output of 5,600kg of P. the standard and actual particulars of April, 1997 are as follows :

Raw Material	Standard		Actual	
	Mix	Price per kg.	Mix	Price Per kg.
I	50%	Rs.40	60%	Rs.42
II	30%	Rs.20	20%	Rs.16
III	20%	Rs.10	20%	Rs.12

Calculate all material variances. The actual quantity of material used was 7,000kg.

The Standard input for 5,600kg of output = $\frac{5,600}{100} \times 125 = 7,000\text{kg}$

Solution :

Raw Material	Standard for output of 5,600kg			Actual for output of 5,600kg		
	Qty Kg.	Rate Rs.	Amount Rs.	Qty kg.	Rate Rs.	Amount Rs.
I	3,500	40	1,40,000	4,200	42	1,76,400
II	2,100	20	42,000	1,400	16	22,400
III	1,400	10	14,000	1,400	12	16,800
Total	7,000		1,96,000	7,000		2,15,600

Material cost variance = Standard Cost of Actual Output – Actual Cost
 = Rs.1,96,000 – 2,15,600 = Rs.19,600 (A)

Material price variance = (Standard Price – Actual Price) x Actual quantity

I	= (Rs.40 – 42) x 42,000kg	= Rs.8,400 (A)
II	= (Rs.20 – 16) x 1,400kg	= Rs.5,600 (F)
III	= (Rs.10 – 12) x 1,400kg	= Rs.2,800 (A)

		= Rs.14,000 (A)

Material usage variance = (Standard quantity – Actual quantity) x Standard price

I	= (3,500kg – 4,200) x Rs.40	= Rs.28,000 (A)
II	= (2,100kg – 1,400) x Rs.20	= Rs.14,000 (F)
III	= (1,400kg – 1,400) x 10	= NIL

		= Rs.14,000 (F)

Material Mix variance = (Revised Standard quantity – Actual quantity) x Standard price

I	= (3,500kg – 4,200) x Rs.40	= Rs.28,000 (A)
II	= (2,100kg – 1,400) x Rs.20	= Rs.14,000 (F)
III	= (1,400kg – 1,400) x Rs.10	= NIL

		= Rs.14,000 (A)

$$\begin{aligned} \text{Material yield variance} &= (\text{Standard yield} - \text{Actual yield}) \times \text{Material cost per unit of} \\ &\quad \text{Output} \\ &= (5,600 - 5,600) \times \text{Rs.35} \quad = \text{NIL} \end{aligned}$$

13.7 DIRECT LABOUR COST VARIANCES :

These variances are about the 2nd element of cost, i.e. Labour. We get reminded of all material variance formula when we look at Labour variances. There is a lot of similarity. The first variance is Direct Labour Cost Variance (DLCV). This is difference between standard cost of labour and actual cost of labour. This is like MCV. It's formula is:

$$\text{DLCV} = \text{SC} - \text{AC} = \text{SH} \times \text{SR} - \text{AH} \times \text{AR}$$

SC = Standard cost,

AC = Actual Cost,

SH = SH for actual output,

SR= Standard Rate,

AH = Actual Hours,

AR = Actual Rate.

1. Labour Rate Variance [LRV]:

This is just like Material Price Variance. This is part of the DLCV which is due to difference between standard wage rate and actual wage rate paid. Formula is:

$$\text{LRV} = (\text{SR} - \text{AR}) \text{AH},$$

Where: SR = Standard Rate

AR = Actual Rate,

AH = Actual Hours.

2. Labour Time (or) Total Efficiency Variance : (LTV (or) LEV)

This is again like material quantity variance. This is part of DLCV which is due to difference in standard Hours for Actual output and Actual Hours. The relevant formula is:

$$\text{LTV (or) LEV} : (\text{SH} - \text{AH}) \text{SR where:}$$

SH = Standard Hours,

AH = Actual Hours,

SR = Standard Rate.

3. Labour Efficiency variance : (LEV) :

(1) Idle Time Variance : As per the chart of labour variances, it is portion of the Labour Efficiency (or) Time variance. As there is material loss in the case of materials, there is problem of idle time in the case of Labour. This idle time is due to abnormal reasons viz., non – availability of raw materials, of special kind of labour, break down of Plant & Machinery etc. Formula is:

$$\text{ITV} = \text{Abnormal Idle Hours} \times \text{SR}$$

Note: This is always adverse variance.

(2) Labour Mix variance : This is similar to material mix variance and all the formula of material mix variance can be used by using SH in the place of SQ and RSH (Revised standard hours) in the place of RSQ (or) RQ the relevant formula are :

$$(a) \text{LMV} = (\text{RSH} - \text{AH}) \text{SR}$$

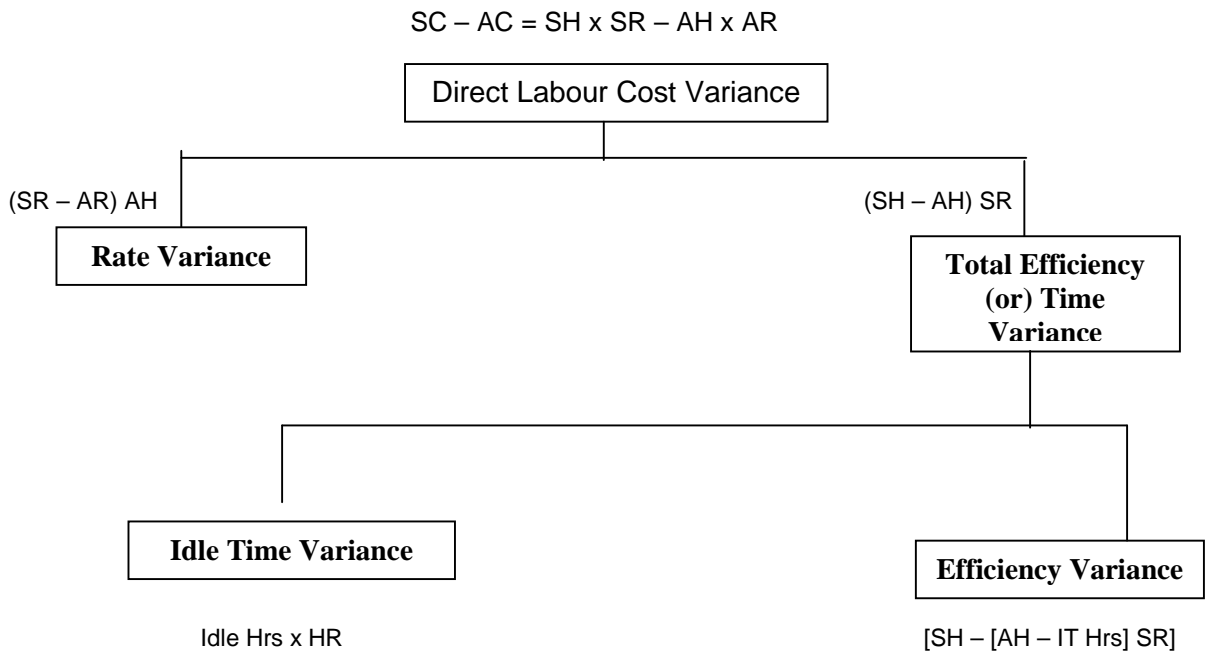
$$(b) \text{LUV} = (\text{SH} - \text{RSH}) \text{SR}$$

From the above it can be understood that the total Labour Efficiency (or) Time variance is a sum of (1) Idle Time variance, (2) Mix variance and (3) usage variance. When LUV is calculated in Labour time variance, there is no need to specially calculate Labour yield variance as it is very much equal to LYU.

(3) Labour yield variance : This is very much similar to MYV. The formula are :

$$(1) \text{LYU} = (\text{AY} - \text{SY}) \text{SC}$$

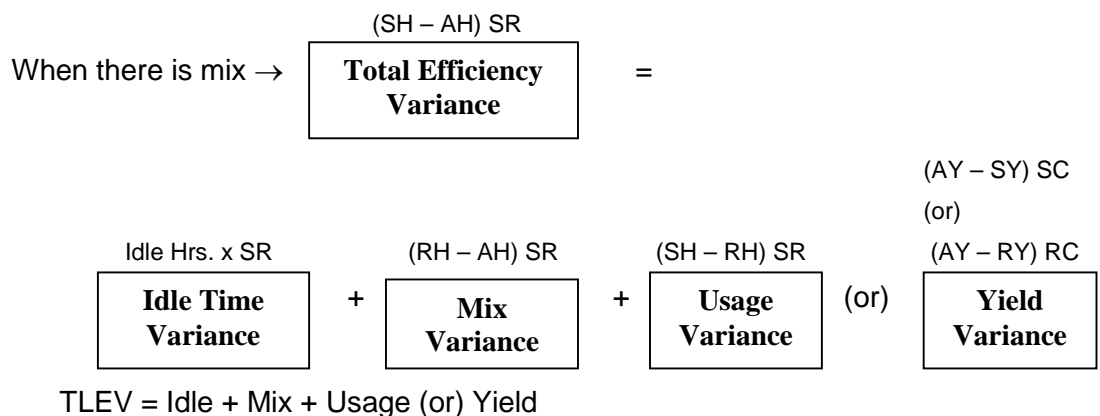
$$(2) \text{LYU} = (\text{AY} - \text{RY}) \text{RC}$$



4. Labour Efficiency Variance : [LEV]

As per the chart, this is part of Total Efficiency variance. When we seek to calculate the real efficiency variance, from out of total Hrs. actually worked, Idle Hours lost due to abnormal condition shall be set a side and with these actual hours, efficiency variance is to be calculated. The formula is :

$$LEV = [SH - (AH - Idle Hours)] SR$$



Verifications:

- (1) LCV = Rate + Total Time (or) Total Efficiency.
- (2) Total Efficiency Variance = Idle Time + Efficiency.
- (3) Total Efficiency Variance = Idle + Mix + usage (or) Yield
- (4) Usage = Yield.

Illu. 6 : Calculate Labour variances from the following data:

Gross Direct wages Rs.30,000

Standard hours 1,600

Standard rate per hour Rs.15

Actual hours paid 1,500

Actual hours paid include hours not worked (abnormal idle time) : 50

Solution :

(i) Labour Cost Variance [LCV] :

$$\begin{aligned} & [\text{Standard Time} \times \text{Standard Rate}] - [\text{Actual Time} \times \text{Actual Rate}] \\ &= [1,600 \times 15] - [1,500 \times 20] \\ &= 24,000 - 30,000 \\ &= \text{Rs.6,000 (Adverse)} \end{aligned}$$

(ii) Labour Rate Variance [LRV] :

$$\begin{aligned} & \text{Actual Time} [\text{Standard Rate} - \text{Actual Rate}] \\ &= 1,500 [15 - 20] \\ &= \text{Rs.7,500 (Adverse)} \end{aligned}$$

(iii) Labour Efficiency Variances [LEV] :

$$\begin{aligned} & \text{Standard Rate} [\text{Standard Time} - \text{Actual Time}] \\ &= 15 [1,600 - 1,450] \\ &= \text{Rs.2,250 (Favourable)} \end{aligned}$$

(iv) Labour Idle time Variance [LITV] :

$$\begin{aligned} & \text{Standard Rate} \times \text{Abnormal Idle Time} \\ &= 15 \times 50 \\ &= \text{Rs.750 (Adverse)} \end{aligned}$$

Reconciliation / Check :

$$\text{LCV} = \text{LRV} + \text{LEV} + \text{LITV}$$

Rs.6,000 (Adverse) = Rs.7,500 (Adverse) + Rs.2,250 (Favourable) + Rs.750 (Adverse)

Illu.7 : With the help of the following data, calculate :

- (i) **Labour Cost Variance,**
 - (ii) **Labour Rate Variance,**
 - (iii) **Labour Efficiency Variance**
- Standard hours : 40 @ Rs.3 per hour**
Actual hour : 50 @ Rs.4 per hour

Solution :

- (i) **Labour Cost Variance [LCV] :**

$$\begin{aligned} & [\text{Standard Time} \times \text{Standard Rate}] - [\text{Actual Time} \times \text{Actual Rate}] \\ &= [40 \times 3] - [50 \times 4] \\ &= 120 - 200 \\ &= \text{Rs.80 (Adverse)} \end{aligned}$$

- (ii) **Labour Rate Variance [LRV] :**

$$\begin{aligned} & \text{Actual Time} [\text{Standard Rate} - \text{Actual Rate}] \\ &= 50 [3 - 4] \\ &= \text{Rs.50 (Adverse)} \end{aligned}$$

- (iii) **Labour Efficiency Variance [LEV] :**

$$\begin{aligned} & \text{Standard Rate} [\text{Standard Time} - \text{Actual Time}] \\ &= \text{Rs.3} [40 - 50] \\ &= \text{Rs.30 (Adverse)} \end{aligned}$$

Reconciliation / Check :

$$\text{LCV} = \text{LRV} + \text{LEV}$$

$$\text{Rs.80 (Adverse)} = \text{Rs.50 (Adverse)} + \text{Rs.30 (Adverse)}$$

Illu.8: From the data given below, calculate labour variances for the two departments :

	Dept. A Rs.	Dept. B Rs.
Actual gross wages (direct)	2,000	1,800
Standard hours produced	8,000	6,000
Standard rate per hour	30 paise	35 paise
Actual hours worked	8,200	5,800

Solution :**(i) Labour Cost Variance [LCV] :**

Standard cost – Actual cost

Dept A :

$$\begin{aligned} & (8,000 \times .30) - \left(8,200 \times \frac{2,000}{8,200} \right) \\ & = 2,400 - 2,000 \\ & = \text{Rs.400 [Favourable]} \end{aligned}$$

Dept B :

$$\begin{aligned} & (6,000 \times .35) - \left(5,800 \times \frac{1,800}{5,800} \right) \\ & = 2,100 - 1,800 \\ & = \text{Rs.300 (Favourable)} \end{aligned}$$

(ii) Labour Rate Variance [LRV] :

Actual Time [Standard Rate – Actual Rate]

Dept A :

$$\begin{aligned} & 8,200 \left[.30 - \frac{2,000}{8,200} \right] \\ & = 2,460 - 2,000 \\ & = \text{Rs.460 (Favourable)} \end{aligned}$$

Dept B :

$$5,800 \left[.35 - \frac{1,800}{5,800} \right]$$

$$\begin{aligned} &= 2,030 - 1,800 \\ &= \text{Rs.}230 \text{ (Favourable)} \end{aligned}$$

(iii) Labour Efficiency Variance [LEV] :

Standard Rate [Standard Time – Actual Time]

Dept. A : 30 [8,000 – 8,200]

$$= \text{Rs.}60 \text{ (Adverse)}$$

Dept B : 35 [6,000 – 5,800]

$$= \text{Rs.}70 \text{ (Favourable)}$$

Reconciliation / Verification :

$$\text{LCV} = \text{LRV} + \text{LEV}$$

Dept A : Rs.400 [Favourable] = Rs.460 (Favourable) + Rs.60 (Adverse)

Dept B : Rs.300 (Favourable) = Rs.230 (Favourable) + Rs.70 (Favourable)

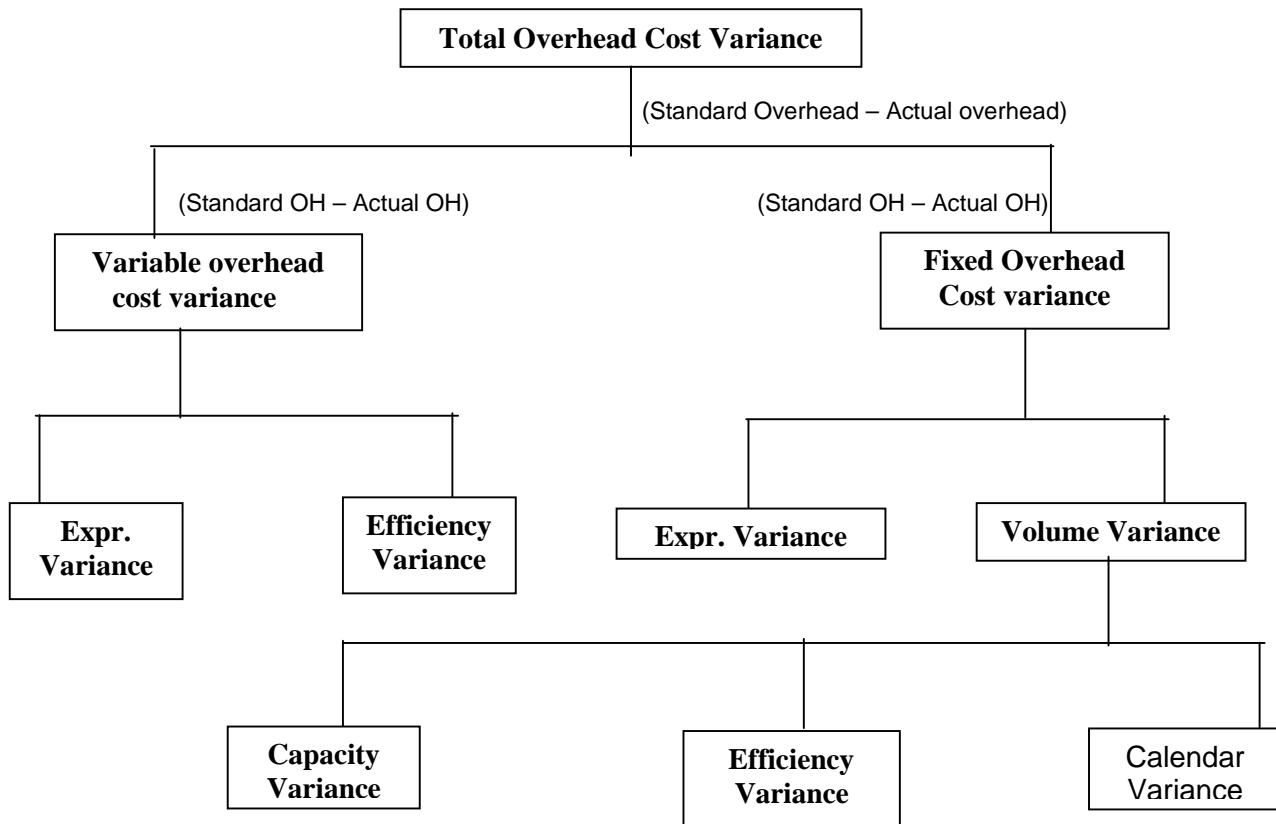
13.8 OVERHEAD VARIANCES (OH Variances)

Overhead is the aggregate of all indirect costs viz., indirect material, indirect labour and indirect expenses. Under cost Accounting, and in standard costing overheads are absorbed (or) recovered from cost units on same suitable basis. Overhead rates of absorption are predetermined in terms of both labour hrs.(or) Machine hrs. and production units. So, the actual output (or) hours worked are multiplied by the predetermined rates of OH absorption in order to find out standard overhead for actual production (or) hours worked and it is compared to actual overheads incurred to find out the variance between standard overhead and actual overhead. Thus, overhead variance analysis is made. Total overhead cost variances can be conveniently divided into:

- (1) Variable overhead variance and
- (2) Fixed overhead variance.

Variable Overhead Variance is further divided into (a) Expenditure variance and (b) Efficiency variance. Similarly, Fixed overhead variance is further divided into (a) Expenditure variance and (b) Volume variance and volume variance is further broken into (i) Capacity Variance (ii) Efficiency Variance and (iii) Calendar Variance. Total overhead cost variance is the difference between Standard overhead and Actual overhead. The whole of this is analysed as under.

Total overhead cost variance = Standard overhead – Actual overhead



1. Variable Overhead Cost Variances:

- 1. Variable overhead Expenditure Variance :** This is the difference between Budgeted Variable overheads for actual output and actual overheads for actual output. The formula is :

$$\text{Variable Overhead Expenditure Variance} = AH (\text{Standard OH Rate} - \text{Actual OH Rate})$$

$$= (\text{Standard OH} - \text{Actual OH})$$

- 2. Variable Overhead Efficiency variance :** (Standard time for Actual production – Actual hours) Standard rate per unit

$$= (\text{Budget overhead} - \text{Standard overhead})$$

This is the difference between Standard Hours for Actual production and actual hours taken, multiplied by Standard Rate per unit.

2. Fixed overhead cost variances :

Fixed overheads are those costs which do not vary with the level of activity but which remain constant for any level. The following are various variances in this category.

(a) Fixed Overhead Expenditure variance : It is that part of the Fixed overhead variance that is due to the difference between budgeted expenditure and actual expenditure.

Fixed Expenditure variance = Budgeted Fixed Overhead – Actual Fixed overhead.

(b) Volume Variance : Fixed Overhead variance may be caused as a result of changes in volume of activity, as per the chart given above. It is the difference between standard overhead and Budgeted overhead. The formula is:

Volume Variance = Standard overhead – Budgeted overhead.

(or)

Recovered Overhead – Budgeted overhead.

(i) Capacity Variance : It is a part of volume variance which is due to under (or) over utilisation of plant and machinery. In terms, formula, it is:

Capacity variance = SR ph (AH – Budgetary Hours)

= SR pu (Standard output – Budgetary Output)

(ii) Efficiency Variance : This variance is again another portion of volume variance. It arises due to increased (or) decreased output due to efficiency (or) in efficiency. The relevant formula is :

Efficiency Variance = SR ph (Standard hours for actual production – Actual hours)

= SR ph (SH – AH)

(iii) Calendar variance : This is also a part of volume variance. This arises due to the difference in Budgeted working days in the budgeted period and actual days in the same budgeted period. The formula is :

Calendar Variance = SR ph/pd x Excess (or) deficit hours / days worked

Checking / Verifications :

1. Total Overhead cost variance = Variance overhead cost + Fixed overhead cost
2. Variable overhead cost variance : Expenditure + Volume
3. Fixed overhead cost variance = Expenditure + volume
4. Volume variance = Capacity + Calendar + Efficiency

Illu 9 : From the following standard and actual data of Product A you are required to calculate : (a) Overhead cost variance, (b) Overhead budget variance, (c) Overhead efficiency variance, (d) Overhead calendar variance, (e) overhead capacity variance, (f) Overhead volume variance.

Standard Data	Actual Production data
Standard hours for the period 2,400	Hours worked 2,500 hours
Standard no. of days 25	Days worked 27
Standard fixed overhead Rs.1,200	Fixed overheads Rs.1,300
Standard production 1,500 units	Actual production 1,600 units

Solution :**(a) Overhead cost variance :**

(Standard overhead cost of actual output – Actual overhead cost)

$$\text{Rs.1,280} - 1,300 = \text{Rs.20 (A)}$$

(b) Overhead budget variance or expenditure variance

Budgeted overhead – Actual overhead

$$\text{Rs.1,200} - 1,300 = \text{Rs.100 (A)}$$

(c) Overhead efficiency variance

(i) Where standard overhead rate per unit is given

(Actual production – Standard production in actual hours) x Standard rate per unit

$$(1,600 - 3,125 / 2 \text{ units}) \times \text{Re.0.80}$$

$$= 75 / 2 \times \text{Re.0.80} = \text{Rs.30 (F)}$$

(ii) Where standard overhead rate per hour is given

(Actual hours for actual production – Standard hours for actual production)
x Standard rate per hour.

$$(2,500 - 2,560) \times \text{Re.}0.50 = \text{Rs.}30 \text{ (F)}$$

(d) Overhead calendar variance

(i) Where standard overhead rate per unit is given

(Revised budgeted quantity i.e., budgeted quantity on the basis of actual working days – Budgeted production) x Standard rate per unit

$$= (1,620 - 1,500) \times \text{Re.}0.80$$

$$= 120 \times \text{Re.}0.80 = \text{Rs.}96 \text{ (F)}$$

(ii) Where standard overhead rate per hour is given

(Budgeted hours on the basis of actual working days – Budgeted hours) x Standard rate per hour

$$= (2,592 - 2,400) \times \text{Re.}0.50 = \text{Rs.}96 \text{ (F)}$$

(e) Overhead capacity variance

(i) Where standard overhead rate per unit is given

(Standard production from actual hours – Revised budgeted quantity for

$$\left(\frac{3,125}{2} - 1,620 \right) \times \text{Re.}0.80$$

$$\frac{3,125 - 3,240}{2} \times \text{Re.}0.80 = \text{Rs.}46 \text{ (A)}$$

actual working days) x Standard rate per unit

(f) Overhead volume variance

(i) Where standard overhead rate per unit is given

(Actual production – Budgeted production) x Standard rate per unit

$$(1,600 - 1,500) \times \text{Re.}0.80 = \text{Rs.}80 \text{ (F)}$$

(ii) Where standard overhead rate per hour is given

(Standard hours for actual production – Budgeted hours) x Standard rate per hour

$$(2,560 - 2,400) \times \text{Re.}0.50 = \text{Rs.}80 \text{ (F)}$$

Working Notes :**(1) Standard overhead cost of actual output**

Total Standard overhead cost	Rs.1,200
Total Standard units	1,500 units
∴ Standard cost per unit	= $1,200 / 1,500 = \text{Re.}0.80$ per unit
∴ Standard cost of actual output 1,600 x 0.80	= Rs.1,280

(2) Standard production in actual hours

If 2,400 hours, the standard production is	= 1,500 units
∴ 2,500 actual hours, the standard production is	= $1,500 / 2,400 \times 2,500 = 3,125 / 2$ units

(3) Standard hours for actual production

If 1,500 units are the output, the standard hours =	2,400
∴ 1,600 units are the output, the standard hours =	$2,400 / 1,500 \times 1,600 = 2,560$ hours

(4) Standard rate per hour

Total overhead cost	Rs.1,200
Total Standard hours	Rs.2,400
∴ Overhead rate per hour =	$1,200 / 2,400 = \text{Re.}0.50$ per hour

(5) Revised budgeted quantity

In 25 working days, the standard production =	1,500 units
∴ In 27 working days, the standard production =	$1,500 / 25 \times 27 = 1,620$ units

(6) Budgeted number of hours

If there are 25 working days, total standard hours are =	2,400
If there are 27 working days, total standard hours are =	$2,400 / 25 \times 27 = 2,592$ hours

Illu.10 : A factory has estimated its overheads for one year at Rs.96,000. The factory runs for 300 days in a year. It works for 8 hours a day. The total budgeted production for the year is 24,000 articles.

Actual data are also given to you as under for the month of April.

Actual overhead	Rs.8,500
Output	2,100 articles
Idle time	4 hours

Calculate : (1) Overhead cost variance, (2) Overhead budget variance, (3) Overhead efficiency variance, (4) Idle Time variance.

Solution :

(1) Overhead Cost Variance :

Formula :

$$\begin{aligned} & \text{Standard overhead cost of actual output} - \text{Actual overhead cost} \\ & = \text{Rs.8,400} - \text{Rs.8,500} = \text{Rs.100 (A)} \end{aligned}$$

(2) Overhead budget variance or expenditure variance

$$\begin{aligned} & \text{Budget overheads} - \text{Actual overheads} \\ & = \text{Rs.8,000} - \text{Rs.8,500} = \text{Rs.500 (A)} \end{aligned}$$

(3) Overhead efficiency variance

(i) Where standard overhead rate per unit is given

$$\begin{aligned} & (\text{Actual production} - \text{Standard production in actual hours}) \times \text{Standard overhead} \\ & \text{rate per unit} \\ & = (2,100 - 1,960) \times \text{Rs.4} = \text{Rs.560 (F)} \end{aligned}$$

(ii) Where standard overhead rate per hour is given

$$\begin{aligned} & (\text{Actual Hours} - \text{Standard hours for actual production}) \times \text{Standard overhead rate} \\ & \text{per hour} \\ & = (196 - 210) \times \text{Rs.40} = \text{Rs.560 (F)} \end{aligned}$$

(4) Idle Time variance :

(i) Where standard overhead rate per unit is given

Formula :

$$\begin{aligned} &\text{Production lost in idle time} \times \text{overhead standard rate per unit} \\ &= 40 \times \text{Rs.4} = \text{Rs.160 (A)} \end{aligned}$$

(ii) Where standard overhead rate per hour is given

Formula :

$$\begin{aligned} &\text{Idle Time} \times \text{overhead standard rate per hour} \\ &= 4 \times \text{Rs.40} = \text{Rs.160 (A)} \end{aligned}$$

Check :

Overhead efficiency variance + Overhead idle time variance = Overhead volume variance

$$\text{Rs.560 (F)} + \text{Rs.160 (A)} = \text{Rs.400 (F)}$$

Overhead volume variance + Overhead budget variance = Overhead cost variance

$$\text{Rs.400 (F)} + \text{Rs.500 (A)} = \text{Rs.100 (A)}$$

Working Notes :

(i) Standard overhead cost of actual output

If monthly production is 2,000 units, overhead cost is Rs.8,000

If monthly production is 2,100 units, overhead cost is

$$8,000 / 2,000 \times 2,100 = \text{Rs.8,400}$$

$$\text{Monthly production} = \frac{24,000}{12} = 2,000 \text{ units}$$

$$\text{Monthly overhead cost} = \frac{96,000}{12} = \text{Rs.8,000}$$

(ii) Standard production in actual hours

Yearly hours 300 days \times 8 = 2,400 hours

Monthly hours = 2,400 / 12 = 200 hours

\therefore Actual hours worked = 200 – 4 = 196 hours

If factory runs 200 hours standard production is 2,000 units

If factory runs 196 hours standard production 2,000 / 200 \times 196 = 1,960 units

(iii) Standard overhead rate per hour

Monthly overhead cost Rs.8,000

Standard hours in a month 200

∴ Rate per hour = $8,000 / 200 = \text{Rs.}40$ per hour.

(iv) Standard overhead rate per unit

Standard units 2,000

Overhead cost Rs.8,000

∴ Rate per unit $8,000 / 2,000 = \text{Rs.}4$ per unit

Illu.11 : A manufacturing company operates a costing system and showed the following data in respect of the month of November.

Actual No. of working days	22
Actual man hours worked during the month	4,300
Number of products produced	425
Actual overhead incurred (Rs.)	1,800

Relevant information from the company's budget and standard cost data are as follows :

Budgeted number of working days per month	20
Budgeted man hours per month	4,000
Standard man hours per product	10
Standard overhead rate per man hour	Rs.0.50

You are required to calculate for the month of November.

- (a) the overhead variance.
- (b) The calendar variance
- (c) The volume variance.

Solution :

(a) Overhead cost variance

Standard overhead cost of actual production – Actual overhead cost

$\text{Rs.}2,125 - \text{Rs.}1,800 = \text{Rs.}325$ (F)

(b) Overhead calendar variance

- (i) where standard overhead rate per unit is given

(Revised budgeted quantity, i.e., budgeted quantity on the basis of actual no. of working days – Budgeted quantity) x Standard rate per unit
 $(440 - 400) \times \text{Rs.}5 = \text{Rs.}200 \text{ (F)}$

- (ii) where standard rate per hour is given
 (Budgeted No. of hours for actual working days – Budgeted hours) x Standard overhead rate per hour
 $(4,400 - 4,000) \times \text{Re.}0.50 = \text{Rs.}200 \text{ (F)}$

(c) Overhead volume variance

- (i) Where standard rate per unit is given
 (Actual production – Budgeted production) x Standard overhead rate per unit
 $(425 - 400) \times \text{Rs.}5 = \text{Rs.}125 \text{ (F)}$
- (ii) Where standard rate per hour is given
 (Standard hours for Actual production – Budgeted hours) x Standard overhead rate per hour
 $(4,250 - 4,000) \times \text{Re.}0.50 = \text{Rs.}125 \text{ (F)}$

Working Notes :

- (1) Standard cost per unit
 $\text{Re.}0.50 \times 10 \text{ hours} = \text{Rs.}5 \text{ per unit}$
- (2) Standard overhead cost of actual production
 $425 \text{ units} \times \text{Rs.}5 \text{ per unit} = \text{Rs.}2,125$
- (3) Revised budgeted quantity
 If 20 are the working days, standard production 400 units
 If 22 are the working days, standard production $400/20 \times 22 = 440$ units
- (4) Budgeted hours for actual working days
 In 20 working days, the standard hours are 4,000
 \therefore In 22 working days, the standard hours are $4,000 / 20 \times 22 = 4,400$ hours
- (5) Standard hours for actual production
 Actual production x Standard hours per unit = $425 \times 10 = 4,250$ hours

13.9 SALES VARIANCES :

There are cases where standard costing systems are so devised as to present the cost variances only, i.e., material, labour and overhead variances. However, many accountants hold the view that a system of standard costing is incomplete if sales variances are not included as a part of comprehensive information presented to management but sales variances are among the more difficult variances from the point of view of calculations.

They can be presented in two different ways and, though the two separate approaches to the overhead variance yield the same result, different results are produced by two methods of calculating sales variances. In spite of the divergence between them, both are very useful for management accountants. The two methods of calculating sales variances are the turnover method and the profit method showing the effects of change in sales on turnover and profit respectively.

Sales variances are the result of two types of changes which may occur in the comparison of budgeted sales with actual sales those due to price and those due to volume. A change in volume may be caused by changes due to either a change in quantity or a change in mix of sales.

A part from the fact there are two methods of calculating variances there are also two techniques which can be used and they are :

- (a) The quantity Technique : This uses quantity of sales as the basis of calculations
- (b) The value Technique : It is concerned with the value of sales as the basis of calculation.

Both these techniques are used in actual practice. Despite the utility of both the techniques it is considered that sales values are more important to management than quantities because values have the capacity to represent heterogeneous products more readily and in a better way than quantities

13.9.1. Variances based on Turnover :

1. **Value Variance** : It is the difference between budgeted sales and actual sales. Representing the total variance, made up of volume and price variances, sales variances are the responsibility of sales manager. The algebraic representation of the variance is –

$$\text{Budgeted Sales} - \text{Actual Sales (or) BS} - \text{AS}$$

2. **Volume Variance** : The variance represents the amount by which standards sales deviate from budgeted sales. It shows the effect of a change in volume on total sales. The formulation for the variance is –

$$\text{Budgeted Sales} - \text{Standard Sales (or) BS} - \text{SS}$$

3. **Price Variance** : The amount by which actual sales deviate from standard sales constitutes price variance. It reveals to management the impact of change in prices on turnover. Symbolically it is represented by –

$$\text{Standard Sales} - \text{Actual Sales (Or) SS} - \text{AS}$$

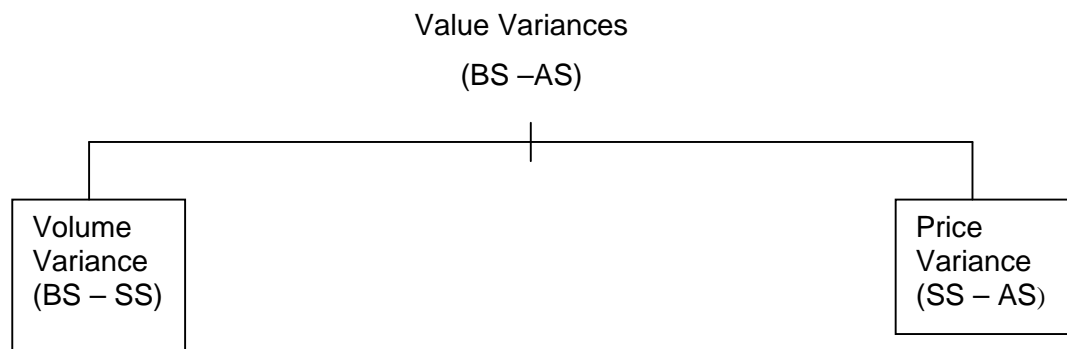
4. **Quantity Variance** : When revised standard sales differ from budgeted sales, it is called quantity variance. This variance shows the position of actual quantity of sales, ad distinct from the mix of sales, in comparison with budgeted or expected sales. The formula for the variance is –

$$\text{Budgeted Sales} - \text{Revised Standard Sales (Or) BS)} - \text{RSS}$$

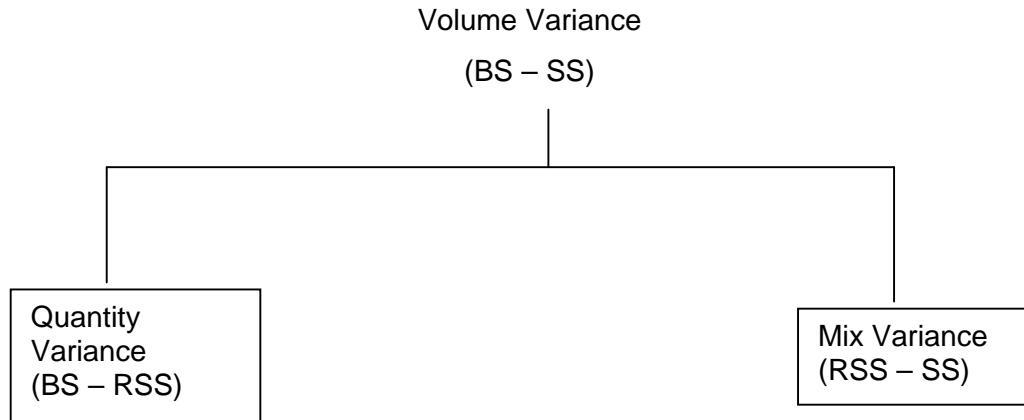
5. **Mix Variance** : The variance consists of the deviation between revised standard sales and standard sales. It highlights the fact that the actual mix of sales has not been in the same ratio as budgeted. The variance is algebraically expressed as –

$$\text{Revised Standard Sales} - \text{Standard Sales (or) RSS} - \text{SS}$$

These variances can be diagrammatically represented as follows



$$\begin{aligned}
 \text{Value Variance} &= \text{Volume variance} + \text{Price Variances} \\
 &= (\text{BS} - \text{SS}) + (\text{SS} - \text{AS}) \\
 &= \text{BS} - \text{SS} + \text{SS} - \text{AS} \\
 &= \text{BS} - \text{AS}
 \end{aligned}$$



$$\begin{aligned}
 \text{Volume variance} &= \text{Quantity Variance} + \text{Mix Variance} \\
 &= (\text{BS} - \text{RSS}) + (\text{RSS} - \text{SS}) \\
 &= \text{BS} - \text{RSS} + \text{RSS} - \text{SS} \\
 &= \text{BS} - \text{SS}
 \end{aligned}$$

13.9.2 Variances based on Profits :

1. **Value Variance** : The difference between budgeted profits and actual profits. Constitutes value variance. Thus, the algebraic representation for the variance would be –

$$\text{Budgeted Profits} - \text{Actual Profits (or) BP} - \text{AP}$$

2. **Price Variance** : It is the difference between standard profit and actual profit. This variance would exactly be the same as Price Variance calculated according to the turnover method owing to the fact that a price change would affect turnover and profit equally. Symbolically, the variance is –

$$\text{Standard profit} - \text{Actual profit (Or) SP} - \text{AP}$$

3. **Volume Variance** : This is the amount by which standard profit differs from budgeted profit. There is an obvious interrelationship between this variance and the volume variance under the turnover method inasmuch as it would equal the percentage of profit on the volume variance calculated under the turnover method. The formula for the variance is –

$$\text{Budgeted profit} - \text{Standard profit (or) BP} - \text{SP}$$

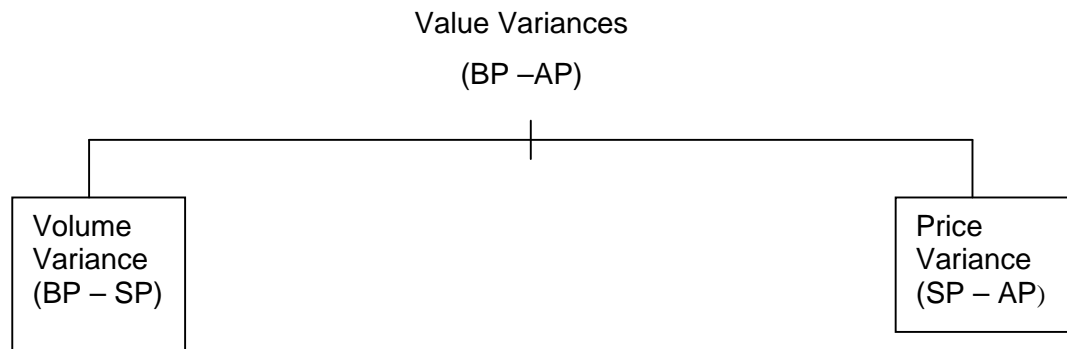
4. **Quantity Variance** : The amount by which revised standard profit deviates from budgetary profit is called Quantity variance. This is also related to the quantity variance under the turnover method as it is equal to the percentage of profit on the latter. The algebraic formulation for the variance is –

$$\text{Budgeted profit} - \text{Revised Standard profit (or) BP} - \text{RSP}$$

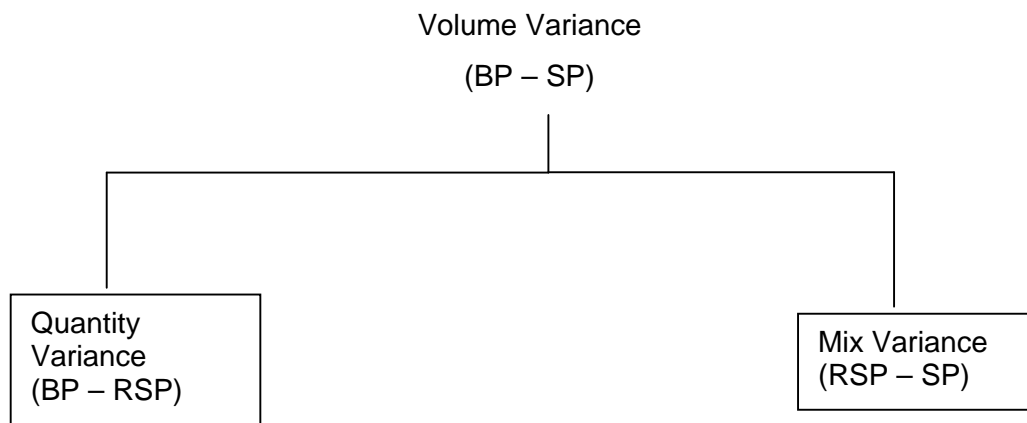
5. Mix variance : The difference between the revised standard profit and standard profit is the mix variance. It can be symbolically express as –

$$\text{Revised Standard Profit} - \text{Standard profit (or) RSP} - \text{SP}$$

The diagrammatic representation of the se variances would be as follows :



$$\begin{aligned}
 \text{Value Variance} &= \text{Volume variance} + \text{Price Variances} \\
 &= (\text{BP} - \text{SP}) + (\text{SP} - \text{AP}) \\
 &= \text{BP} - \text{SP} + \text{SP} - \text{AP} \\
 &= \text{BP} - \text{AP}
 \end{aligned}$$



$$\begin{aligned}
 \text{Volume variance} &= \text{Quantity Variance} + \text{Mix Variance} \\
 &= (\text{BP} - \text{RSP}) + (\text{RSP} - \text{SP})
 \end{aligned}$$

$$= BP - RSP + RSP - SP$$

$$= BP - SP$$

Illu.13 : The budgeted and the actual sales for a period in respect of three products are given below :

Budgeted figures

Product	Quantity	Price	Value
A	1,000	5	5,000
B	750	10	7,500
C	500	15	7,500
	2,250		20,000

Actuals

Product	Quantity	Price	Value
A	1,200	6	7,200
B	700	9	6,300
C	600	14	8,400
	2,500		21,900

Calculate sales variances.

Solution :

Products	Budgeted			Actual			Actual Qty. x Budgeted price Value
	Qty.	Rate Rs.	Value	Qty.	Rate Rs.	Value	
A	1,000	5	5,000	1,200	6	7,200	6,000
B	750	10	7,500	700	9	6,300	7,000
C	500	15	7,500	600	14	8,400	9,000
	2,250		20,000	2,500		21,900	22,000

(1) Sales value variance = Budgeted sales – Actual sales

$$= 20,000 - 21,900$$

$$= 1,900 (F)$$

(2) Sales price variance = (Budgeted price – Actual price) x Actual quantity.

$$\begin{array}{lcl} \text{A} & = (6 - 5) \times 1,200 & = 1,200 \text{ F} \\ \text{B} & = (10 - 9) \times 700 & = 700 \text{ A} \\ \text{C} & = (15 - 14) \times 600 & = 600 \text{ A} \end{array}$$

(3) Sales volume variance = (Budgeted price - Actual quantity) x Budgeted selling price

$$\begin{array}{lcl} \text{A} & = (1,000 - 1,200) \times 5 & = 1,000 \text{ F} \\ \text{B} & = (750 - 700) \times 10 & = 500 \text{ A} \\ \text{C} & = (500 - 600) \times 15 & = 1,500 \text{ F} \\ & & \text{-----} \\ & & 2,000 \text{ F} \\ & & \text{-----} \end{array}$$

(4) Sales mix variance = (Budgeted price per unit of actual mix – Budgeted price per unit of budgeted) x Total Actual quantity

$$\begin{aligned} &= \left(\frac{22,000}{2,500} - \frac{20,000}{2,250} \right) \times 2,500 \\ &= (8.80 - 8.88) \times 2,500 \\ &= 222 \text{ (A)} \end{aligned}$$

(5) Sales quantity variance = (Total actual quantity – Total budgeted quantity) x Budgeted price per unit of budgeted mix

$$\begin{aligned} &= (2,500 - 2,250) \times \frac{20,000}{2,250} \\ &= 2,222 \text{ (F)} \end{aligned}$$

13.10. QUESTIONS

A. Short Answer Questions

1. Define Standard Costing
2. What are the different types of material variances
3. How is material mix variance calculated?
4. Discuss various types of sales variance?
5. How is the overhead volume variance computed.

6. Explain overhead calendar variance.

B. Essay Type Questions

1. What is meant by standard costing? State its main objectives
2. What is variance? Indicate its significance to the Management?
3. Explain the different methods of disposal of variances, stating the suitability of each.
4. Define Standard costing? Explain its merits and demerits.
5. Define and explain briefly the following terms.
 - (a) Wages rate variance (b) Labour Efficiency Variance (c) Labour Mix variance (d) Labour Idle Time variance.

13.11 EXERCISES

1. The standard materials required for producing 100 units is 120 Kg. A standard price of 0.50 paise per kg is fixed and 24,000 units were produced during the period. Actual materials purchased were 3,00,000 kg at a cost of Rs.1,65,000. Calculate material cost variance.

[Ans.: Material Cost Variance 2,92,800 (adverse)]

2. Calculate Material Yield Variance from the following.

Standard rate Rs.25, Standard Yield 2500 Kgs.

Actual yield 2515 kgs.

[Ans.: 375 favourable]

4. Calculate: (a) Material Cost Variance (b) Material price variance (c) Material Usage variance form the following.

Material	Standard		Actual	
	Quantity (Units)	Rate (Rs.)	Quantity (units)	Rate Rs.
X	2,000	20	2,100	19
Y	3,000	30	2,900	31

[Ans.: (a) 200 favourable (b) 800 unfavourable (c) 1,000 favourable]

6. The standard cost of a chemical mixture is :

40% material A at Rs.20 per kg.

60% material B at Rs.30 per kg.

A standard loss of 10% is expected in production. During a period there is used :

90 Kg. Material A at a cost of Rs.18 per kg.

110 kg material B at a cost of Rs.34 per kg.

The weight produced is 182 kg of good product.

Calculate : (i) Material Cost variance (ii) Material price variance (iii) Material mix variance.

[Ans.: (i) 470 (adverse) (ii) 260 (adverse) (iii) 300 (favourable)]

7. From the following find out Labour Mix variance.

(a) Total Weight of standard labour hours 8,000 hours

(b) Total weight of actual labour hours 8,500 hrs.

(c) Standard cost of standard labour mix Rs.32,000

(d) Standard cost of actual labour mix Rs.36,000

[Ans.: 2,000 (unfavourable)]

8. The following data is taken out from the books of a manufacturing company:

Budgeted labour composition for producing 100 units

20 Men @ Rs.15 per hour for 25 hours

30 Women @ Rs.12 per hour for 30 hours

Actual labour composition for producing 100 units

25 Men @ Rs.18 per hour for 24 hours

25 Women @ Rs.13 per hour for 25 hours

You are required to Calculate:

(i) Labour cost variance

(ii) Labour rate variance

(iii) Labour efficiency variance

(iv) Labour mix variance.

[Ans.: (I) 625 A (ii) 2,425 A (iii) 1,800 F (iv) 487.50 A]

9. Calculate fixed overhead variance from the following:

	Standard	Actual
Fixed Overheads	Rs.8,000	Rs.8,500
Output in units	4,000 units	3,800 units

[Ans.: 900 adverse]

10. From the following particulars calculate :

- (i) Variable overhead variance
- (ii) Fixed overhead variance
- (iii) Volume variance and
- (iv) Expenditure variance

Particulars	Standard	Actual
Fixed Overheads	Rs.8,000	Rs.8,500
Variable overheads	Rs.12,000	Rs.11,200
Output in units	4,000	3800

[Ans.: (a) 200 favourable (b) 900 unfavourable (c) 400 unfavourable (d) 500 unfavourable]

11. From the following data, calculate overhead variance.

Budgeted Overheads :		
Fixed	Rs.6,000	
Variable	Rs.4,000	Rs.10,000
Budgeted output		Rs.10,000
Budgeted hours		5,000
Actual overheads :		
Fixed	5,000	
Variable	5,000	10,000
Actual output (units)		8,000
Actual hours worked		5,000

[Ans.: (1) Overhead Cost Variance 2,000 (adverse) (2) Variable Overhead variance 1,800 (adverse) (3) Fixed overhead variance 200 adverse]

12. The following table shows the budgeted and actual sales of M/s. Sphinx Ltd. Salem for 1986-87. Compute price, volume and mix variances of sales.

Products	Budget			Actual		
	Units	Price per unit Rs.	Total Rs.	Units	Price per unit Rs.	Total Rs.
A	3,000	30	90,000	3,500	35	1,22,500
B	2,000	20	40,000	2,400	25	60,000
C	1,000	10	10,000	500	5	2,500
Total	6,000		1,40,000	6,400		1,85,000

**[Ans.: Sales Volume variance 18,000 (f); Sales Price Variance : Rs.27,000 (f);
Sales Quantity Variance Rs.9,333 (f); Sales mix variance Rs.8,667 (f)]**

13.12. SUGGESTED READINGS

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Chapter – 14

Cost – Volume – Profit Analysis

Objectives :

After reading this unit you should be able to

- **Know about CVP Analysis**
- **Understand the break even analysis**
- **Calculate the break even point, profit volume ratio, and margin of safety**
- **Present the break even chart**
- **understand the managerial uses of marginal costing**

Structure**14.1 Introduction****14.2 Break Even Analysis****14.3 Graphic method of Break – even Analysis (or) Break – even chart:****14.4 Questions****14.5 Exercises****14.6 Suggested Readings****14.1 INTRODUCTION :**

Cost – Volume – profit analysis is an important technique for knowing the relationship among costs, volume and Profits. Profit depends upon several factors. Most important factors are : Cost of production, Volume of Activity / sales, and the sales of the products. Cost – Volume – Profit analysis is an important tool used to plan for profit in the business organisation.

If it is closely observed, it becomes evident to us that all the variables in Cost – Volume – Profit are inter–dependent. Profit depends upon sales and selling price depends largely on cost of sales and cost of sales depends upon volume of production. Thus, Cost – Volume – Profit analysis gives an opportunity to the management to have good control over business.

Several important critical questions as under mentioned may be answered with the help of Cost – volume – profit analysis.

- (1) To avoid losses, how much sales should be made?
- (2) To make a desired profit, how much should be produced / sold ?
- (3) What is the best sales / Production mix?
- (4) Is making better than buying (or) vice – versa?

14.2 BREAK EVEN ANALYSIS (BE Analysis)

Both Cost volume profit analysis and break even analysis are often synonymously used as Break even analysis is the most widely used concept and widely known form of Cost volume profit analysis. Break Even analysis refers to the study of relationship among different items viz., cost, volume and profit. Besides this, Break even analysis also refers to the techniques of identifying that level of activity at which, total revenues equal the total expenses. It is a point where there is “no profit, no loss”.

Before we go for Break Even Analysis, features of marginal costing, assumptions, basics of marginal costing viz., marginal cost equation, contribution, P / V ratio, margin of safety concepts etc are dealt with.

14.2.1. Profit Volume Ratio (P/v (or) C/s Ratio)

It is also called – contribution Ratio (or) margin Ratio. It expresses the relation of contribution to sales. Often, it is expressed as:

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

Where : Contribution = Sales – Variable cost

$$\therefore P / V \text{ ratio} = \frac{S - V}{S} = \frac{C}{S} = \frac{F + P}{S} =$$

$$P / V = \frac{\text{Change in profit}}{\text{Change in Sales}} \text{ (or) } \frac{\text{Change in Contribution}}{\text{Change in Sales}}$$

$$P/V \text{ in a \%} = C / S \times 100$$

Importance of P/ V :

Higher and higher the P/v ratio, the higher and higher will be the profit and **Vice – versa**. So, every management seeks to increase the P/ V ratio. The possibilities to increase the P/ V are:

- (a) Increasing the selling price p. u.
- (b) Reducing the VC.
- (c) Shifting to those products having higher P/v ratio.

Illu.1 : From the following data, calculate : P/V, FC, and Sales volume to earn a desired profit of Rs.40,000/-

Sales :	Rs.1,00,000
Profit :	Rs.10,000
Variable costs :	70%

Sales = Rs.1,00,000

Variable cost = 70%

$$= \frac{1,00,000 \times 70}{100}$$

$$= \mathbf{Rs.10,000.}$$

$$(1) \text{ P/ V Ratio} = \frac{S - V}{S} = \frac{1,00,000 - 70,000}{1,00,000}$$

$$= 30,000 / 1,00,000 \times 100 = 30\%$$

(2) FC = ?

$$\text{Equation} = S - V = F + P$$

$$F + P = S - V$$

$$F = S - V - P$$

$$= 1,00,000 - 70,000 - 10,000$$

$$= 2,00,000$$

(3) Sales to earn a profit of Rs.40,000

$$\text{Equation} = F + P / P/v$$

$$= 2,00,000 + 40,000/30\%$$

$$= 2,40,000 \times 100/30 = \mathbf{Rs.8,00,000}$$

14.2.2. Margin of Safety :

Margin of safety is the difference between total sales and BEP for sales. Lower Break – even point for sales means higher safety and **Vice – Versa**.

The relevant formula for margin of safety (M/S) is :

$$\begin{aligned} M/S &= \text{Actual Sales} - \text{Break – even Sales} \\ &= \text{AS} - \text{BEP for sales} \end{aligned}$$

M/S can be calculated in terms of P/V ratio also

$$M/S = \text{Profit} \div P/V \text{ ratio}$$

$$M/S \text{ as a percentage} = M/S / \text{Total Sales} \times 100$$

Significance of M/S :

Business goes to make profit still, even if, sales drop substantially when M/S is relatively higher while, a small drop in sales may throw the business out of gear, when M/S is relatively less. Hence, the aim of business is always to see that M/S. is as high as possible.

Illu.2 : From the following, calculate M/S and percentage there of.

Actual Sales :	Rs.5,00,000
B. E. Sales :	Rs.4,00,000

Solution:

$$\begin{aligned} M/S &= \text{Actual Sales} - \text{BEP for Sales} \\ &= \text{Rs.5,00,000} - \text{Rs.4,00,000} \end{aligned}$$

$$M/S = \text{Rs.1,00,000}$$

$$\begin{aligned} \% \text{ of M/S} &= \frac{M/S}{\text{Actual Sales}} \times 100 \\ &= \frac{1,00,000}{5,00,000} \times 100 = 20\% \end{aligned}$$

It means that margin of safety is 20% and BEP for sales is occurring at 80% of Actual sales.

Illu.3 : Calculate Margin of safety and the amount of actual sales from the following :

(a) Profit	Rs.10,000
(b) P/V	50%
(c) BEP Sales	Rs.20,000

$$(1) M/S = P \div P/V =$$

$$= \frac{10,000}{50} = \frac{10,000 \times 100}{50}$$

$$= \frac{100}{100}$$

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

$$(2) \text{ Actual Sales} = M/S + \text{BEP Sales}$$

$$[M/S = AS - \text{BEP for sales}]$$

$$= 20,000 + 20,000 = \text{Rs.40,000}$$

Illu.4 : Calculate : (a) Contribution PU, (b) BEP (c) M/S. (d) Profit (e) Volume of sales to earn a profit of Rs.24,000.

When : Total VCs = Rs.30,000

Total Sales = Rs.60,000

Units Sold : 20,000

Total fixed costs : Rs.18,000

Solution :

(a) Contribution PU:

$$C = S - V = 60,000 - 30,000 = 30,000$$

$$C \text{ p. u} = \text{Rs.30,000} \div 20,000 \text{ units}$$

$$= \text{Rs.1-50/-}$$

(b) BEP Sales = $F \div P/V = FS / S - V$

$$= \frac{18,000}{60,000 - 30,000} = \frac{18,000}{30,000}$$

$$= \frac{18,000}{60,000}$$

$$= \frac{18,000 \times 60,000}{30,000} = \text{Rs.36,000}$$

(c) M/s : AS – BEP Sales

$$60,000 - 36,000 = \text{Rs.24,000/-}$$

$$(d) \text{ Profit} = F + P = S - V$$

$$\therefore P = S - V - F$$

$$= 60,000 - 30,000 - 18,000 = \text{Rs.}12,000/-$$

(e) Volume of Sales to earn a profit of Rs.24,000/-

$$= \frac{F + P}{S - V} = \frac{18,000 + 24,000}{30,000}$$

$$\frac{S}{S} = \frac{42,000}{60,000}$$

$$= \frac{42,000 \times 60,000}{30,000} = \text{Rs.}84,000$$

Units required to earn a profit of Rs.24,000 = $84,000 / 3 = 28,000$ units

Illu.5 : The following data relates to two periods.

Period	Sales Rs.	Profit Rs.
I year ending 31-12-2004	1,00,000	15,000
II year ending 31-12-2005	1,20,000	23,000

Calculate : (a) P/V (b) FC (c) BEP.

Solution :

$$(a) \text{ P/ V ratio} = \frac{\text{Change in profit}}{\text{Change in sales}} \times 100$$

$$= \frac{8,000}{20,000} \times 100 = 40\%$$

(b) FC calculation :

Period I : Sales : 1,00,000 Rs.

$$P/ V = 40\%$$

$$C = \frac{1,00,000 \times 40}{100} = 40,000/-$$

$$F + P = C$$

$$F = C - P = 40,000 - 15,000 = 25,000/-$$

(c)

$$\text{BEP} = \frac{F}{P/V} = \frac{25,000}{\frac{40}{100}} = \frac{25,000 \times 100}{40}$$

$$= \frac{1,25,000}{2} = 62,500/-$$

14.3. GRAPHIC METHOD OF BREAK – EVEN ANALYSIS (OR) BREAK – EVEN CHART:

The oft quoted Break even point (BEP) can be also depicted with the help of a graph. Importantly a break even chart is a graphic Representation of Marginal costing. A vivid description is portrayed about relations among : costs, volume of activity and profits. Besides this, it also reveals the estimated profit / Loss at various levels of output. The BEP, as is indicated in the chart is the point at which the total cost line and total sales line cut with each other.

14.3.1 Hints for preparation of BEA chart :

The following are important points :

- (1) On the X – axis, units of production or sales are measured.
- (2) Costs and sales Revenues are measured on Y – axis.
- (3) Fixed cost line is drawn as a line parallel to X – axis. This implies that fixed cost is common for all levels of output.
- (4) Variable costs of different levels of output are plotted over fixed costs line. The variable cost line is joined to F. cost line at zero level of activity. Since V. C. line is drawn above FC line, it is called total cost line.
- (5) Sales revenues for various levels are plotted and a line is drawn joining all the points. This is sales line.
- (6) The point of intersection of sales revenue and total cost lines is the BEP.
- (7) No. of units to be produced at BEP can be ascertained by drawing a perpendicular to X – axis from the point of intersection.
- (8) Similarly, cost of BEP units to be produced can be ascertained by drawing a perpendicular to Y – axis from the point of intersection.
- (9) The area below BEP is called loss area and the area above BEP is called profit area.

Illu.6 : From the following information, prepare Break Even Chart showing BEP.

Budgeted output	:	80,000 units
Fixed Expenses	:	4,00,000 Rs.
Variable cost p. u.	:	Rs.10/-
Selling price p. u.	:	Rs.20/-

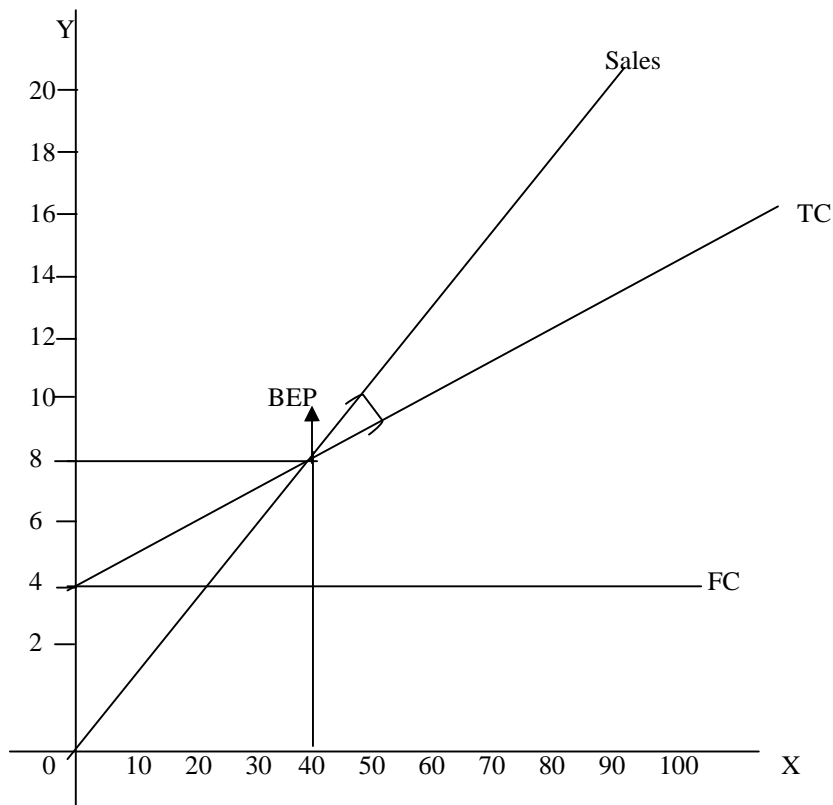
Solution:

Total Cost and Sales

Output units	Variable cost Rs.	Fixed Cost Rs.	Total Cost Rs.	Sales Rs.
20,000	2,00,000	4,00,000	6,00,000	4,00,000
40,000	4,00,000	4,00,000	8,00,000	8,00,000
60,000	6,00,000	4,00,000	10,00,000	12,00,000
80,000	8,00,000	4,00,000	12,00,000	16,00,000

From the above table, BEP is 40,000 units, as, the total cost Rs.8,00,000 is equal to Rs.8,00,000 of sales as at BEP, Cost is just equal to revenue.

Break Even Chart



Out put in thousands

Fixed cost line runs parallel to X-axis. Total cost line is drawn from 4 lakhs on Y axis. Sales line is drawn from 0. Both TC and sales line cut each other at 40,000 units of output (Rs.8,00,000) and hence, B.E.P. from the graph and chart is 40,000 units of output at a cost of Rs.8,00,000.

**Illu.7 : How do we calculate Break even point algebraically (or) arithmetically?
[BEP]**

The BEP can be calculated in terms of :

- (a) Units of Sales / output
- (b) Sales value and
- (c) A percentage

Solution:

(a) BEP in units of output / sales :

$$\begin{aligned} \text{BEP Units} &= \frac{\text{Total Fixed cost}}{\text{Selling price P. u.} - \text{Variable cost p.u.}} \\ &= \frac{\text{TFC}}{\text{S} - \text{V}} = \frac{\text{TFC}}{\text{Contribution pu}} = \frac{\text{FC}}{\text{C (pu)}} \end{aligned}$$

$$= \frac{\text{FC} \times \text{S}}{\text{S} - \text{V}} = \frac{\text{FC} \cdot \text{S}}{\text{C}}$$

(b) BEP (In Rupees) =

$$= \frac{\frac{\text{FC}}{\text{Sales} - \text{Variable cost}}}{\text{Sales}} = \frac{\text{FC}}{\text{S}}$$

(c) BEP as a % capacity of Sales :

$$\text{BEP \%} = \frac{\text{BEP for output}}{\text{Total output}} \times 100 \quad (\text{or}) \quad \frac{\text{BEP for sales}}{\text{Total Sales}} \times 100$$

$$\text{With P/V ratio} = \frac{F}{P/V} = \frac{F}{\frac{S - V}{S}} = \frac{FS}{S - V}$$

With the help of BEP for units and sales, the volume of output (or) Sales, for a desired profit can be easily calculated. Since the profit at BEP is zero, the desired profit is to be added to the existing Fixed cost, in order to calculate the volume of output (or) sales. The relevant formula for this are :

- (1) Units to earn a desired profit = $F + P / C$ (pu)
- (2) Sales to earn a desired profit = $F + P / \text{P/V ratio}$

Illu.8 : From the following particulars, find out

- (i) **BEP for units and Sales value**
- (ii) **No. of units to earn a desired profit of Rs.90,000/-**

- ◆ **Fixed factory overheads : Rs.60,000**
- ◆ **Fixed selling overheads : Rs.12,000**
- ◆ **Variable Manufacturing cost p. u. Rs.12/-**
- ◆ **Variable selling cost p. u. Rs.3/-**
- ◆ **Selling price p. u. Rs.24/-**

Solution :

- (i) **BEP (units) =**

$$= \frac{F}{C \text{ pu}} = \frac{F}{(S - V) \text{ pu}}$$

Total Fixed cost = Factory Overhead + Selling overhead = 60,000 + 12,000 = Rs.12,000

Selling price : 24, Variable cost = Manufacturing Cost + Selling Cost
= 12 + 3 = 15/-

∴ S = 24, V = 15

$$\therefore \text{BEP (units)} = \frac{F}{S - V \text{ (pu)}} = \frac{72,000}{24 - 15} = 8,000 \text{ units}$$

$$(ii) \quad \text{BEP (Sales)} = \text{BEP units} \times \text{Selling price p. u} \\ = 8,000 \times 24 = 1,92,000 \text{ Rs.}$$

(iii) No. of units to earn a desired
Profit of Rs.90,000

$$= \frac{F + P}{(S - V) \text{ pu}} = \frac{72,000 + 90,000}{24 - 15} = \frac{1,62,000}{9}$$

= **18,000 units**

**Illu.9 : From the following, calculate (a) P/V ratio (b) BEP (Sales) with P/V
(c) Sales required to earn a profit of Rs.4,50,000/- Fixed expenses : Rs.90,000.**

Variable cost p. u :

Material Rs.5/-

Labour Rs.2/-

Direct Overhead : 100% on Labour

Selling price p. u : Rs.12/-

Solution :

$$(1) \quad \text{P/ V ratio} = \frac{S - V}{S} =$$

$$S = 12, V = \text{Material Cost} + \text{Labour Cost} + \text{Direct Overhead} = \\ = 5 + 2 + 2 = 9/-$$

$$\therefore \text{P/ V} = \frac{S - V}{S} = \frac{12 - 9}{12} = \frac{3}{12} = \frac{1}{4} \text{ (or) } 25\%$$

$$(2) \quad \text{BEP (Sales) with P/ V} = \frac{F}{\text{P/ V}} = \frac{F}{\frac{S - V}{S}} = \frac{FS}{S - V}$$

$$= \frac{90,000}{1/4} = \frac{90,000 \times 4}{1} = \text{Rs.}3,60,000$$

$$(3) \quad \text{Sales required to earn a profit of Rs.4,50,000} = \frac{F + P}{\text{P/V}} = \frac{90,000 + 4,50,000}{1/4}$$

$$= \frac{5,40,000 \times 4}{1} = 21,60,000 \text{ Rs.}$$

14.3.2. Cash break – even point :

It is the point where the volume of sales and cash realisation there of will be just sufficient to meet immediate cash liabilities. While calculating this point, cash fixed costs (excluding fixed share of depreciation, deferred expenses etc.) and cash contribution (after making adjustments for variable share of depreciation) are considered. This point enables management in determining the level of activity below which, the liquidity position of the company would be adversely affected. Thus, cash BEP is there in marginal costing.

$$\text{Cash BEP (units)} = \frac{\text{Cash Fixed cost}}{\text{Cash contribution pu}}$$

Illu.10 : Calculate cash BEP, from the following :

- ◆ Selling price Rs.40/-
- ◆ Variable cost per unit : 30/-
- ◆ Depreciation included in above p. u Rs.5/-
- ◆ Fixed cost Rs.1,00,000
- ◆ Depreciation included in fixed cost Rs.25,000

Solution:

- ◆ Cash BEP = Cash Fixed Cost / Cash contribution pu
- ◆ Cash fixed cost = Rs.1,00,000 – 25,000 = Rs.75,000/-
- ◆ Cash contribution (pu) = (40 – (30 – 5)) = Rs.15/-
- ◆ C. BEP (units) = C.F. / C. C. (pu) = 75,000 / 15 = 5,000 units
- ◆ Cash BEP (units) = 5,000 units
- ◆ Cash BEP (Sales) = 5,000 x 40 = 2,00,000 Rs.

Illu.11 : Calculate cash BEP units / sales from the following :

- ◆ S.P. Pu : Rs.50/-
- ◆ VC pu. Rs. 40/-
- ◆ Depreciation included in VC put = Rs.10/-
- ◆ Fixed cost : Rs.2,00,000 and
- ◆ Depreciation included in FC : Rs.40,000

Solution:

$$\begin{aligned}\text{Cash BEP (Units)} &= \frac{\text{Cash Fixed cost}}{\text{Cash contribution pu}} \\ &= \frac{2,00,000 - 40,000}{(50 - (40 - 10))} = \frac{1,60,000}{20} \\ &= 8000 \text{ units}\end{aligned}$$

$$\text{Cash BEP in sales} = 8000 \times 50 = \text{Rs.}4,00,000/-$$

Composite BEP:

It is a break-even point for a company producing several products.

$$\text{Composite BEP (for sales)} = \frac{\text{Total Fixed Cost}}{\text{Composite P/V}}$$

$$\text{Composite P/V (in a \%)} = \frac{\text{Total Sales} - \text{Total VC}}{\text{Total Sales}} \times 100$$

Illu.12 : Calculate composite P/V and BEP (Sales) from the following:

Products	Sales value Rs.	Variable cost Rs.
X	20,000	10,000
Y	40,000	14,000
Z	60,000	36,000

Total Fixed Cost : Rs.50,000

Solution:

$$\begin{aligned}\text{Composite P/ V} &= \frac{\text{Total contribution}}{\text{Total Sales}} \\ &= \frac{(20,000 - 10,000) + (40,000 - 14,000) + (60,000 - 36,000)}{20,000 + 40,000 + 60,000} \\ &= \frac{10,000 + 26,000 + 24,000}{1,20,000} = \frac{60,000}{1,20,000} \times 100 = 50\%\end{aligned}$$

= Rs.1,00,000

$$\text{Composite BEP} = \frac{\text{TF}}{\text{Total P/V}} = \frac{50,000}{\frac{50}{100}} = \frac{50,000 \times 100}{50}$$

Advantages of BE charts:

- It is a simple and understandable form about the relations among cost, volume and profit.
- It is an invaluable aid to management for decision making
- This chart can analyse the profitability of different products.
- BE chart is tool to forecast business outcomes
- This chart shows profitability at different levels of output.

Limitations:

- B.E. Chart is highly assumptious.
- It provides limited data
- B. E. chart does not suit to all factors influencing business.
- B. E. chart by itself does not suggest any remedy as such. etc.

14.4 QUESTIONS

A. Short Answer Questions

1. What is break even point?
2. What is margin of safety?
3. What is profit volume ratio?
4. What is cash break even point?

B. Essay type questions :

1. Discuss the applications of the marginal costing technique
2. Explain cost volume profit analysis
3. Explain the uses of break even analysis in profit planning
4. What assumptions are made to construct a simple break even chart?
5. Explain the utility of break even analysis in Managerial Decisions

6. What are the managerial uses of break even analysis?
7. What do you mean by P/V ratio? What are its uses?

14.5 EXERCISES

1. Find out Profit volume ratio from the following:

Sales Rs.60,000; Break even Sales Rs.40,000; Fixed Costs Rs.10,000

[Ans.: 25%]

2. The following figures of sales and profits of two periods are available in respect of a concern:

Period	Sales (Rs.)	Profit (Rs.)
2002	1,00,000	15,000
2003	1,20,000	23,000

You are required to find out:

- (i) Break even point
- (ii) Sales required to earn a profit of Rs.30,000.

[Ans.: (i) Rs.62,500; (ii) Rs.1,37,500]

3. A confectioner markets three products, all of which require sugar. His average sales, cost of sales and sugar consumption are as follows:

	Product X	Product Y	Product Z	Total
Sales	Rs.10,000	Rs.12,000	Rs.8,000	Rs.30,000
Cost of sales	Rs.6,000	Rs.8,000	Rs.5,600	Rs.19,600
Sugar requirement	500kg	800kg	240kg	1,540kg

Due to government restrictions his sugar quota has been reduced to 1405kgs.

Suggest a sales mix which would yield maximum profit to the company under the given circumstances.

[Ans.: Contribution : X Rs.4,000; Y Rs.3,325; Z Rs.3,000 = Rs.10,325]

4. From the following particulars, calculate:

Break even point in terms of Sales value and in units.

	Rs.
Fixed Factory overhead	60,000
Fixed selling overhead	12,000
Variable Manufacturing cost per unit	12
Variable selling cost per unit	3
Selling price per unit	24

[Ans.: Break even points = 8,000 units]

5. From the following data, calculate:

(i) P. V. Ratio

(ii) Break – even sales

(iii) Sales required to earn a profit 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.

[Ans.: (a) 25% (b) Rs.3,60,000; (c) Rs.21,60,000]

6. From the following information, ascertain by Break even point how much the values of sales must be increased by the company.

Sales Rs.3,00,000

Fixed cost Rs.2,00,000

[Ans.: Break even Sales Rs.4,50,000]

7. The sales turnover and profit during two years were as

Year	Sales Rs.	Profit Rs.
2002	1,40,000	15,000
2003	1,60,000	20,000

You are required to calculate:

(a) P / V ratio

(b) Sales required to earn a profit of Rs.40,000

(c) Profit when sales are Rs.11,20,000

[Ans.: (a) 25% (b) Rs.2,40,000 (c) Rs.2,60,000]

8. The following data are available from the records of a company.

Sales Rs.60,000

Variable cost Rs.30,000

Fixed cost Rs.15,000

You are required to:

(a) Calculate the P /V ratio, Break – even point and margin of safety to this level.

(b) Calculate the effect of 10% increase in sale price

(c) Calculate the effect of 10% decrease in sale price.

[Ans.: (a) P.V. Ratio 50% ; Break even point Rs.30,000; Margin of Safety Rs.30,000;

(b) P.V. Ratio = 54.55%; Break Even point Rs.27,500; Margin of Safety Rs.38,500

(c) P.V. Ratio = 44.44%; Break Even point Rs.33,750; Margin of safety Rs.20,250]

9. Sales of a product amounts to 300 units per month at Rs.15 per unit. Fixed overhead cost is Rs.600 per month and variable cost is Rs.9 per unit. There is a proposal to reduce prices by 15 per cent. Calculate present and future P / V ratio. How many units must he sold to earn the present total profits?

[Ans.: P.V. Ratio (present) 40%; (future) 29.41%; selling price is reduced by 15% = 480 units; Profit Rs.1,200]

10. From the following information calculate:

(a) P / V Ratio

(b) Break – even point

(c) Margin of safety

Total sales Rs.3,60,000

Selling price, per unit Rs.100

Variable cost, per unit Rs.50

Fixed cost Rs.1,00,000

(d) If the selling price is reduced to Rs.90, by how much is the margin of safety reduced?

[Ans.: Profit Rs.80,000; (a) 50% (b) Rs.2,00,000 (c) Rs.1,60,000; (d) Contribution Rs.40; P.V. ratio 44.44%; Break even point Rs.2,25,000; Margin of Safety Rs.1,35,000]

14.6 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
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4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
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Chapter – 15

Marginal Costing and Managerial Decisions

Objectives :

After reading this unit we should be able to :

- Know the meaning of absorption costing
- Understand the meaning and definition of marginal costing
- Analyse the differences between absorption costing and marginal costing

Structure :

15.1 Introduction

15.2 Absorption Costing

15.3 Marginal Costing

15.4 Advantages of Marginal Costing

15.5 Limitations of Marginal Costing

15.6 Difference between Absorption Costing & Marginal Costing

15.7 Managerial Uses / applications of Marginal Costing

15.8 Questions

15.9 Exercises

15.10 Suggested Readings

15.1 INTRODUCTION :

The cost of a product (or) a process can be ascertained any one of the following Techniques.

- (i) Absorption Costing
- (ii) Marginal Costing

15.2 ABSORPTION COSTING :

Absorption costing is also known by several names viz., Traditional, Conventional, Full cost method etc. In this system, all costs (both variable and fixed costs) without exception are charged to the products. Variable costs are directly assigned to the products while, fixed costs are apportioned on a suitable basis over various products produced during a period.

Illu.1 : Galaxy Co. is manufacturing x, y, z products. Their costs are as under.

Particulars		X Rs.	Y Rs.	Z Rs.
Direct Material p.u.	Rs.	3	4	5
Direct Labour	Rs.	2	3	4
Selling Price	Rs.	10	15	20
Output	(Units)	1,000	1,000	1,000

Total overheads are Rs.6,000 out of which Rs.3,000 are fixed and the rest are variable. It is decided to apportion these costs over different products in the ratio of output. You are required to prepare a statement showing cost of each product and profit as per absorption costing.

Solution :

Statement of Cost and Profit (As per Absorption Costing Technique)

Particulars	1,000 units		1,000 units		1,000 units	
	p.u Rs.	Total Rs.	P.U. Rs.	Total Rs.	P.U. Rs.	Total Rs.
Direct material	3	3,000	4	4,000	5	5,000
Direct labour	2	2,000	3	3,000	4	4,000
Overheads :						
Variable Overheads	1	1,000	1	1,000	1	1,000
Fixed Overheads	1	1,000	1	1,000	1	1,000
Total Cost	7	7,000	9	9,000	11	11,000

Profit	3	3,000	6	6,000	9	9,000
Selling Price	10	10,000	15	15,000	20	20,000

Total Profit = Rs.3,000 + Rs.6,000 + Rs.9,000 = Rs.18,000

The system of absorption costing suffers from several limitations. It holds that prices are a function of costs. The demand side of the product is totally forgotten. Only history is considered for pricing the product. Charging fixed overheads on an important suitable base brings all the problems. These costs are to be invariably incurred whether there is production (or) no production. This means that cost of the product depends not only upon expenses incurred but also upon volume of activity.

For example, if the costs of material and labour for a unit is Rs.3 and Rs.4 respectively and the fixed costs are Rs.2,000 and the volume of output is 1,000 units. The total cost of production is as under :

	Rs.
Direct material costs	3,000
Direct labour costs	4,000
Fixed Overheads	2,000
Total Costs	9,000

The cost per unit comes to Rs.9. In case, the output goes down to 800 units the cost of production will be as follows.

	Rs.
Direct material costs	2,400
Direct labour costs	3,200
Fixed Overheads	2,000
Total Costs	7,600

The cost per unit comes to Rs.9.50 p.u. From the above it is clear that the cost of the product has gone up by Rs.0.50 ps. P.u. not because of any increase in DMC or DLC but only because of a lower volume of output. This seems to be a little bit illogical.

Hence, some people argue that Fixed Overheads should not be considered while computing the costs of products. They should rather be charged against the total Fund of contribution arising as a surplus over variable costs. Marginal costing is a tool and

appropriate technique explained below and is a technique of cost accounting which deals with this concept.

15.3 MARGINAL COSTING :

Marginal costing is a specific technique of costing in which only variable costs are charged for costing the products, while fixed costs are charged against a fund called contribution which is excess of the selling price over and above the variable costs.

ICMA defines Marginal costing as :

It is a technique where only the variable costs are charged to cost units, the fixed costs attributable being written off in full against the contributions for that period. This will be made clear in the following example.

Illu. 2: Prepare a statement of cost and profit as per marginal costing technique, using the same data in the above example.

Solution :

**Statement of Cost and Profit
(As per Marginal Costing Technique)**

Particulars	1,000 units		1,000 units		1,000 units	
	p.u Rs.	Total Rs.	P.U. Rs.	Total Rs.	P.U. Rs.	Total Rs.
Direct material	3	3,000	4	4,000	5	5,000
Direct labour	2	2,000	3	3,000	4	4,000
Overheads :						
Variable Overheads	1	1,000	1	1,000	1	1,000
Total Cost	6	6,000	8	8,000	10	10,000
Contributions	4	4,000	7	7,000	10	10,000
Selling Price	10	10,000	15	15,000	20	20,000

Total fund of contribution from the three products amounts to Rs.21,000 as under.

	Rs.
Total fund of contribution (X = Rs.4,000 + Y = 7,000 + Z = 10,000)	21,000

Less : Total Fixed Cost	3,000
Profit	18,000

Thus marginal costing takes only variable costs into account while costing the products. Other details of marginal costing will be dealt with in the following pages.

Marginal Cost :

In general, marginal costs are the total of all fixed costs viz., Direct material cost, Direct labour cost and direct expenses and variable overheads. In other words, it is the total of prime cost and variable overheads.

ICWA, London :

Marginal cost is defined 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. In one way, it is the additional cost of producing one additional unit.

Illu.3 Milton Plastic works produce plastic cans. The variable cost of the can is Rs.5. The fixed costs per annum are Rs.5,000. Currently, 200 cans are being produced. The cost sheet is as under.

	Rs.
Variable cost (Rs.200 x 5)	1,000
Fixed Costs	5,000
Total Cost	6,000

If production is raised by one unit (plastic cans) the cost sheet for 201 cans would be as under :

	Rs.
Variable cost (Rs.201 x 5)	1,005
Fixed Costs	5,000
Total Cost	6,005

Marginal cost is Rs.5 (i.e., cost of producing one additional unit). Thus, marginal costs include only variable costs. Within the capacity of the organisations an increase of one unit in production, obviously will cause an increase in variable costs only. The following illustration amply makes it clear..

Calculate Marginal Costs from the following data.

Total Cost Rs.	Production Units	DMC Rs.	DLC Rs.	Variable Overheads	Fixed Costs Rs.
3,250	500	1,000	750	500	1,000
5,500	1,000	2,000	1,500	1,000	1,000
7,500	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

Solution :

Marginal Cost Statement

Units	Total Cost (a)		Fixed Cost (b)		Marginal Cost C = (a-b)	
500	3,250	6.50	1,000	2.00	2,250	4.50
1,000	5,500	5.5	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

From the above, it is clear that with an increase in production, the total cost p.u. is decreasing. This is due to the fact that the fixed overheads are spread over relatively more units of output. Hence, cost of production p.u. comes decreasing with every rise in volume of output. While marginal cost p.u. remains constant at Rs.4.50, the Fixed costs p.u. decreases from Rs.2 to Rs.0.40.

Illu.4 : Prepare Marginal Cost Statement from the following information:

	Variable Cost Rs.	Fixed Cost Rs.
Materials	60,000	-
Labour	30,000	-
Factory expenses	20,000	30,000
Administrative expenses	10,000	20,000
Sales Rs.2,00,000		

Solution :**Marginal Cost Statement**

		Rs.
Sales		2,00,000
Less: Cost of Sales:		
Materials	60,000	
Labour	30,000	
Variable Overhead	30,000	1,20,000
Contribution		80,000
Less: Fixed overheads		50,000
Net Profit		30,000

Contribution = Sales – Variable Cost.

15.3.1. Basic Features of Marginal Costing :

Importantly, the following are the basic features.

- (a) It is not an independent system of ascertaining costs as Job costing (or) Process costing.
- (b) It is a special technique of presentation of costs for managerial decision making.
- (c) All elements of cost viz., materials, labour and Expenses, are divided into fixed and variable costs up to the possible extent.
- (d) Only variable costs are product costs.
- (e) Fixed costs are considered as period costs being charged to Profit & Loss a/c of the year in which they are incurred.
- (f) Stocks of finished goods and WIP are valued at variable costs (or) marginal costs.
- (g) Prices are fixed based on marginal costs by adding "Contribution" which is the excess of sales over marginal cost of sales etc.

15.3.2. Premises of Marginal costing :

Marginal costing dwells on the following assumptions.

- (1) All elements of cost are capable of being segregated into fixed, variable and semi variables.
- (2) Variable cost per unit of output remains constant irrespective of levels of output and then, it varies in sympathy with changes in volume of output.
- (3) Selling price remains constant for all levels of activity.
- (4) Fixed costs remain uncharged for the entire volume of output.
- (5) Volume of output alone influences the costs.

15.3.3. Contribution : (C)

It is the most important concept in marginal costing for managerial decisions. It is the difference between sales and variable costs. It is known by different names. It is called – contribution margin, (or) gross margin. Contribution contributes first to fixed costs and then only, to profit. In terms of a formula, it can be expressed as

$$\text{Contribution} = \text{Sales} - \text{Variable (Marginal) Cost}$$

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

$$\text{Simply, } C = S - V.$$

15.3.4. Marginal Cost Equation :

The algebraic expression of contribution is known as Marginal cost equation. It is understood as:

$$S - V = F \pm P = C$$

Where :

S = Selling price

V = Variable Cost

F = Fixed Cost

P = Profit

C = Contribution

It is very much useful to find out the 4th item, if three out of the four are known to us.

$$S - V = F \pm P$$

Illu.5 : Calculate variable cost from the following

- ◆ Sales = Rs.1,50,000
- ◆ Fixed Cost = Rs.30,000
- ◆ Profit = Rs.40,000

Solution :

$$\text{Marginal Cost Equation} = S - V = F \pm P = F - P$$

$$S - V = F + P$$

$$- V = F + P - S = 30,000 + 40,000 - 1,50,000$$

$$= 70,000 - 1,50,000$$

$$= - 80,000$$

$$\therefore V C = \text{Rs.80,000}$$

Illu.6 : From the under mentioned data, find out profit.

- ◆ F . C. = Rs.2,50,000

- ◆ **VC = Rs.10/- p. u.**
- ◆ **Selling price = Rs.15/- p. u**
- ◆ **Output level = 75,000 units of output**

Solution :

$$\begin{aligned}\text{Marginal Cost Equation} &= S - V = F + P \\ &= F + P = S - V \\ &= P = S - V - F \\ &= 11,25,000 - 7,50,000 - 2,50,000 \\ &= 11,25,000 - 10,00,000 = \text{Rs.1,25,000}\end{aligned}$$

15.4 ADVANTAGES OF MARGINAL COSTING :

Largely, the following are the advantages :

- (a) Statements prepared in Marginal costing are amply clear and easily understandable.
- (b) Since fixed costs are kept outside the purview, over and under absorption of overheads does not arise at all.
- (c) Helps management in managerial decision making [Discussed earlier in a detailed manner].
- (d) Facilitates for the calculation of BE point.
- (e) Complimentary to standard costing and budgetary control.
- (f) Helps in cost control & Cost Reduction.
- (g) It is picturesque description and reporting tool to management etc.

15.5 LIMITATIONS :

Limitations of B.E. Analysis are limitations of Marginal costing. They are briefly discussed.

- (1) It is all conditional and based on assumptions.
- (2) All costs are not amenable or division into fixed and variable.
- (3) Variable costs do not always remain constant and always do not vary in proportion to volume of activity.
- (4) Fixed costs also are not completely constant.
- (5) Exclusion of fixed costs from the product costs in marginal costing, is a little bit illogical.
- (6) Not very much suitable to cost control and cost reduction.

But, Marginal costing is very much invaluable to the management for marginal decision making.

Illu.7 : Electro Electronics Ltd. deals in electric goods and submits the following information in respect of the goods manufactured by it.

Selling price	Rs.5.00
Variable cost per unit	Rs.2.00
Fixed Overheads	Rs.75,000
Units produced	Rs.75,000

The company is expected to reduce the selling price in order to meet the competition. You are required to calculate the level of output to maintain present level of profit if the proposed reduction in prices is 10 per cent and 20 per cent.

Solution :

Marginal Cost Statement

No.of Units : 75,000

	Present	Price Reduction		
	Price	10% (Rs.)	15% (Rs.)	20% (Rs.)
	Rs.			
Sales	3,75,000	3,37,500	3,18,750	3,00,000
Less : Marginal Cost	1,50,000	1,50,000	1,50,000	1,50,000
Contribution	2,25,000	1,87,500	1,68,750	1,50,000
Less : Fixed Cost	75,000	75,000	75,000	75,000
Profit	1,50,000	1,12,500	93,750	75,000
Contribution per unit	3.00	2.50	2.25	2.00

Profit to be maintained Rs.1,50,000 (desired profit)

$$\begin{aligned} \text{Contribution to be earned} &= \text{Desired profit} + \text{Fixed Cost} \\ &= \text{Rs.1,50,000} + \text{Rs.75,000} = \text{Rs.2,25,000} \end{aligned}$$

No. of units required to be sold at different levels of

$$\text{Price reduction} = \frac{\text{Total Contribution to be earned}}{\text{Contribution per unit}}$$

Hence,

At 10% reduction = Rs.2,25,000/Rs.2.50 = 90,000 units

At 15% reduction = Rs.2,25,000/Rs.2.25 = 1,00,000 units

At 20% reduction = Rs.2,25,000/Rs.2.00 = 1,12,500 units

Illu.8 : Paper Private limited receives a special order from Sabee Private Limited for supply of 50,000 units of a product that usually sells for Rs.10 per unit. Sabee Pvt. Ltd., offers Rs.9 per unit for this product. Papee Pvt. Ltd. incurs Rs.6 per unit in variable costs to manufacture each item, plus Rs.2 per unit for variable administrative cost. Total fixed manufacturing costs are Rs.3,00,000. Other fixed costs amounts to Rs.1,50,000 pr year. Productivity capacity is 4,00,000 units annually and sales volume through normal sales outlets will be about 3,00,000 units of this year.

Write a short report on the advisability or otherwise of accepting the offer.

Solution :

Marginal Cost Statement

Particulars	Per unit	Current year Capacity 3,00,000 units	Proposed Additional Output 50,000 units	Total Capacity 100% 4,00,000 units
	Rs.	Rs.	Rs.	Rs.
Sales	10.00	30,00,000	4,50,000	40,00,000
Less : Marginal Cost				
Variable Cost	6.00	18,00,000	3,00,000	24,00,000
Variable admn. Cost	2.00	6,00,000	1,00,000	8,00,000
	8.00	24,00,000	4,00,000	32,00,000
Contribution	2.00	6,00,000	50,000	8,00,000
Fixed Cost		4,50,000		4,50,000
Profit/Loss		1,50,000	50,000	3,50,000

Comments : If the order is accepted, revenues will increase by Rs.4,50,000 (Rs.9 x 50,000). The incremental costs will only be Rs.4,00,000 (8 x 50,000) – the variable cost

of producing the extra unit. Therefore, the company will gain Rs.50,000 (Rs.4,50,000 – Rs.4,00,000) by accepting the special order.

15.6 DIFFERENCES BETWEEN ABSORPTION COSTING AND MARGINAL COSTING

In absorption costing, without exception, all costs are recovered from production whereas, only variable costs are charged to production in marginal costing. Fixed costs are completely ignored in marginal costing. The basis for this is that only variable costs are incurred for additional output while fixed expenses remain constant. Hence, there is no point in burdening additional output with the share of fixed overheads otherwise it will give a wrong idea about the likely profit to be earned on additional sales. On account of recovery of only variable expenses from production, the costing stocks in marginal costing will be valued at marginal cost. Thus, marginal costing differs from absorption costing in two areas.

1. Recovery of overheads; and
2. Valuation of stocks

- 1. Absorption or Recovery of Overheads :** In absorption costing, both variable and fixed overheads are recovered from production. On other hand, in marginal costing there will be under recovery of overheads, as only variable overheads are charged to production and are recovered from production. Thus, there is over recovery in Absorption costing while there is under recovery of overheads in marginal costing.
- 2. Valuation of Stocks :** Stocks of work in progress and finished goods are valued at works cost and total cost of production respectively, in absorption costing. This works cost and total cost of production do include fixed overheads. But, in marginal costing, all items in production are valued only at variable costs. Thus, under valuation will be there in closing stock valuation, leading to carrying over of fixed expenses of one period to the next period. The following illustration will make the above point clear.

Illu.9 : Using the same data of the earlier illustration compute profit under both Absorption and marginal costing systems assuming that the units sold of the products x, y z are 900 in each case.

Solution :

**Statement of Profit
(Under Absorption Costing System)**

Particulars	X Rs.	Y Rs.	Z Rs.
Direct Material	3,000	4,000	5,000
Direct Labour	2,000	3,000	4,000
Overheads : Variable	1,000	1,000	1,000
Total Marginal Cost	6,000	8,000	10,000
Add : Fixed overheads	1,000	1,000	1,000
Total Cost of production	7,000	9,000	11,000
Less : Closing stocks	700	900	1,100
Cost of goods sold	6,300	8,100	9,900
Profit	2,700	5,400	8,100
Sales	9,000	13,500	18,000

Total Profit : X Rs.2,700 + Y Rs.5,400 + Z Rs.8,100 = Rs.16,200

**Statement of Profit
(Under Marginal Costing Technique)**

Particulars	X Rs.	Y Rs.	Z Rs.
Total Marginal Costs	6,000	8,000	10,000
Less : closing stock	600	800	1,000
Marginal cost of production of goods sold	5,400	7,200	9,000
Contributions (Sales - marginal costs)	3,600	6,300	9,000
Sales	9,000	13,500	18,000

Thus, total profit under marginal costing will be

	Rs.
X's contribution	3,600
Y's Contribution	6,300
Z's contribution	9,000

Total Contribution Fund	18,900
Less : Total Fixed costs	3,000
Total Profit	15,900

From the above, we notice that the profit in Absorption Costing is Rs.16,200, while, the profit in marginal costing is Rs.15,900. The reason for the difference is closing stock valuation system. The closing stock in absorption costing technique includes Rs.300 by way of fixed expenses and hence, the profit in absorption costing is higher than the other profit. In the same way if there is opening stock but no closing stock and if the valuation includes Fixed expenses in absorption costing, profit in absorption costing will be relatively less when compared to the profit in marginal costing. This tells us that there would not be any difference in profit, when there is no problem of stock.

15.7 MANAGERIAL USES / APPLICATIONS OF MARGINAL COSTING :

It has been repeatedly discussed that marginal costing is very much invaluable managerial aid to decision making. The following are some of the uses of marginal costing.

- (1) Profit planning and maintaining an expected level of profit.
- (2) Make (or) buy decisions (outsourcing)
- (3) Problem of Key – factor (or) limiting factor.
- (4) Best sales / production mix
- (5) Alternative method of production
- (6) Optimum level of activity / capacity
- (7) Effect of change in selling price
- (8) Pricing decisions etc.

15.7.1 Profit planning and expected level of profit : Marginal costing technique can be used to plan for the profit desired. It needs to decide future activities to achieve desired profit. Change in selling price, VCs, and product mix itself affects the profitability. The following example explains it best.

Illu.10 : The price structure of Hero Cycles Ltd. is as under:

Items	Per cycle Rs.
Materials :	60
Labour :	20
Variable overhead	20
Fixed overhead	50
Profit	50
Selling price	200

The above is based on the manufacture of one lakh cycles per annum. The Company exports. Due to competition, it will have to reduce the selling prices but it wants to keep the total profit in tact. What level of production has to be reached to get the same amount of profit if the selling price is to be reduced by (i) 10% and (ii) 20%.

Solution:

To attempt this problem, present profit is to be computed in the 1st place.

- Fixed overhead per cycle : Rs.50/-
Total fixed overhead for 1,00,000 cycles = 50 x 1,00,000 = Rs.50,00,000.
- Profit per cycle : Rs.50/-
Total profit for 1,00,000 cycles : Rs.50 x 1,00,000 = Rs.50,00,000.
Total profit presently = Rs.50,00,000.

$$\text{Desired Sales (in units)} = \frac{F+P}{P/V \text{ ratio}} = \frac{F+P}{C \text{ pu}}$$

If the selling price is Reduced by 10%:

$$\text{New Selling Price} = 200 - 10\% = 200 - 20 = \text{Rs.180/-}$$

$$\begin{aligned} \therefore \text{Desired units for desired profit} &= \frac{F+P}{C(\text{pu})} = \frac{50L + 50L}{180 - 100} \\ &= \frac{1,00,00,000}{80} = 1,25,000 \text{ cycles} \end{aligned}$$

(i) If the selling price is Reduced by 20%:

$$\text{New Selling Price} = 200 - 20\% = 200 - 40 = \text{Rs.160/-}$$

$$\therefore \text{Defined units for defined profit} = \frac{F+P}{C(\text{pu})} = \frac{100,00,000}{160 - 100}$$

Comment :

$$= \frac{100,00,000}{60} = 1,66,667 \text{ cycles}$$

- (1) 1,25,000 cycles have to be made to get the same profit, if the SP is sought to be brought down by 10%.
- (2) 1,66,667 cycles have to be made, to get the same profit, by reducing the Selling Price by 20%.

Illu.11: Two companies M Limited and N Limited furnish their profit and loss a/c's for the year 2005 as under :

Items		M Ltd. Rs.		N Ltd. Rs.
Sales		1,50,000		1,50,000
Less: VC s	1,20,000		1,00,000	
Fixed costs :	15,000	1,35,000	35,000	1,35,000
Budgeted Net profit		15,000		15,000

You are required to:

- (i) Calculate BEP for each business
- (ii) Calculate sales volume at which each will attain a profit of Rs.5,000/-
- (iii) State which business is likely to get more profit
- (1) if there is heavy demand for the product and if there is
- (2) low demand for the product with reasons.

Solution:

- (i) For calculation of BEP, we need to calculate P/V ratio :

$$P/V \text{ ratio} = \frac{\text{Contribution}}{\text{Sales}} = \frac{S - V}{S} \text{ (or)} \frac{S - V}{S} \times 100$$

$$\text{M Ltd. : } \frac{1,50,000 - 1,20,000}{1,50,000} = \frac{30,000}{1,50,000} \times 100 = 20\%$$

$$\text{N Ltd. : } \frac{1,50,000 - 1,00,000}{1,50,000} = \frac{50,000}{1,50,000} \times 100 = \frac{1}{3} \text{ or } 33 \frac{1}{3}\%$$

BEP for M Ltd. :

Total FC / P / V =

$$= \frac{1,50,000}{\frac{1}{5}} = \frac{15,000 \times 5}{1} = \text{Rs.75,000}$$

BEP for N Ltd. :

$$\frac{\text{Total Fixed Cost}}{\text{P/V}} = \frac{35,000}{1/3} = \frac{35,000 \times 3}{1}$$

$$= \text{Rs.1,05,000}$$

(ii) Sales volume at a profit of Rs.5,000

Sales for a defined profit in M Ltd. = F + P / P/V

$$= \frac{15,000 + 5,000}{1/5} = \frac{20,000 \times 5}{1}$$

$$= \text{Rs.1,00,000}$$

Sales for a defined profit of Rs.5,000 in N Ltd. = F + P / P/V

$$= \frac{35,000 + 5,000}{1/3} = \frac{40,000 \times 3}{1}$$

$$= \text{Rs.1,20,000}$$

(iii)

(a) When heavy Demand is three: A Company with higher P/V can get more profit. Hence, N Ltd. gets more profit.

(b) Low Demand : When there is low demand for the product, it is that Company that gains more, which has BEP at a lower level. Hence, M. Ltd. gets more profits.

15.7.2 Make or Buy Decision: Often it is a big problem to the management to decide whether making a product (or) a component in the company is better than buying it from an outside agency specialised in that (or) not. Sometime, buying may prove to be better and sometimes making may be better than buying. Hence, marginal costing will be of much help. For this, the most important condition is that we must observe distinction between fixed costs and variable costs. The direction either to make (or) buy is given based on the above cost classification. **One is advised to make the**

product if the VC / MC of the product is more than the buying price. Buying is better if the case is otherwise.

Make if $VC < \text{Outside price}$. **Buy** if $VC > \text{outside price}$.

Illu.12 : A Manufacturing company says that its cost of making a component X is Rs.8.00 in its workshop and also tells that the same component is available in the outside market at Rs.6.50/- itself with an assurance that there is continuous supply. Often your recommendation with regard to make (or) buy decision.

Give also your view, if the outside supplier intends to supply the same at Rs.5.50/- The cost of making Product X is as under :

Cost of X

Items	Rs.
Material :	3.00
Labour :	2.00
Variable expenses :	1.00
Depreciation and other fixed overheads	2.00
Total Cost	8.00

Solution:

$$\begin{aligned} \text{Variable cost (or) Marginal cost} &= \text{Material} + \text{Labour} + \text{Variable expenses} \\ &= 3 + 2 + 1 = 6/- \end{aligned}$$

$$\therefore \text{MC/ VC} = \text{Rs.6/-}$$

Since variable cost of manufacturing (or) making the product is Rs.6/- and since it is less than the outside, supply price of Rs.6.50/-, it is to be made.

- When the supplier supplies the component at 5.50/-, the better alternative is to buy, as VC is more than the outside supply price.
- (i) Hence, in the 1st case, it is better to make than to buy.
- (ii) In the 2nd case, it is better to buy than to make it.

15.7.3 Key factor (or) Priority fixation with reference to Key – factors :

Marginal costing helps the management in giving priority to the production of the items for maximising profitability in the light of limiting factor (or) Key – factor. Key factor is called by different names viz., limiting factor, budget factor, principal factor, scarce factor etc. In marginal costing, contribution p.u. is considered for

recommending products for introduction newly (or) stopping them, in the normal conditions. But in an abnormal condition where some resource viz., material, time, production capacity, finance etc. is found to be a key – factor, then, the same above said contribution per unit of key – factor is to be calculated and thus, based on that adjusted C (pu) decision is to be made with regard to priorities. The following illustration explains it best.

Illu.13 : Jain Co. manufactures and markets three products P, Q and R. All one made from the same Machines. Machine capacity is key – factor. From the following data, indicate priorities for products P, Q, R to maximise profits.

Items	Products		
	P	Q	R
Raw material cost pu (Rs.)	11.25	16.25	21.25
Direct Labour pu (Rs.)	2.50	2.50	2.50
Other variable expenses (pu) (Rs.)	1.50	2.25	3.55
Selling price pu (Rs.)	25.00	30.00	35.00
Standard Machine Time in (mts.)	39	20	28

Solution :

Statement of Priorities

Items	Products					
	P		Q		R	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Selling price :		25.00		30.00		35.00
Less: Material cost	11.25		16.25		21.25	
Labour cost	2.50		2.50		2.50	
Variable expenses	1.50	15.25	2.25	21.00	3.55	27.30
(A) Contribution p. u		9.75		9.00		7.70
(B) Standard machine time in minutes as K. F.		39		20		28
(C) Contribution per minute of K. F. [A ÷ B]		9.75 / 39 = 0.25		9.00 / 20 = 0.45		7.70 / 28 = 0.275
(D) Priority given :		3 rd		1 st		2 nd

Comment : It is clear that “Q” product is giving highest contribution per unit of K. F. and hence, it will maximise the profit if it is given 1st priority.

Illu.14 : The following particulars are obtained from the records of a factory.

Items	Product A Rs. P. u	Product B Rs. P.u
Selling Price :	200	500
Material (Rs.20 P. Lt.)	40	160
Labour (Rs.10 Ph)	50	100
Variable overheads	20	40
Total fixed overhead Rs.15,000	-	-

Comment as the profitability of each product with ranks given when :

- Raw material is in short supply
- Production capacity is limited
- Sales quantity is limited
- Sales value is limited.
- Only 1,000lts. of raw material is available for both products in total and maximum sales quantity of each product is 300 units.

Solution :

Items		Product A Rs. P. u		Product B Rs. P.u
Selling Price :		200		500
Less: Variable costs :				
Materials	40		160	
Labour	50		100	
Variable overhead	20	110	40	300
Contribution p. u.		90		200

- $P/V \% [S - V / S \times 100] =$ 45 % 40%
- Contribution per lt. $90/2 = 45$ $200 / 8 = 25$
- Contribution per hour $90/5 = 18$ $200/ 10 = 20$

- (a) When Raw material is in short supply, contribution per Lt. Of A is more and hence, A is more profitable ranking is : A and B
- (b) When production capacity is limited, contribution per hour of product B is more and hence, "B" is more profitable.
Ranking is : B and A
- (c) When sales quantity is limited : Contribution per unit of B is more and hence, Be is more profitable.
Ranking is : B and A
- (d) When sales value is limited, the P/ V ratio in % of product A is higher and hence, A is more profitable.
Ranking is : A and B
- (e) When Raw material and sales quantity are limited, raw material should be used for a maximum No. of units of product A of 300 units. This will consume 600 Lts. of Raw materials and the remaining 400 lts. of material will be used for producing 50 units of B ($400 \div 8$)

Profit in this case would be as:

	Rs.
Contribution from 300 of A @ 90 =	27,000
Contribution from 50 of B @ 200 =	10,000
Total contribution	37,000
Less: Total fixed Costs :	15,000
Maximum profit	22,000

15.7.4. Best product mix : One of the important uses of marginal costing is that the company can decide the good, better and the best products and similarly, it can also trace out bad, worse and worst products and thus, as per the cost and contribution analysis of different products, the mix of products can be made in such a manner that all the products in the mix are all good and profitable. The question "What mix of products shall we produce?" is best solved, by marginal costing. See the following illustration.

Illu.15 : Present the following data in a suitable way to the management to help it know what is the best product mix, from the following three proposed mixes.

Items	Product	P. u. Rs.
Selling Prices :	A	20
	B	15
Direct Material	A	10
	B	9
Direct Labour	A	3
	B	2

Total Fixed expenses : Rs.800 and Variable expenses are allocated as 100% of Direct Labour.

Proposed Product Mixes :

- (i) 1000 units of A and 200 units of B
- (ii) 1500 units of A and 1500 units of B
- (iii) 2000 units of A and 1000 units of B

Solution:

(a) Marginal Cost Statement:

Items	Products	
	A Rs.	B Rs.
Direct Materials	10	9
Direct Labour	3	2
Variable overheads / Expenses (100 % of D. L.)	3	2
Marginal Cost :	16	13
Selling price:	20	15
Contribution (pu)	4	2

(b)

Items	Product Mix		
	1000 of A + 2000 of B Rs.	1500 of A + 1500 of B Rs.	2000 of A + 1000 of B Rs.
Total Sales :	1000 x 20 + 2000 x 15 = 20,000 + 30,000 = 50,000	1500 x 20 + 1500 x 15 = 30,000 + 22,500 = 52,500	2000 x 20 + 1000 x 15 = 40,000 + 15,000 = 55,000
Less: MCs / VCs	1,000 x 16 = 16,000 2,000 x 13 = 26,000 42,000	1500 x 16 = 24,000 1500 x 13 = 19,500 43,500	2,000 x 16 = 32,000 10,000 x 13 = 13,000 45,000

Contribution (S – V)	8,000	9,000	10,000
Less: Total Fixed Cost :	800	800	800
Profit	7,200	8,200	9,200

Best product mix is the third one, as profit is the highest.

15.7.5. Alternative method of production : Marginal costing helps in deciding whether machine work is better than manual work (or) **Vice – Versa**. The method which gives more amount of contribution is to be considered better method of production. See the following illustration, for more details.

Illu.16 : Product – Q can be made on both machines X and Y. Machine – X can produce 100 units of Q, ph. And Machine – Y can produce 150 units ph. Total machine hours available during the entire year are 2500. Taking the following data, determine the more profitable method of production.

Items	Per unit of Q	
	Machine X Rs.	Machine B Rs.
Marginal Cost:	5-00	6-00
Selling price :	9-00	9-00
Fixed Cost :	2-00	2-00

Solution:

Profitability Statement

Items	Machine A	Machine B
Selling price :	9-00	9-00
Less: Variable Costs :	5-00	6-00
Contribution per unit	4-00	3-00
Output per unit	100-00	150-00
Contribution per unit	400-00	45-00

Items	Machine X	Machine Y
Machine Hour per year	2,500	2,500
Annual Contribution	10,00,000	11,25,000

Comment : Since Machine Y is yielding more contribution, Y is more profitable.

15.7.6. Determination of Optimum level of Activity : Marginal costing helps the management in identifying the best level of activity. When different levels are studied, that particular level is the optimum level which yields as higher contribution. See the following illustration.

Illu.17: A factory engaged in making plastic buckets is operating at 40% level and produces 10,000 buckets p.a. the cost breakup for one bucket is as under :

Material	:	Rs.10
Labour	:	3
Overhead	:	5 [Fixed is 60%]
Selling price	:	20

If it is decided to work at 50% level, the Selling price falls by 3%. At 90% level, the Selling price falls by 5% accompanied by a similar fall in prices of materials. You are required to calculate the profit at 50%, and 90%. Levels and also calculate BEP for the same levels.

Solution :

Statement of Profitability at 50% and 90% levels

Items	50% level		90% level	
	Rs. P.u.	Total Rs.	Rs.p. u.	Total Rs.
Sales	19-40 (20 – 3% of 20)	2,42,500	19-00 (20 – 5% of 20)	4,27,500
Variable Costs :				
Materials	10-00	1,25,000	9-50 (10 – 5% 10)	2,13,750
Labour	3-00	37,500	3-00	67,500
Overhead (40% of 5)	2-00	25,000	2-00	45,000
Total Variable cost	15-00	1,87,500	14-50	3,26,250
S – V = C	4-40	55,000	4-50	1,01,250
Fixed overhead	-	30,000	-	30,000
Profit (C – F)		25,000		71,250

$$\text{BEP (in units)} = \frac{\text{Fixed Cost}}{\text{C (pu)}}$$

$$\text{BEP at 90\%} = \frac{30,000}{4.50} = 6,667 \text{ units}$$

15.7.7. Effect of changes in selling price : Management is often confronted with the problem of analysing the effect of changes in sales price on profitability of the company. Sometimes, it may have to reduce the selling price due to competition, slump, Government Regulations etc. Then, the company can examine these changes in prices and their effect on profitability with marginal costing technique and contribution analysis in particular. Look into the following.

Illu.18 : The following are the data available from the records of a company.

Items	Rs.
Sales	60,000
Variable cost :	30,000
Fixed Cost :	15,000

Calculate from the above :

- (a) P/ V ratio, BEP, M/s at this level
- (b) The effect of 10% rise in selling price
- (c) The effect 10% decrease in selling price.

Solution :

(a)

(1) P/ V ratio in % =

$$\begin{aligned}
 &= \frac{S - V}{S} \times 100 \\
 &= \frac{60,000 - 30,000}{60,000} \times 100 \\
 &= \frac{30,000}{60,000} \times 100 = 50\%
 \end{aligned}$$

(2) BEP = FC / P/V =

$$\begin{aligned}
 &= \frac{15,000}{50} = \frac{15,000 \times 100}{50} \\
 &= \frac{15,000}{100}
 \end{aligned}$$

$$= \text{Rs.30,000}$$

$$(3) \text{ M/S} = \text{present Sales} - \text{BEP for Sales} \\ = 60,000 - 30,000 = 30,000$$

(b) Effect of 10% rise in selling price :

$$\text{Sales} = \text{Rs.60,000} + 6,000 = 66,000$$

$$(1) \text{ P/V} =$$

$$= \frac{S - V}{S} \times 100 = \frac{66,000 - 30,000}{66,000} \times 100$$

$$= \frac{36,000}{66,000} \times 100 = \frac{600}{11} = 54.55\%$$

$$(2) \text{ BEP} = F / \text{P/V} =$$

$$= \frac{15,000}{54.55\%} = \text{Rs.27,500}$$

$$(3) \text{ M/S} = \text{Present Sales} - \text{BEP (Sales)}$$

$$66,000 - 27,500 = 38,500/-$$

(c) Effect of 10% decrease in selling price :

$$\text{Selling price} = 60,000 - 10\% \text{ of } 60,000$$

$$= 60,000 - 6,000 = \text{Rs.54,000}$$

$$(1) \text{ P / V} =$$

$$= \frac{54,000 - 30,000}{54,000} \times 100 = \frac{24,000 \times 100}{54,000}$$

$$(2) \text{ BEP} =$$

$$= \frac{F}{\text{P/V}} = \frac{15,000}{44.44\%} = \text{Rs.33,750}$$

$$(3) \text{ M/S} = \text{Present Sales} - \text{BEP}$$

$$= \frac{400}{9} = 44.44\%$$

$$= 54,000 - 33,750 = 20,250$$

Thus, profitability is largely effected by changes in prices.

15.7.8 Pricing Decision - Accepting Additional orders : This is a big decision making area to the management. When additional orders are to be accepted (or) additional markets are explored at a price lower than the normal price to utilise the available idle capacity, it should be meticulously managed that the whole thing does not influence the normal market and goodwill of the company. The order must never be accepted if it is from a local merchant, that too, at a price less than the normal price. The following illustrations will explain it best.

Illu.19 : The cost sheet of a product is given as under :

Items	p. u. Rs.
Direct Material :	5-00
Direct Labour :	3-00
Fixed Factory overhead	0-50
Variable Factory overhead	0-50
Administration overhead	0-75
Standard Fixed overhead	0-25
Standard variable overhead	0-50
Cost	10-50
Selling price	12-00

The above figures are for an output of 50,000 units, while, the capacity of the firm is 65,000 units. A foreign customer is desirous of buying 15,000 units at a price of Rs.10/- p.u. advise the manufacturer whether the order should be accepted (or) not. What will be the advice, if the order were from a local merchant ?

Solution :

Statement of Marginal Cost (or) Additional Cost for Additional 15000 units

Items	p. u. Rs.	Total for 15000 units Rs.
Direct Materials	5-00	75,000
Direct Labour	3-00	45,000
Prime Cost	8-00	1,20,000

Variable Overheads :		
Factory Overhead	0-50	7,500
Standard Overhead	0-50	7,500
Marginal cost	9-00	1,35,000
Sales	10-00	1,50,000
Contribution (S – V)	1-00	15,000

Comments :

1. The order from foreign customer will give an additional contribution of Rs.15,000 and hence, it may be considered as additional profit, since, Fixed costs must have been already met from the internal market.
2. The order from the local merchant must not be accepted at a price of Rs.10/- as it would adversely effect the domestic market.

Illu.20 : Electro Electronics Ltd. deals in electric goods and submits the following information in respect of the goods manufactured by it.

Selling price	Rs.5.00
Variable cost per unit	Rs.2.00
Fixed Overheads	Rs.75,000
Units produced	Rs.75,000

The company is expected to reduce the selling price in order to meet the competition. You are required to calculate the level of output to maintain present level of profit if the proposed reduction in prices is 10 per cent and 20 per cent.

Solution :

Marginal Cost Statement**No.of Units : 75,000**

	Present Price Rs.	Price Reduction		
		10% (Rs.)	15% (Rs.)	20% (Rs.)
Sales	3,75,000	3,37,500	3,18,750	3,00,000
Less : Marginal Cost	1,50,000	1,50,000	1,50,000	1,50,000
Contribution	2,25,000	1,87,500	1,68,750	1,50,000
Less : Fixed Cost	75,000	75,000	75,000	75,000
Profit	1,50,000	1,12,500	93,750	75,000
Contribution per unit	3.00	2.50	2.25	2.00

Profit to be maintained Rs.1,50,000 (desired profit)

$$\begin{aligned}\text{Contribution to be earned} &= \text{Desired profit} + \text{Fixed Cost} \\ &= \text{Rs.1,50,000} + \text{Rs.75,000} = \text{Rs.2,25,000}\end{aligned}$$

No. of units required to be sold at different levels of

$$\begin{aligned}\text{Price reduction} &= \frac{\text{Total Contribution to be earned}}{\text{Contribution per unit}}\end{aligned}$$

Hence,

At 10% reduction = Rs.2,25,000/Rs.2.50 = 90,000 units

At 15% reduction = Rs.2,25,000/Rs.2.25 = 1,00,000 units

At 20% reduction = Rs.2,25,000/Rs.2.00 = 1,12,500 units

Illu.21 : Paper Private limited receives a special order from Sabee Private Limited for supply of 50,000 units of a product that usually sells for Rs.10 per unit. Sabee Pvt. Ltd., offers Rs.9 per unit for this product. Papee Pvt. Ltd. incurs Rs.6 per unit in variable costs to manufacture each item, plus Rs.2 per unit for variable administrative cost. Total fixed manufacturing costs are Rs.3,00,000. Other fixed costs amounts to Rs.1,50,000 pr year. Productivity capacity is 4,00,000 units annually and sales volume through normal sales outlets will be about 3,00,000 units of this year.

Write a short report on the advisability or otherwise of accepting the offer.

Solution :

Marginal Cost Statement

Particulars	Per unit	Current year Capacity 3,00,000 units	Proposed Additional Output 50,000 units	Total Capacity 100% 4,00,000 units
	Rs.	Rs.	Rs.	Rs.
Sales	10.00	30,00,000	4,50,000	40,00,000
Less : Marginal Cost				

Variable Cost	6.00	18,00,000	3,00,000	24,00,000
Variable admn. Cost	2.00	6,00,000	1,00,000	8,00,000
	8.00	24,00,000	4,00,000	32,00,000
Contribution	2.00	6,00,000	50,000	8,00,000
Fixed Cost		4,50,000		4,50,000
Profit/Loss		1,50,000	50,000	3,50,000

Comments : If the order is accepted, revenues will increase by Rs.4,50,000 (Rs.9 x 50,000).

The incremental costs will only be Rs.4,00,000 (8 x 50,000) – the variable cost of producing the extra unit. Therefore, the company will gain Rs.50,000 (Rs.4,50,000 – Rs.4,00,000) by accepting the special order.

15.8 QUESTIONS

A. Short Answer Questions

1. Define the term marginal costing.
2. How can the cost be classified on the basis of variability?
3. What is contribution?
4. What is angle of incidence?
5. What is cash break even point?

B. Essay Questions :

1. Explain the advantages and disadvantages of marginal costing.
2. Discuss the applications of the marginal costing technique.
3. Explain the specific decision making areas where the principles of marginal costing could be applied.
4. What is significance of contribution of marginal costing? State its uses in managerial decision making.
5. What is marginal costing? Explain the advantages and disadvantages of marginal costing.

15.9 EXERCISES

1. Hind General Corporation produces only one product which had the following costs.

Variable Manufacturing costs Rs.4 per unit

Fixed Manufacturing costs Rs.2,00,000 per year

The normal capacity is set at 2,00,000 units. There are no work in process inventories.

In 2005 the company produced 2,00,000 units and sold 90 per cent of them at a price of Rs.7 per unit. In 2006, the company produced 2,10,000 units and sold 2,15,000 units at the same price.

You are required to prepare income statements for 2005 and 2006 based on absorption costing.

[Ans.: Net income : 2005 Rs.3,60,000; 2006 Rs.4,40,000]

2. Prabhakaran Industries Ltd., Salem furnishes the following details for the year ended 31st December, 1986, for preparing the Comparative Income Statement of the year ended Marginal costing and Absorption costing.

Sales	2,000 units at Rs.20 per unit
Fixed Manufacturing cost	Rs.4,200
Variable Manufacturing cost	2,100 units at Rs.12 per unit
Inventory at close	100 units
Fixed selling and administrative expenses	Rs.1,000
Variable selling and administrative expenses	Rs.1,400

[Ans.: Absorption Costing : Net Income Rs.9,600; Marginal Costing : Net Income Rs.9,400]

3. Prepare Marginal Cost Statement from the following information:

	Variable Cost Rs.	Fixed Cost Rs.
Materials	60,000	-
Labour	30,000	-
Factory expenses	20,000	30,000
Administrative expenses	10,000	20,000
Sales Rs.2,00,000		

[Ans.: Net profit Rs.30,000]

4. From the following data, prepare Marginal Costing Statement:

Particulars	Product – A Rs.	Product – B Rs.	Product – C Rs.
Sales	30,000	60,000	80,000
Direct materials	12,000	25,000	36,000
Direct labour	8,000	10,000	14,000
Factory overheads:			
Fixed	6,000	8,000	6,000
Variable	2,000	3,000	5,000
Fixed office overheads	1,000	2,000	2,000
Sales overheads:			

Fixed	2,000	2,000	3,000
Variable	1,000	3,000	3,000

[Ans.: Net profit Rs.16,000]

5. Polestar Electronics decides 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 directors wish to maintain net profits at the present level.

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.: Profit Rs.10,000; The management have to ensure increase of sales by 6,667 unit; Desired sales (16,667) – present sale (Rs.10,000), before reducing selling price]

6. Product A can be manufactured either by machine X or machine Y. Machine X can produce 100 units of A per hour and machine Y, 200 units per hour. Total machine hours available are 4000 hours per annum. Taking into account the following cost data, determine the profitable method of manufacture:

	Per unit of Product A	
	Machine X Rs.	Machine Y Rs.
Direct material	16	20
Direct wages	24	24
Variable overheads	8	8
Fixed overheads	10	10
Total cost	58	62
Selling price	60	60

[Ans.: Machine X Profit Rs.8,00,000; Machine Y Loss Rs.16,00,000; P.V. Ratio : Machine X 20%; Machine Y 13.33%; Break even point : Machine X Rs.2,00,00,000; Machine Y Rs.6,00,00,000; Thus, Machine X is suitable for production]

7. From the following particulars.

(a) Find out unit contribution for R and S Products.

(b) Suggest which contribution of sales is preferable.

Particulars	R (per one unit)	S (per one unit)
Direct Material	20	18
Direct Wages	6	4
Sales price	40	30

Fixed expenses Rs.800 and variable expenses are 100% on wages.

Sales Mix

- (1) 200 units of R and 400 units of S
- (2) 300 units of R and 300 units of S
- (3) 400 units of R and 200 units of S

[Ans.: Contribution per unit : Product R = Rs.8; Product S Rs.4; (1) Profit Rs.2,400; (2) Profit Rs.2,800; (3) Rs.3,200; At sales mixture (c) 400 units of R and S give the maximum profit, it is more profitable]

8. Ram & Co. and Syam & co. are two competing business units selling same type of product in the same market. Their budget profit and loss accounts for the year ending 30 June 2004 are as follows:

	Ram & Co. Rs.	Syam & Co. Rs.
Sales	75,000	75,000
Variable cost	60,000	50,000
Fixed costs	7,500	17,500
Net budgeted profit	7,500	7,500

You are required to:

- (a) Calculate the BEP of each business unit
- (b) State which business is likely to earn greater profits (i) in heavy demand (ii) in low demand condition.

[Ans.: (a) Ram & Co. Rs.37,500; Syam & Co. Rs.52,500 (b) (i) In case of heavy demand, Shyam & co. is better, because it has higher P/V. ratio. (ii) In case of low demand, Ram & Co. is better, as break even point as well as fixed cost are low.]

9. Present the following information to show clearly to management:

- (a) The marginal product cost and the contribution per unit.
- (b) The total contribution and profits resulting from each of the following mixtures:

	Product	Price per unit (Rs.)
Direct material	A	10
Direct Material	B	9
Direct Wages	A	3
Direct wages	B	2

Fixed expenses. Rs.800.

Variable expenses are allotted to the products as 100% direct wages.

Selling price per unit A – Rs.20; B – Rs.15.

Sales Mixtures:

- (a) 100 units of product A & 200 of B
- (b) 150 units of product A & 150 of B
- (c) 200 units of Product A & 100 of B.

[Ans.: Contribution per unit : Product A Rs.4; Product B Rs.2; (a) Profit Nil; (b) Profit Rs.100; (c) Profit Rs.200; As sales mixture (a) i.e., 200 units of A and 100 units of B gives the maximum profit, it is more profitable.]

10. The price structure of a Fan made by the Fan Co. Ltd., is as follows:

	Per Fan Rs.
Materials	60
Labour	20
Variable overheads	20
	100
Fixed overheads	50
Profit	50
Selling price	200

This is based on the manufacture of one lakh fans per annum. The co., expects that due to competition they will have to reduce selling prices, but they want to keep the total profits in tact. What level of production will have to be reduced i.e., how many fans 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%?

[Ans.: (a) 1,25,000 fans (b) 1,66.667 fans]

15.10 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
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4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
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6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter – 16

Financial Statement Analysis

Objectives :

After going through this unit we should be able to :

- Understand the meaning of financial statements
- Know the objectives of analysis of financial statements
- Explain the types and formats of financial statements
- Know the methods of financial analysis

Structure :

16.1 Introduction

16.2 Meaning of Financial Statements

16.3 Objectives of Analysis of Financial Statements

16.4 Types of Financial Statements

16.5 Formats of Financial Statements

16.6 Limitations of Financial statement Analysis

16.7 Types of Financial Analysis

16.8 Methods of Financial Analysis

16.9 Questions

16.10 Exercises

16.11 Suggested Readings

16.1 INTRODUCTION :

Accounting process involves recording, classifying and summarising various business transactions. The daily transactions of a business are recorded in different subsidiary books. These transactions are posted into various ledger accounts and the balances are taken out at the end of a financial period. The aim of maintaining various records is to determine profitability of enterprise from operations of the business and also

to find out its financial position. The term analysis of financial statements is applied to almost every kind of detail inquiry into financial data. A financial executive has to evaluate the past performance, present financial position, liquidity situation, enquire into profitability of the concern and to plan for future operations. The analysis of financial statements is an attempt to determine the significance and meaning of the financial statements data so that the forecast may be made of the future prospects for earnings, ability to pay interest and debt maturities and profitability.

16.2 MEANING OF FINANCIAL STATEMENTS :

According to Himpton John, "A financial statement is an organised collection of data according to logical and consistent accounting procedures. Its purpose is to convey an understanding of some financial aspects of a business firm. It may show a position at a moment of time as in the case of a balance sheet, or may reveal a series of activities over a given period of time, as in the case of an income statement." On the basis of the information provided in the financial statements, management makes a review of the progress of the company and decides the future course of action. The annual reports constitute one of the major vehicles of corporate financial reporting to shareholders. It is, therefore, essential that these reports are elaborate, standardised in terms of accounting treatment and provides details for analysis and understanding of corporate performance by the shareholders. In India, the Institute of Chartered Accountants of India have for long been spearheading the process of standardisation in accounting treatment and enhancing disclosure requirements to shareholders. All companies are now required to state whether their accounts are prepared with applicable accounting standards and give particulars of any material departures from those standards and the reasons therefore. The trend in the area of corporate financial reporting in India, may be observed from the greater disclosure norms set at every stage and personal accountability of both directors and auditors. With the introduction of corporate governance concept.

16.3 OBJECTIVES OF ANALYSIS OF FINANCIAL STATEMENTS :

The following are the main objectives of the analysis of financial statements.

1. To estimate the earning capacity of the firm

2. To judge the financial position and financial performance of the firm.
3. To determine the long term liquidity of the funds as well as solvency
4. To determine the debt capacity of the firm
5. To decide about the future prospects of the firm.

As a matter of fact, the objectives of analysis of these statements, depend to a large extent on the point of view of the analyst, the degree of interest in the company and the need for depth of enquiry and finally on the amount and quality of the data available.

16.4 TYPES OF FINANCIAL STATEMENTS :

1. **Income Statement** : The income statement or profit and loss account is considered as a very useful statement of all financial statements. It depicts the expenses incurred on production, sales and distribution and sales revenue and the net profit or loss for a particular period. It shows whether the operations of the firm resulted in profit or loss at the end of a particular period.
2. **Balance Sheet** : Balance Sheet is a statement which shows the financial position of a business as on a particular date. It represents the assets owned by the business and the claims of the owners and creditors against the assets in the form of liabilities as on the date of the statement.
3. **Statement of Retained Earnings** : The statement of retained earnings is also called the profit and loss appropriation account. It is a link between the income statement and the balance sheet. Retained earnings are the accumulated excess of earnings over losses and dividends. The balance shown by the income statement is transferred to the balance sheet through this statement after making the necessary appropriations.
4. **Funds Flow Statements** : According to Anthony, "The funds flow statement described the sources from which additional funds were derived and the use to which these funds were put." Funds Flow statement helps the financial analyst in having a more detailed analysis and understanding the changes in the distribution of resources between two balance sheet periods. The statement reveals the sources of funds and their application for different purposes.
5. **Cash Flow Statement** : A cash flow statement depicts the changes in cash position from one period to another. It shows the inflow and outflow of cash and helps the management in making plans for immediate future. An estimated cash flow statement

enables the management to ascertain the availability of cash to met business obligations. This statement is useful for short-term planning by the management.

6. **Schedules** : These are the statements which explain the items given in income statement and balance sheet. Schedules are part of financial statements which give detailed information about the financial position of a business organisation.

16.5 FORMATS OF FINANCIAL STATEMENTS :

The two main financial statements viz., the income statement and the balance sheet, can either to presented in the horizontal form or the vertical form. Where statutory provisions are applicable, the statement has to be prepared in accordance with such provisions.

16.5.1 Income Statement :

There is no legal format for the profit and loss account. Therefore, it can be presented in the traditional `T' form, or vertically in statement form. An example of the two formats given as under.

(i) Horizontal Forms

Manufacturing, Trading and Profit & Loss account for the year ending.....

Dr.			Cr.		
Particulars	Rs.	Rs.	Particulars	Rs.	Rs.
To Opening Stock :			By Cost of finished goods c/d		X x x
Raw materials	X x x		By Closing stock		
Work in progress	X x x	X x x	Raw materials	X x x	
To Purchases of raw materials		X x x	Work in progress	X x x	X x x
To Manufacturing wages		X x x			
To Carriage inwards		X x x			

To other factory expenses		X x x			
		X x x			X x x
To Opening stock of finished goods		X x x	By Sales		X x x
To cost of finished goods b/d		X x x	By Closing stock of finished goods		X x x
To Gross profit c/d		X x x	By Gross loss c/d		X x x
		X x x			X x x
To Gross loss b/d		X x x	By gross profit b/d		X x x
To Office and administration expenses		X x x	By Miscellaneous receipts		X x x
To Selling and distribution expenses		X x x	By Net loss c/d		X x x
To Interest and financial expenses		X x x			
To Provision for income tax		X x x			
To Net profit c/d		X x x			
		X x x			X x x
To Net loss b/d		X x x	By Balance b/d (from previous year)		X x x
To General reserve		X x x	By Net profit b/d		X x x
To Dividend		X x x			
To Balance c/d		X x x			
		X x x			X x x

(ii) Vertical Form :**Income statement of for the year ending.....**

Particulars		Rs.	Rs.
Sales			X x x
Less : Sales returns		X x x	

Sales tax/Excise Duty	(1)	X x x	X x x
Net Sales			X x x
Cost of goods sold			
Materials consumed			X x x
Direct labour			X x x
Manufacturing expenses			X x x
Add /Less : Adjustment for change in stock			X x x
	(2)		X x x
Gross Profit	(1) - (2)		X x x
Less : Operating expenses		X x x	
Office and administration expenses		X x x	
Selling and distribution expenses		X x x	X x x
Operating profit			X x x
Add : Non-Operating income			X x x
			X x x
Less : Non-operating expenses (including interest)			X x x
Profit before interest and tax			X x x
Less : Interest			X x x
Profit before tax			X x x
Less : Tax			X x x
Profit after tax			X x x
Appropriations			
Transfer to reserves			X x x
Dividends declared/paid			X x x
Surplus carried to Balance Sheet			X x x
			X x x

16.5.2 Balance Sheet :

The companies act, 1956 stipulates that the balance sheet of a joint stock company should be prepared as per Part I of scheduled VI of the Act. However, the statement form has been emphasized upon by accountants for the purpose of analysis and interpretation.

(i) **Horizontal Form :****Balance Sheet of as on**

Liabilities	Rs.	Assets	Rs.
Share capital (with all particulars of authorised, issued, subscribed capital)	X x x	Fixed Assets	
Called up capital	X x x	1. Goodwill	X x x
Less : Calls in arrears	X x x	2. Land & Buildings	X x x
Add : Forfeited shares	X x x	3. Leasehold property	X x x
Reserves and Surplus		4. Plant and machinery	X x x
1. Capital reserves	X x x	5. Furniture & Fittings	X x x
2. Capital redemption reserve	X x x	6. Patents and trade marks	X x x
3. Share premium	X x x	7. Vehicles	X x x
4. Other reserves	X x x	Investments	
Less : Debit balances of profit & loss a/c (If any)	X x x	Current Assets, Loans and Advances	
5. Profit & loss appropriation a/c	X x x	(a) Current assets	
6. Sinking fund	X x x	1. Interest accrued on investments	X x x
Secured Loans		2. Loose tools	X x x
Debentures	X x x	3. Stock in trade	X x x
Add : outstanding interest	X x x	4. Sundry debtors	X x x
Loans from banks	X x x	Less : Provision for doubtful debts	X x x
Unsecured Loans		5. Cash in hand	X x x
Fixed deposits	X x x	6. Cash at bank	X x x
Short term loans and advances	X x x	(b) Loans and Advances	
Current Liabilities & Provisions		7. Advances to subsidiaries	X x x
(a) Current Liabilities		8. Bills receivable	X x x
1. Bills payable	X x x	9. Prepaid expenses	X x x

2. Sundry creditors	X x x	Miscellaneous expenditure (to the extent not written off or adjusted)	
3. Income received in advance	X x x	1. Preliminary expenses	X x x
4. Unclaimed dividends	X x x	2. Discount on issue of shares and debentures	X x x
5. Other liabilities	X x x	3. Underwriting commission	X x x
(b) Provisions		Profit and loss account (Loss), if any	X x x
6. Provision for taxation	X x x		
7. Proposed dividends	X x x		
8. Provident fund & pension fund			
Contingent liabilities not provided for	X x x		
	X x x		X x x

(ii) Vertical Form :**Balance Sheet of As on**

	Particulars	Schedule No.	Current Year	Previous Year
1.	Sources of funds			
	1. Shareholder's funds			
	(a) Capital		X x x	X x x
	(b) Reserves and surplus		X x x	X x x
	2. Loan Funds			
	(a) Secured Loans		X x x	X x x
	(b) Unsecured loans		X x x	X x x
	Total		X x x	X x x
II.	Application of Funds			
	1. Fixed assets			
	(a) Gross Block		X x x	X x x

	(b) Less : Depreciation		X x x	X x x
	© Net block		X x x	X x x
	(d) Capital work in progress		X x x	X x x
	2. Investments			
	3. Current Assets, Loans and advances			
	a. Inventories		X x x	X x x
	b. Sundry debtors		X x x	X x x
	c. Cash and bank balances		X x x	X x x
	d. Other current assets		X x x	X x x
	e. Loans and advances		X x x	X x x
			X x x	X x x
	Less : Current Liabilities and Provisions			
	(a) Current Liabilities		X x x	X x x
	(b) Provisions		X x x	X x x
	Net Current Assets		X x x	X x x
	4. (a) Miscellaneous expenditure to the extent not written off or adjusted		X x x	X x x
	(b) Profit & Loss a/c (debit)		X x x	X x x
	Total		X x x	X x x

(iii) Vertical Form for Analysis :

Balance Sheet of as on

	Particulars		Rs.
	Assets		
1.	Current Assets		
	Cash and bank balances		X x x
	Debtors		X x x
	Stock		X x x
	Other current assets		X x x
2.	Fixed Assets		X x x
	Less : Depreciation		X x x
3.	Investments		X x x

			X x x
	Total Assets	(1 + 2 + 3)	X x x
	Liabilities		
(a).	Current Liabilities		
	Bills payable		X x x
	Creditors		X x x
	Other Current liabilities		X x x
			X x x
(b)	Long term debt		
	Debentures		X x x
	Other long term debts		X x x
			X x x
©	Capital and Reserves		
	Share capital		X x x
	Reserves and Surplus		X x x
	Total Liabilities	(a + b + c)	X x x

16.5.3. Statement of Retained Earnings

The preparation of Statement of Retained Earnings is a common feature in corporate accounting practice, to show how the balance in Profit and Loss account is appropriated for various purposes like provision for dividend, transfer to reserve a/c

Profit & Loss appropriation account

Particulars	Rs.	Particulars	Rs.
To Transfers to reserves	X x x	By Last year's balance	X x x
To Dividends paid (interim or final)	X x x	By Current year's net profit (transferred from profit & loss a/c)	X x x
To dividends proposed	X x x	By Excess provisions (which are no longer required)	X x x
To Surplus carried to balance sheet	X x x	By Reserves withdrawn (if any)	X x x
	X x x		X x x

16.6 LIMITATIONS OF FINANCIAL STATEMENT ANALYSIS :

The analysis of financial statements has certain limitations also. Hence any person using this technique must keep in mind those limitations. Main limitations are as follows.

1. The analysis of financial statements is only a means to reach conclusions and no conclusion in itself. So, it cannot work as a substitute for sound judgement. The judgement ultimately, will depend upon the intelligence and skill of the analyst.
2. The figures drawn from one year statements have limited use and value. So, it will be dangerous to depend upon them only.
3. The basic nature of financial statements is historic. Past can never be hundred per cent presentative of the future. Hence, future course of business events should be forecast and interpreted in the context.
4. The results of the analysis of financial statements should not taken as an indication of good or bad management. The ratios or other figures explain only probable state events.
5. Any change, in the method or procedure of accounting mass the utility of such analysis. The figures of different financial statements lose the characteristic of comparability.
6. The figures of one firm are seldom fully comparable with those of the other because there is difference in the nature of products, procedure in accounting, cost of plant and machinery, nature and pattern of financing, etc. But analysis generally ignores these facts and make an objective comparison of two business firms. The results will be naturally misleading.
7. The repaid changes in the value of money also reduce the validity of such analysis and no useful conclusions can be drawn from a comparative study fo the financial statements of different years.
8. An analyst should also be cautions from window dressing in the accounts.

16.7 TYPES OF FINANCIAL ANALYSIS :

Two types of analysis are undertaken to interpret the position of an enterprise. They are : (1) Vertical Analysis (2) Horizontal analysis. The Companies Act, 1956 permits the companies to present the financial statements in vertical as well as horizontal form.

- (i) **Vertical Analysis** : It is the analysis of relationship as between different individual components. It is also the analysis between these components and their totals for a given period of time. Such an analysis examines only the relationship as between different components for a given point of time. It does not focus light on changing behaviour of the above relationships. It is also regarded as static analysis. Comparison of current assets to current liabilities or comparison of debt to equity for one point of time are the examples of vertical analysis. Thus, the vertical analysis can be made in the following ways.
1. By preparation of common size statements of the two similar units
 2. By preparing common size statement of different years of the same business unit.
- (ii) **Horizontal Analysis** : It is the analysis of changes in different components of the financial statements over different periods with the help of a series of statements. Such an analysis makes it possible to study periodic fluctuations in different components of the financial statements. Study of trends in debt or share capital or their relationship over the past ten year period or study of profitability trends for a period of five or ten years are examples of horizontal type of analysis. Horizontal analysis is also known as 'dynamic analysis' since this reflects changes in financial position of the company over a long period of time. It comprises :
1. Comparison of the Financial Statements of different years of the same business unit.
 2. Comparison of Financial Statement of a particular year of different business units.

16.8 METHODS OF FINANCIAL ANALYSIS :

A number of methods or devices are used to study the relationship between different statements. An effort is made to use those devices which clearly analyse the position of the enterprise. 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.

16.8.1. Comparative Statement Analysis :

Comparative financial statements are those statements which are designed to provide time perspective to the consideration of various elements of financial position embodied in such statements. In these statements figures for two or more periods are shown side by side to facilitate comparison. Both the income statement and balance sheet can be prepared in the form of comparative financial statements.

- (i) **Comparative Income Statement** : The income statement discloses net profit or net loss on account of operations. A comparative income statement will show the absolute figures for two or more periods, the absolute change from one period to another and if desired the change in terms of percentages. Since the figures for two or more periods are shown side by side, the reader can quickly ascertain whether sales have increased or decreased, whether cost of sales has increased or decreased etc. Thus, only a reading of data included in comparative income statement will be helpful in deriving meaningful conclusions.
- (ii) **Comparative Balance Sheet** : Comparative balance sheet as on two or more different dates can be used for comparing assets and liabilities and finding out any increase or decrease in those items. Thus, while in a single balance sheet the emphasis is on present position, it is on change in the comparative balance sheet. Such a balance sheet is very useful in studying the trends in an enterprise.
- (iii) Comparative financial statements can be prepared for more than two periods or on more than two dates. However, it becomes very cumbersome to study the trend with more than two periods data. Trend percentages are more useful in such cases.
- (iv) According to American Institute of Certified Public Accountants ``the presentation of comparative financial statements in annual and other reports enhances the usefulness of such reports and brings out more clearly the nature and trend of current changes affecting the enterprise. Such presentation emphasises the fact that statements for a series of periods are far more significant than those of a single period and that the accounts of one period are but an installment of what is essentially a continuous history. In any one year, it

is ordinarily desired that the balance sheet, the income statement and the surplus statement be given for one more proceeding year as well as for the current year.”

Illu.1 : The income statements of a company are given for the years ending on 30th June, 2003 and 30th June 2004. Rearrange the figures in a comparative form and study the profitability position of the company:

	2003 (Rs.'000)	2004 (Rs.'000)
Net Sales	785	900
Cost of goods sold	450	500
Opening Expenses:		
General and administrative expenses	70	72
Selling expenses	80	90
Non – Operating expenses:		
Interest paid	25	30
Income – Tax	70	80

Solution :

Comparative Income Statement for the year 2003 & 2004

Particulars	<i>Rs.'000</i>		Change in Rs.	Change in %
	2003	2004		
Net Sales	785	900	115	14.65
(-) Cost of goods sold	450	500	50	11.11
Gross profit (1)	335	400	65	19.40
Less: Operating expenses:				
General and administrative expenses	70	72	2	2.86
Selling Expenses	80	90	10	12.50
Total operating expenses(2)	150	162	12	8.00

Operating profit (1-2) (3)	185	238	53	8.65
(-) Non – operating expenses interest paid	25	30	5	20.00
Total Non-Operating expenses (4)	25	30	5	20.00
Profit before Taxes (3-4) (5)	160	208	48	30.00
(-) Income Tax Paid	70	80	10	14.28
Profit after Taxes (6)	90	128	38	42.22

Profitability position of a company: As there is raise in the sales revenue, but raise in the expenditure pattern is lesser than that of the raise in sales revenue, the overall profitability is said to be good.

Illu.2 : From the following income statement of Y Ltd., prepare a comparative income statement.

(Amount in Lakhs rupees)

	For the ear ended 31 March			
		2003		2004
		Rs.		Rs.
Net Sales		1,370		1,442
Cost of goods sold		838		926
Gross Profit		532		516
Operating expenses:				
Administration expenses	94		92	
Selling expenses	188	282	182	274
Operating profit		250		242
Add: Other incomes - dividend		44		50
		294		292
Less: Other deductions -				
Interest paid		44		44
Et profit before tax		250		248
Income tax		124		124
Net profit after tax		126		124

Solution :

Comparative Income Statement of Y Ltd.

<i>Particulars</i>	<i>2003</i>	<i>2004</i>	<i>Increase/ Decrease Rs.</i>	<i>Increase/ Decrease %</i>
Net Sales	1,370	1,442	(+) 72	(+) 5.26%
Less: Cost of goods sold	838	926	(+) 88	(+)10.50%
Gross Profit (A)	532	516	(-) 16	(-) 3.01%
Less: Operating expenses:				
Administration expenses	94	92	(-) 2	(-) 2.13%
Selling Expenses	188	182	(-) 6	(-) 3.18%
Total operating expenses (B)	282	274	(-) 8	(-) 2.84 %
	250	242	(-) 8	(-) 3.2%
Add: Operating incomes	-	-	-	-
Operating profit before interest and tax	250	242	(-) 8	(-) 3.2%
Add: Non – operating income dividend	44	50	(+) 6	(+)13.64%
Earnings before interest and taxes	294	292	(-) 2	(-) 0.68%
Less: Interest paid	44	44	NIL	NIL
Earnings before tax	250	248	(-) 2	(-) 0.8%
Less: Income Tax	124	124	NIL	NIL
Earnings After Taxes	126	124	(-) 2	(-) 1.59%

Illu.3 : The following are the balance sheets of a company for the years 2003 and 2004. Prepare a comparative balance sheet and study the financial position of the company:

Balance Sheet as on 30th June 2003 and 2004.

<i>Liabilities</i>	<i>2003</i>	<i>2004</i>
	<i>Rs.</i>	<i>Rs.</i>
Equity share capital	6,00,000	8,00,000

Reserves and Surplus	3,30,000	2,22,000
Debentures	2,00,000	3,00,000
Long term loans	1,50,000	2,00,000
Bills payable	50,000	45,000
Sundry Creditors	1,00,000	1,20,000
Other current liabilities	5,000	10,000
	14,35,000	16,97,000
Assets	2003	2004
	Rs.	Rs.
Land & Buildings	3,70,000	2,70,000
Plant & Machinery	4,00,000	6,00,000
Fixtures & Fittings	45,000	55,000
Cash in hand & at Bank	20,000	80,000
Bills receivables	1,50,000	90,000
Sundry Debtors	2,00,000	2,50,000
Stock	2,50,000	3,50,000
Prepaid expenses	-	2,000
	14,35,000	16,97,000

Solution :

**Comparative Balance Sheet of a company
for the year 2003 & 2004**

	Year ending 31 st December		Increase/ Decrease (Amounts)	Increase/ Decrease (Percentage)
	2003	2004		
Assets	Rs.	Rs.	Rs.	Rs.
Current Assets:				
Cash in hand and Bank	20,000	80,000	+60,000	+ 300.00
Bills receivable	1,50,000	90,000	-60,000	- 40.00
Sundry Debtors	2,00,000	2,50,000	+50,000	+ 25.00
Stock	2,50,000	3,50,000	+1,00,000	+ 40.00
Prepaid expenses	-	2,000	+2,000	- 100.00
Total Current Assets (1)	6,20,000	7,72,000	+1,52,000	+ 24.52

Fixed Assets:				
Land & Buildings	3,70,000	2,70,000	-1,00,000	- 27.03
Plant & Machinery	4,00,000	6,00,000	+2,00,000	+ 50.00
Fixture & Fittings	45,000	55,000	+ 10,000	+ 22.22
Total Fixed Assets (2)	8,15,000	9,25,000	+1,10,000	+ 13.49
Total Assets (1 + 2)	14,35,000	16,97,000	+2,62,000	+ 18.26
Liabilities & Capital	Rs.	Rs.	Rs.	Rs.
Current Liabilities:				
Bills Payable	50,000	45,000	-5,000	- 10.00
Sundry Creditors	1,00,000	1,20,000	+20,000	+ 20.00
Other current liabilities	5,000	10,000	+5,000	+ 100.00
Total Current Liabilities (1)	1,55,000	1,75,000	+20,000	+ 12.90
Liabilities:				
Long term loans:				
Debentures	2,00,000	3,00,000	+1,00,000	+ 50.00
Long-term loan on Mortgage	1,50,000	2,00,000	+50,000	+ 33.33
Total Long Term loans (2)	3,50,000	5,00,000	+1,50,000	+ 42.86
Share holders funds:				
Equity Share Capital	6,00,000	8,00,000	+2,00,000	+ 33.33
Reserve & Surplus	3,30,000	2,22,000	-1,08,000	- 32.73
Total Share holders Funds (3)	9,30,000	10,22,000	+92,000	+ 9.90
Total Liabilities (1+2+3)	14,35,000	16,97,000	+2,62,000	+ 18.26

Interpretation:

1. The comparative balance sheet of the company reveals that during 2004 their has been an increase in fixed assets of 1,10,000 i.e., 13.49% while long-term liabilities to outsiders have relatively increased by Rs.1, 50,000 and equity share capital has increased by Rs.2 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 the working capital.
2. The current assets have increased by Rs.1, 52,000 i.e., 24.52% and cash has increased by Rs.60, 000. On the other hand, there has been an increase in inventories amounting to Rs.1 lakh. The current liabilities have increased only by

Rs.20, 000 i.e., 12.9%. This further confirms that the company has raised long-term finances even for the current assets resulting in to an improvement in the liquidity position of the company.

3. Reserved and surplus have decreased from Rs.3, 30,000 to Rs.2, 22,000 i.e., 32.73% which shows that the company has utilized reserves and surpluses for the payment of dividends to shareholders either in cash or by the issue of bonus shares.
4. The overall financial position of the company is satisfactory.

Illu.4 : The following are the Balance Sheets of Vidhi Ltd., for the years ended 31.3.2001 and 31.3.2002:

<i>Liabilities</i>	<i>31.3.01 Rs.</i>	<i>31.3.02 Rs.</i>	<i>Assets</i>	<i>31.3.01 Rs.</i>	<i>31.3.02 Rs.</i>
Equity Capital	1,00,000	1,65,000	Fixed Assets (Net)	1,20,000	1,75,000
Preference capital	50,000	75,000	Inventory	20,000	25,000
Reserves	27,500	25,000	Debtors	50,000	62,500
Overdraft	25,000	25,000	Bills receivable	10,000	30,000
Creditors	20,000	25,000	Prepaid expenses	5,000	6,000
Provision for tax	17,500	25,000	Cash in Bank	20,000	26,500
			Cash in hand	5,000	15,000
	2,30,000	3,40,000		2,30,000	3,40,000

Prepare a comparative Balance Sheet and comment.

Solution :

Comparative Balance Sheet of Vidhi Ltd. for the year ended 31-3-01

<i>Particulars</i>	<i>31-3-01</i>	<i>31-3-02</i>	<i>Increase/ decrease Rs.</i>	<i>Increase/ decrease Rs.</i>
Current Assets:				
Inventory	20,000	25,000	(+) 5,000	(+) 25%
Debtors	50,000	62,500	(+) 12,500	(+) 25%
Bills receivable	10,000	30,000	(+) 20,000	(+) 200%
Prepaid expenses	5,000	6,000	(+) 1,000	(+) 20%
Cash in bank	20,000	26,500	(+) 6,500	(+) 32.5%
Cash in hand	5,000	15,000	(+) 10,000	(+) 200%
Total Current Assets (A)	1,10,000	1,65,000	(+) 55,000	(+) 50%
Current Liabilities:				
Overdraft	25,000	25,000	NIL	NIL
Creditors	20,000	25,000	(+) 5,000	(+) 25%
Provision for tax	17,500	25,000	(+) 6,500	(+) 42.86%
Total Current Liabilities (B)	62,500	75,000	(+) 12,500	(+) 20%
Working Capital A – B	47,500	90,000	(+) 42,500	(+) 89.47%
Add: Fixed assets (Net)	12,000	1,75,000	(+) 55,000	(+) 45.83%
Capital employed	1,67,500	2,65,000	(+) 97,500	(+) 58.21%
Less: Long term liabilities	-	-	-	-
Shareholder funds	1,67,500	2,65,000	(+) 97,500	(+) 58.21%
Proof:				
Equity capital	1,00,000	1,65,000	(+) 65,000	(+) 65%
Preference capital	50,000	75,000	(+) 25,000	(+) 50%
Reserves	17,500	25,000	(+) 7,500	(+) 42.86%
	1,67,500	2,65,000	(+) 97,500	(+) 58.21%

Comment on financial position: Compared with 2001 and 2002 total current assets increased by 50% and current liabilities increased by 20% working capital is increase by 58.21%. Share capital is increased by 65% of an amount available by issuing the shares in mostly used for working capital.

16.8.1 Common size Statement Analysis :

Common size statement is financial tool of studying key changes and trends in financial position of a company. In common size statement, each item is stated as a percentage of the total of which that item is a part, each percentage exhibits the relation of the individual item to its respective total. Therefore, the common size percentage method represents a type of ratio analysis. That is why this statement is also designated as "component percentage" or "100 per cent statement". Preparation of the common size statement involves two steps.

- (i) State the total of the statement as 100 per cent
- (ii) Compute the ratio of each item to the total in the statement.

Common-size statement can be used both for vertical and horizontal analysis. Comparison of the company's position with the related industry as a whole is possible with the help of vertical analysis. In contrast, horizontal analysis facilitates trend analysis of the financial position of the company over the past several years. There are two types of common size statements, viz., common size income statement and balance sheet.

(a) Common Size Income Statement :

The Common size income statement is designed to exhibit what proportion of the net sales has been absorbed by the various costs and expenses incurred by the enterprise, and the proportion that remains as net income. For preparing common size income statement all items in the income statement are expressed in percentage form in terms of total sales.

The common size income statements for a number of years are very helpful in pointing out efficiencies and inefficiencies. It must be remembered that the percentages may be influenced by variation in sale prices, higher or lower cost of goods acquired or both. Common size percentages must be supplemented for making detailed analysis of financial and operating data. It will, therefore, be more useful to use trend ratios as well as individual ratios showing relationships between balance sheet and income statement items.

(b) Common Size Balance Sheet :

Common size balance sheet is prepared by stating the total assets as 100 and reducing individual assets into percentages of the total. Likewise, individual liability items are expressed as percentages of the total liabilities. Thus, the common size balance sheet percentage shows the relation of each asset item to total assets and of each liability percentage shows the relation of each liability item to total liabilities and

owner's equity item to total liabilities and owners' equity. A closer scrutiny of the common size balance Sheet discloses that this statement focuses on two important aspects.

1. Distribution pattern of liabilities as between current liabilities, long term liabilities and equity capital.
2. Distribution pattern of assets as between current assets, fixed assets and others

The common size balance sheet analysis can, of course, be carried further and extended to the study of what portion of a sub-group, rather than the total, an item is. Thus, in assessing the liquidity of current assets, it may be of interest to know not only what proportion of total assets is inventories, but also what proportion of current assets to represented by this asset. A study of common size statement of the company with that of a competitive company or the industry would show whether or not the company is managing assets efficiently. An analysis of the pattern of distribution of liabilities reveals the debt equity position of the company too large a percentage of liabilities and a relatively low margin of safety for creditors.

While common size statements do not focus light on the relative sizes of individual companies which are compared, the problem of actual comparability between them is a matter to be resolved by the analyst judgement. Comparison of common size statement of a single enterprise over the years is valuable in that it reveals the changing proportions of components within group of assets and liabilities. However, care must be exercised in interpreting such changes and the trend which discloses.

Illu.5 : Following are the income statements of X & Co. Ltd. and Y & Co. Ltd. For the year ended 31st December 2003.

<i>Expenses</i>	<i>X & Co. Ltd. Rs.</i>	<i>Y & Co. Ltd. Rs.</i>	<i>Incomes</i>	<i>X & Co. Ltd. Rs.</i>	<i>Y & Co. Ltd. Rs.</i>
To Opening Stock	20,000	32,000	By Sales	3,84,000	4,31,000
To Purchases	1,40,000	1,60,000	By Closing stock	40,000	45,000
To Wages	40,000	30,000	By Profit on sale of land	8,000	14,000
To Manufacturing			By Discount	2,000	6,000

expenses	20,000	25,000			
To Salaries	45,000	48,000			
To Office expenses	15,000	1,7000			
To Selling expenses	42,000	50,000			
To Depreciation	20,000	28,000			
To Loss by fire	10,000	5,000			
To Interest paid	18,000	23,000			
To Profit	64,000	78,000			
	4,34,000	4,96,000		4,34,000	4,96,000

You are required to prepare common size income statement.

Solution :

Comparative Income Statement of X & co. Ltd. and Y & Co. Ltd. For the year ended 31-12-2003

Particulars	X & Co. Ltd. Amount Rs.	%	Y & Co. Ltd. Amount Rs.	%
Sales (A)	3,84,000	100	4,31,000	100
Less: Cost of goods sold:				
Opening Stock	20,000	5.21	32,000	7.42
Add: Purchases	1,40,000	36.46	1,60,000	37.12
Wages	40,000	10.42	30,000	6.96
Manufacturing expenses	20,000	5.20	25,000	5.80
	2,20,000	57.29	2,47,000	57.30
Less: Closing Stock	40,000	10.42	45,000	10.44
Cost of goods sold (B)	1,80,000	46.87	2,02,000	46.86
Gross profit (A) – (B) = (c)	2,04,000	53.13	2,29,000	53.14
Less: Operating Expenses:				
Salaries	45,000	11.72	48,000	11.14
Office Expenses	15,000	3.91	17,000	3.94
Selling expenses	42,000	10.94	50,000	11.60
Depreciation	20,000	5.21	28,000	6.50
Total operating expenses (D)	1,22,000	31.78	1,43,000	33.18
(c) – (D)	82,000	21.35	86,000	19.95

Add:	Operating Income:				
	Discount	2,000	0.52	6,000	1.39
	Operating Profit Before Interest and Tax (OPBIT)	84,000	21.87	92,000	21.34
Less:	Non – operating expenses				
	Loss by fire	10,000	2.60	5,000	1.16
		74,000	19.27	87,000	20.18
Add:	Non – operating Income:				
	Profit on sale of land	8,000	2.08	14,000	3.25
	Earnings before interest and Tax	82,000	21.35	1,01,000	23.43
Less:	Interest paid	18,000	4.69	23,000	5.34
	Earnings after taxation	64,000	16.66	78,000	18.09

Illu.6 : The following are the Balance Sheet of Gayatri & Co. for the year 2003 and 2004:

<i>Liabilities</i>	<i>2003</i>	<i>2004</i>	<i>Assets</i>	<i>2003</i>	<i>2004</i>
	<i>Rs.</i>	<i>Rs.</i>		<i>Rs.</i>	<i>Rs.</i>
Bills payable	25,000	38,000	Bank a/c	50,000	70,000
Creditors	75,000	1,00,000	Debtors	1,00,000	1,50,000
Outstanding Taxes			Stock	1,00,000	1,50,000
	50,000	75,000			
6% Debentures	50,000	75,000	Land	50,000	50,000
6% Preference share capital	1,50,000	1,50,000	Buildings	1,50,000	1,35,000
Equity share capital	2,00,000	2,00,000	Machinery	1,50,000	1,35,000
Reserve	1,00,000	1,22,000	Furniture	50,000	70,000
	6,50,000	7,60,000		6,50,000	7,60,000

From the above information's, prepare common size Balance Sheet.

Solution :

**Common Size Balance Sheet of Gayathri Co.
For the year 2003 & 2004**

Particulars	2003		2004	
	Amount	%	Amount	%
Assets:				
Current Assets:				
Bank	50,000	7.69	70,000	9.21
Debtors	1,00,000	15.38	1,50,000	19.74
Stock	1,00,000	15.39	1,50,000	19.74
Total Current Assets (1)	2,50,000	38.46	3,70,000	48.69
Fixed Assets:				
Land	50,000	7.69	50,000	6.58
Buildings	1,50,000	23.08	1,35,000	17.76
Machinery	1,50,000	23.08	1,35,000	17.76
Furniture's	50,000	7.69	70,000	9.21
Total Fixed Assets (2)	4,00,000	61.54	3,90,000	51.31
Total Assets (1 +2)	6,50,000	100.00	7,60,000	100.00
Liabilities:				
Current Liabilities:				
Bills payable	25,000	3.85	38,000	5.00
Creditors:	75,000	11.54	1,00,000	13.16
Outstanding taxes	50,000	7.69	75,000	9.87
Total Current Liabilities (1)	1,50,000	23.08	2,13,000	28.03
Long term debts:				
6% Debentures	50,000	7.69	75,000	9.87
Total long term debts (2)	50,000	7.69	75,000	9.87
Shareholder's funds:				
6% Preference share capital	1,50,000	23.08	1,50,000	19.74
Equity Share Capital	2,00,000	30.77	2,00,000	26.31
Reserve	1,00,000	15.38	1,22,000	16.05
Total shareholder's fund (3)	4,50,000	69.23	4,72,000	62.10

Total Liabilities (1+2+3)	6,50,000	100.00	7,60,000	100.00
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Comment: Overall financial position of the company in 2004 is satisfactory as there is slight raise in current assets with slight fall in fixed assets and slight rise in current liabilities as well as shareholder funds.

Illu.7 : The Balance Sheets of M Company and N Company as on 31-3-2004 are given below. Prepare common size Balance Sheet and compare the financial position of the companies.

Balance Sheet as on 31-3-04

<i>Liabilities</i>	<i>M Com.</i>	<i>N Com</i>	<i>Assets</i>	<i>M Com</i>	<i>N Com</i>
	<i>Rs.</i>	<i>Rs.</i>		<i>Rs.</i>	<i>Rs.</i>
Pref. Share capital	1,20,000	1,60,000	Buildings	80,000	1,23,000
Equity share capital	1,50,000	4,00,000	Machinery	2,34,000	6,00,000
Reserve fund	14,000	18,000	Short-term		
Debentures	1,50,000	1,30,000	Investments	1,000	40,000
Bills payable	2,000	NIL	Stock	10,000	25,000
Creditors	12,000	4,000	Debtors	4,000	8,000
Outstanding expenses	15,000	6,000	Prepaid expenses	1,000	2,000
Proposed dividends	10,000	90,000	Cash & Bank	8,000	10,000
	4,38,000	8,08,000		4,38,000	8,08,000

Solution :

Common size Balance Sheet as on 31-3-04

<i>Particulars</i>	<i>M Company</i>		<i>N Company</i>	
	<i>Amount Rs.</i>	<i>Percentage</i>	<i>Amount Rs.</i>	<i>Percentage</i>
Assets side:				
Current Assets:				
Short term investments	1,000	0.23%	40,000	4.95%

Stock	10,000	2.28%	25,000	3.09%
Debtors	4,000	0.91%	8,000	0.99%
Prepaid expenses	1,000	0.23%	2,000	0.25%
Cash & Bank	8,000	1.83%	10,000	1.24%
Total Current Assets (A)	24,000	5.48%	85,000	10.52%
Fixed Assets:				
Buildings	80,000	18.26%	1,23,000	15.22%
Machinery	3,34,000	76.26%	6,00,000	74.26%
Total Fixed Assets (B)	4,14,000	94.52%	7,23,000	89.48%
Total Assets (A) + (B)	4,38,000	100%	8,08,000	100%
Liabilities side:				
Current Liabilities:				
Bills payable	2,000	0.46%	NIL	NIL
Creditors	12,000	2.74%	4,000	0.50%
Outstanding expenses	15,000	3.42%	6,000	0.74%
Proposed dividends	10,000	2.26%	90,000	11.14%
Total Current liabilities (c)	39,000	8.90%	1,00,000	12.38%
Long term liabilities:				
Debentures	1,15,000	26.26%	1,30,000	16.09%
Total long term liabilities (D):	1,15,000	26.26%	1,30,000	16.09%
Capital & Reserves:				
Preference share capital	1,20,000	27.40%	1,60,000	19.80%
Equity share capital	1,50,000	34.24%	4,00,000	48.50%
Reserve fund	14,000	3.20%	18,000	2.23%
Total Capital & Reserves (E)	2,84,000	64.84%	5,78,000	71.53%
Total liabilities (C)+(D)+(E)	4,38,000	100%	8,08,000	100%

16.8.2 Trend Analysis :

Trend analysis depicts behaviour of the ratios over a period of time and the trends in the operation of the enterprise. The trend figures are index figures giving a bird's eye view of the comparative data by presenting it over a period of time. This is horizontal analysis of financial statement, often called as Pyramid Method of ratio analysis 0- a guide to yearly changes. Under this form of analysis, generally financial ratios are studied for a specified number of years. It is a dynamic analysis depicting the changes over a stated period. Their method of analysis is one of 'direction'. The working of trend analysis involves the following three steps.

1. selection of a base year
2. Assignment of an index number of 100 to each item of the base year

3. Calculation of percentage relationship that each item bears to the same item in the base year.

Objectives of Trend Analysis :

It is of great significance in making comparative study of financial statements for several years. It shows the direction of movement over a period of time. The following are the objectives of Trend analysis.

- (i) To draw a comparative chart and make a comprehensive study of Financial statements.
- (ii) Trend analysis indicates the direction of movement or changes in item over a long period of time.
- (iii) To have a better view of things unaffected by short term fluctuations, by studying a long term trend percentage analysis.

Limitations of Trend Analysis :

This tool has its own limitations. It is necessary that the base year must be a normal year. Further, it places all items at par in the base year with the result that a variation in the least significant item may receive an emphasis out of all proportion to its importance.

Illu.8 : From the following particulars, compute trend percentages:

	Year			
	2000	2001	2002	2003
Equity share capital	10	12	14	16
Preference share capital	10	10	10	10
Reserves	05	08	05	10
Creditors	03	05	13	12

Solution :

Liabilities	Trend percentage				Rs. In lakhs (Base Year 2000)			
	2000	2001	2002	2003	2000	2001	2002	2003
	Rs.	Rs.	Rs.	Rs.	%	%	%	%
Equity share capital	10	12	14	16	100	100	140	160
Pref. Share capital	10	10	10	10	100	100	100	100

Reserves	05	08	05	10	100	160	100	200
Creditors	03	05	13	12	100	167	433	400
Total	28	35	42	48	100	125	150	171

Illu.9 : From the following data, prepare a statement showing trend percentages.

	2000	2001	2002	2003
	Rs.	Rs.	Rs.	Rs.
Sales	10,000	9,500	12,000	13,000
Cost of goods sold	6,000	5,890	6,960	7,280
Gross Profit	4,000	3,610	5,040	5,720

Solution :

Trend Ratios

	2000	2001	2002	2003	2000	2001	2002	2003
	Rs.	Rs.	Rs.	Rs.	%	%	%	%
Sales	10,000	9,500	12,000	13,000	100	95.0	120.0	130.0
(-) Cost of goods sold	6,000	5,890	6,960	7,280	100	98.16	116.0	121.33
Gross profit	4,000	3,610	5,040	5,720	100	90.25	126.0	143.0

16.9 QUESTIONS :

1. Define Financial Statement.
2. What are the objectives of financial statements?
3. What are the different methods used in financial statements?
4. State the objectives and limitations of Financial statement analysis.
5. What are financial statements? Explain various methods of financial statement analysis.

6. Write short notes on Comparative Financial Statements.
7. What do you understand by `Common size Statements
8. What are trend ratios? How are they computed?

16.10 EXERCISES :

1. Prepare the comparative Income statement from the following:

Income Statement

<i>Particulars</i>	1998 Rs.	1999 Rs.	<i>Particulars</i>	1998 Rs.	1999 Rs.
To Cost of goods sold	1,00,000	1,00,000	By Sales	2,50,000	3,00,000
To Operational expenses	75,000	1,10,000			
To Interest	25,000	20,000			
To Tax	25,000	30,000			
To Net Profit	25,000	40,000			
	2,50,000	3,00,000		2,50,000	3,00,000

2. From the 31-3- 1998 and 31-3-1999 following information of 'A' Ltd., Prepare Comparative Balance Sheet and write the interpretation:

Liabilities	(Rs.'000)	
	1998	1999
Share Capital	2,400	3,600
Reserves	1,872	2,124
Debentures	300	600
Long-term debt	900	1,530
Bills payable	1,530	702
Other liabilities	42	60
	7,044	8,616

Assets	(Rs.'000)	
	1998	1999
Land and Buildings	1,620	1,040
Plant	1,860	4,716
Furniture	54	108
Other fixed Assets	120	180
Long –term Investments	276	354
Bank	708	60
Bills receivable	1254	1120
Stock	960	780
Prepaid expenses	18	18
Other current assets	174	2240
	7,044	8,616

3. A firm has a profit before interest and taxes of Rs.5, 00,000, interest charges Rs.1,00,000 and taxes Rs.50, 000. Calculate earnings after taxes.
4. The Balance Sheet of Hero Co. and Villan Co. compare the financial position of the companies by means of common size Balance Sheet.

Liabilities	Hero Co. Rs.	Villain Co. Rs.
Preferential share Capital	1,00,000	1,50,000
Equity share Capital	1,70,000	5,10,000
Reserve fund	10,000	8,000
P & L a/c	4,000	10,000
Debentures	1,00,000	1,00,000
Bills payable	17,000	30,000
Creditors	27,000	10,000
Provision for taxes	20,000	1,10,000
	4,48,000	9,28,000

Assets	Hero Co. Rs.	Villain Co. Rs.
Buildings	75,000	1,00,000
Machinery	2,25,000	4,00,000
Furniture	5,000	23,000
Motor car	1,00,000	2,00,000
Inventory	11,000	65,000
Debtors	5,000	10,000
Cash at Bank	26,150	1,28,800
Cash in hand	850	1,200
	4,48,000	9,28,000

5. Prepare a common size statement from the following balance sheet.

Liabilities	1999	2000	Assets	1999	2000
Capital	1,000	1,200	Debtors	450	390
Capital reserve	90	185	Cash	200	15
General reserve	500	450	Stock	320	250
Sinking fund	90	100	Investments	300	250
Debentures	450	650	Buildings	800	1,400
Creditors	200	150	Land	198	345
Other liabilities	15	20	Furniture	77	105
	2,345	2,755		2,345	2,755

6. From the following prepare a comparative statement:

	31-3-01	31-3-02		31-3-01	31-3-02
	Rs.	Rs.		Rs.	Rs.
To cost of goods sold	1,00,000	1,20,000	By Sales	2,00,000	2,50,000
To Office expenses	20,000	20,000			
To Selling expenses	10,000	20,000			
To Other expenses	30,000	-			
To Net Profit	40,000	90,000			

	2,00,000	2,50,000		2,00,000	2,50,000
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7. From the following particulars compute trend percentages:

	2000	2001	2002	2003
Cash	20	24	16	28
Debtors	40	50	65	80
Stock	60	80	70	100
Other Current Assets	10	15	25	30

7.11 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
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3. Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.
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6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter – 17

Ratio Analysis

Objectives :

After reading this lesson you should be able to :

- Understanding the meaning of a ratio and ratio analysis
- Know the objects and utilities of ratio analysis
- Classify the ratios on the basis of profitability, activity, liquidity, solvency
- Discuss the advantages and limitations of ratio analysis

Structure :

17.1 Introduction

17.2 Meaning of Ratio

17.3 Objects and Utility of Ratio Analysis

17.4 Classification of Ratios

17.5 Advantages of Ratio Analysis

17.6 Limitations of Ratio Analysis

17.7 Questions

17.8 Exercises

17.9 Suggested Readings

17.1 INTRODUCTION :

The most important task of a financial manager is to interpret the financial information in such a manner that it can be well understood by the people, who are not well versed in financial information figures. The technique by which it is done, known as 'Ratio Analysis' 'Ratio' is a relationship between two or more variables expressed in (i) percentage (ii) rate and (iii) proportion.

The construction of ratios is a major analytical rule in the hands of financial executives. Mostly financial statements are expressed in absolute rupee figures. The use

of ratios aids the financial manager and other analysts in pointing out the relative importance of the various items appearing in the financial statements. Each major item in the balance sheet and the income statement has a relationship with one or more items in either or both statements which can be expressed in ratio. By using ratio, comparisons with financial statements or other firms are facilitated and comparison of a firm's financial performance can too be made over a period of time.

17.2 MEANING OF RATIO :

Ratios are simply a means of highlighting in arithmetical terms the relationship between figures drawn from various financial statements. Robert Anthony defines a ratio as – simply one number expressed in terms of another.' A great number of ratios can be computed from the basis financial statements – balance sheet and profit and loss account.

Ratio Analysis :

It involves three steps. First, the financial manager selects from the statements those sets of data which are relevant to his objective of analysis and calculates appropriate ratios for the firm. The second step calls for a comparison either with the industry standards or with the ratio of the same firm relating to past. After such comparison the conclusions may be withdrawn and presented in the shape of reports.

17.3 OBJECTS AND UTILITY OF RATIO ANALYSIS :

Ratio analysis is an important and useful technique to check upon the efficiency with which working capital is being used in the enterprise. Some ratio indicate the trend of progress or downfall of the firm. It helps the financial management in evaluating the financial position and performance of the firm. The use of ratio analysis is not confined to the financial manager only. The credit supplier, bank, lending institutions and experienced investor all use ratio analysis as their initial tool in evaluating the firm as a desirable borrower or as potential investment outlet. It functions as a sort of health test. With the help of ratio analysis financial executive can measure whether the firm is at present financially healthy or not. The following are the important managerial uses of ratio analysis.

1. **Aid in Financial Forecasting** : Ratio analysis is very helpful in financial forecasting . Ratios relating to past sales, profits and financial position are base for future trends.
2. **Aid in comparison** : With the help of ratio analysis ideal ratios can be composed and they can be used for comparison of a particular firm's progress and performance.
3. **Aid in Cost Control** : Ratios are very useful for measuring the progress and performance.
4. **Communication Value** : Different financial ratios communicate the strength and financial standing of the firm to the internal and external parties.
5. **Other uses** : Financial ratios are helpful in the diagnosis and financial health of a firm. They highlight the liquidity, solvency, profitability and capital gearing, etc., of the firm. They are a useful tool of analysis of financial performance.

17.4 CLASSIFICATION OF RATIOS :

Ratios can be classified on the following two basis.

1. **According to Financial statements** : According to this basis, the ratios are classified as under –
 - (a) **Balance Sheet ratios** : These ratios are calculated to know the financial position of a concern on a particular date. Both items for which ratio is to be calculated appear on the balance sheet. Such a ratio may be called a financial ratio. Example of balance sheet ratios are – Current ratio, quick ratio, liquidity ratio, ratio of inventory to working capital, ratio of current assets to fixed assets, debt to equity ratio, proprietary ratio and capital gearing ratio.
 - (b) **Profit and Loss Ratios** : Ratios which are drawn from trading and profit and loss account are known as profit and loss ratios. These ratios deal with the relationship between two items both of which belong to the profit and loss account. Such a ratio may be called an operating ratio. Examples of these ratios are – Gross profit ratio, operating ratios, operating profit ratio and net profit ratio.
 - (c) **Combined ratios** : These ratios portray the relationship between items, one of which is a part of the balance sheet and the other of the profit and loss account. Such a ratio may be called a mixed ratio. Examples of these ratios are – Stock turnover ratio, Receivable turnover ratio, working capital turnover ratio, Fixed assets turnover ratio, capital turnover ratio, Total assets turnover ratio, Return on shareholders, Investment and Return on capital employed.

Chart Showing Application of Different Ratios

	For Testing	Ratio concerned	Interested parties
A.	Profitability	<ol style="list-style-type: none"> 1. Gross Profit ratio 2. Net profit ratio 3. Operating ration 4. Return on capital employed 5. Dividend ratio 6. Earning per share 7. Dividend per share 	Shareholders Creditors (Long term) Government Purchasers of Enterprise Employees
B.	Liquidity and Solvency	<ol style="list-style-type: none"> 1. Current Ratio 2. Liquid ratio 3. Absolute Liquid ratio 4. Proprietary ratio 5. Assets to proprietorship ratio 6. Debt Equity ratio 7. Capital Gearing ratio 	Creditors (Short term) Investors Money lenders
C.	Capital Structure	<ol style="list-style-type: none"> 1. Capital gearing ratio 2. Equity capital ratio 3. Long term loans to Net worth 	Shareholders and outsiders
D.	Activity	<ol style="list-style-type: none"> 1. Debtors Turnover ratio 2. Creditors Turnover ratio 3. Stock Turnover ratio 4. Fixed Asset Turnover ratio 5. Current assets turnover ratio 6. Total Assets turnover ratio 7. Working capital turnover ratio 	Management Shareholders Creditors (Long and Short Term) Customers

E.	Management Efficiency	All concerned ratios	Management
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2. According to Purpose or Functional Classification :

On the basis of purpose, ratios can be grouped into the following four categories.

(a) Profitability Ratios : A measure of 'profitability' is the overall measure of efficiency.

Under profitability ratios, following ratios should be studied to judge the profitability of an organisation.

(i) Gross Profit ratio (GPR) : It expresses the relationship of gross profit on sales to net sales, in terms of percentage, representing the percentage of gross profit earned on sales. The ratio is arrived at as follows.

$$\text{Gross profit ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}}$$

(ii) Operating ratio : This ratio expresses the relationship between total cost of goods and sales. It is calculated as follows.

$$\frac{\text{Cost of goods sold} + \text{Operating expenses}}{\text{Net Sales}} \times 100$$

The main components of this ratios are :

(a) Cost of goods sold = Opening stock + Purchases + Manufacturing expenses – Closing stock or sales – Gross Profit.

(b) Operating expenses = Office and Administrative expenses and selling and distribution expenses.

(iii) Operating Profit Ratio : This ratio establishes the relationship between

$$\text{Operating Profit ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$$

operating profit and sales and is calculated as follows.

The main component of this ratio are :

- (a) Operating profit = Gross profit – Operating expenses
 (b) Operating profit ratio = $\frac{\text{Operating profit}}{\text{Net Sales}} \times 100$

(iv) Net profit ratio : This is the ratio of net income or profit after taxes to net sales. This ratio is very useful to the proprietors because it reveals the overall efficiency of the business. The ratio is arrived at as follows.

$$\text{Net Profit ratio} = \frac{\text{Net Profit after Taxes}}{\text{Net Sales}} \times 100$$

(b) Liquidity ratios : These ratios, constituting ratio analysis of the short term financial position, are intended to derive a picture of the capacity of a firm to meet its short term obligation out of its short term resources. Some of the important liquidity ratios are as follows.

(i) Current or working capital Ratio : This is the ratio of the current assets to the current liabilities of a business at any time. The ratio is usually taken at the end of a financial year when all the required figures can be collected after they

$$\text{Quick Ratio or Acid Test ratio} = \frac{\text{Liquid or Quick Assets}}{\text{Liquid or Quick Liabilities}}$$

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

have been thoroughly examined. It is expressed as follows.

The ratio should preferably be 2:1. If the current assets are two times the current liabilities, there will be no adverse effect on business operations when the payment of current liabilities is made.

(ii) Quick Ratio : This is the ratio of liquid assets to current liabilities. 1 to 1 ratio is considered ideal ratio for concern. This ratio is of great importance for banks and financial institutions. This ratio is also known as Acid Test Ratio or Liquid Ratio. It is worked out as follows.

$$\text{Quick Ratio or Acid Test ratio} = \frac{\text{Liquid or Quick Assets}}{\text{Liquid or Quick Liabilities}}$$

Liquid assets are those assets which are readily converted into cash and will include cash, cash at bank, bills receivables, sundry debtors and short term investments.

- (iii) **Debtors Turnover ratio** : This ratios also known as Receivable Turnover ratio measures the accounts receivables (trade debtors and bills receivables) in terms of number of days of credit sales during a particular period. This ratio is calculated as follows :

$$\text{Debtors Turnover ratio} = \frac{\text{Trade Debtors + Bills receivable}}{\text{Net Credit Sales}} \times \text{No. of days in a period}$$

- (iv) **Stock or Inventory Turnover ratio** : It establishes the relationship between cost of goods sold during a given period and the average stock of goods in hand during that period. This ratio can be calculated as follows.

$$\text{Stock turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average Stock held}}$$

- (a) Cost of goods sold = Opening Stock + Purchases – Closing Stock or sales
- Gross Profit

(b)

$$\text{Average Stock} = \frac{\text{Opening stock} + \text{Closing Stock}}{2}$$

(c) Solvency Ratios :

Solvency refers to the ability of the concern to meet its long term liabilities. These ratios are studied to measure the long term solvency and comprise of :

- (i) **Debt Equity ratio** : This ratio reflects the proportionate relationship between outsider's Funds and Shareholders' funds. It relates to all recorded creditors claims on asset to the owners, recorded claims in order to measure the firm's obligation to creditors in relation to funds provided by the owners. It is also known as 'External – Internal Equity ratio' and is calculated as follows.

$$\text{Debt Equity ratio} = \frac{\text{External Equity}}{\text{Internal Equities}} \quad (\text{or})$$

$$\text{Debt to equity ratio} = \frac{\text{Outsider's Funds}}{\text{Shareholders funds}}$$

Outsiders' Funds include all long term debts, while shareholders funds consist of Preference Share capital, equity share capital and all types of reserves.

- (ii) **Proprietary Ratio** : A variant of debt to equity ratio is the proprietary ratio which establishes the relationship between proprietors funds and total assets. The ratio is worked out as follows

$$\text{Proprietary ratio} = \frac{\text{Shareholders' Funds}}{\text{Total Assets}}$$

- (iii) **Creditors Equity to Total Equities** : This ratio is ascertained to find out the proportion of outsiders' equity in the total equities. This can be calculated with the help of the following formula.

$$\text{Creditors' Equity total Equities} = \frac{\text{Creditors' Equity}}{\text{Total Equities}}$$

- (c) **Over-all ratios** : These ratios are also known as 'Test of overall profitability'. Under this, we shall study the following ratios.

- (i) **Return on Investment** : The ratio shows how much concern is earning on its capital employed. Return on investment or Return on capital employed can be ascertained with the help of the following formula.

$$\text{Return on Investment} = \frac{\text{Profit before tax}}{\text{Capital Employed}} \times 100$$

- (ii) **Return on Equity Capital** : Another aspect to be considered in the analysis of overall profitability is the rate of return on Equity capital which relates to the net profits available to equity shareholders to the amount of capital invested by them. Another way of looking at the rate of return on equity capital is to divide the net profit available to equity shareholders by the number of outstanding equity shares in order to calculate earnings per equity share. This ratio is ascertained with the help of the following formula.

Rate of Return on Equity Capital =

$$\frac{\text{Net profit - Dividend due to preference shares}}{\text{Number of Equity shares}}$$

= Earnings per Equity share

- (iii) **Dividend per share and Pay out ratio** : The pay out ratio indicates the proportion of earnings which has been paid out to the equity shareholders out of the total earnings available to them. This is ascertained with the help of the following formula.

$$\text{Dividend per share} = \frac{\text{Account of Dividend shares}}{\text{Number of Equity shares}}$$

Pay out ratio =

$$\frac{\text{Amount of Dividend paid on Equity shares}}{\text{Amount of Total Earnings available for Distribution among equity shares}}$$

17.5 ADVANTAGES OF RATIO ANALYSIS :

Ratio Analysis is a very important and useful tool for financial analysis. It serves many purposes and is helpful not only for internal management but also for prospective investors, creditors and other outsiders. The following are the important uses (advantages) of ratio analysis.

1. It is an important and useful tool to exercise check upon the efficiency with which the working capital is being used (managed) in a business enterprise. Efficient Management of Work cap.
2. It helps the management of business concern in evaluating its financial position and efficiency of performance.
3. It serves as a sort of health test of a business firm, because with the help of this analysis financial managers can determine whether the firm is financially healthy or not.
4. A ratio analysis covering a number of past accounting (financial) periods clearly show the trend of changes in the business position (i.e., whether the trend in financial position, income position etc. is upward, or downward or static). The progress or downfall of a business concern is clearly indicated by this analysis. Use to measure the trend of the Business.
5. It helps in making financial estimates for the future (i.e., in financial forecasting)
6. It helps the task of managerial control to a great extent.
7. It helps the credit suppliers and investors in evaluating a business firm as a desirable debtor or as a potential investment outlet.
8. With the help of this analysis ideal (standard) ratios can be established and these can be used for the purpose of comparison of a firm's progress and performance.
9. This analysis communicates important information regarding financial strength and standing, earning capacity, debt (borrowing) capacity, liquidity position, capacity to

meet fixed commitment (charges), solvency , capital gearing, working capital management, future prospects etc., of a business concern.

10. This analysis may be employed for the purpose of comparing the working result and efficiency of performance of a business enterprise with that of other enterprises engaged in the same industry. (Inter firm comparison).
11. It helps the management of a business concern to discharge their basic functions of planning, coordinating, controlling etc.
12. It serves as an instrument for testing management efficiency
13. It sometimes provides a useful tool for decisions on certain policy matters.

17.6 LIMITATIONS OF RATIO ANALYSIS :

The chief limitations of accounting ratios are states below.

1. **A single ratio has no significance** : A ratio taken by itself would be meaningless unless it is studied along with other ratios. Ratios of one firm should be compared with ratios of other such similar firms and any deviations should be investigated.
2. **It ignores qualitative factors** : They are the factors which cannot be expressed in terms of money. Ratio analysis is a tool of qualitative factors like sincerity, ability to pay back loans etc., which may sometimes be of more importance in taking financial decisions.
3. **Lack of proper standard for comparison** : Since business firms differ from one another in capital structure, financial problems, size etc., a standard fixed for one firm may not be suitable to other firms.
4. **Reveals more about Past** : Balance Sheet and profit and loss account are historical statements because they are prepared on the basis of the events and transactions that have already taken place. Ratios are calculated from other sources because this ratio analysis provides only a fraction of information required for decision making.
5. **Fraction of Information** : Information received from the ratio analysis should always be used in conjunction with the information received from other sources because this ratio analysis provides only a fraction of information required for decision making.
6. **Illusory Precision** : Ratio analysis may attach some precision to the arithmetical results of the accounting data because of their numerical character. But these data are more estimates e.g., estimates regarding the life of an asset, provision for doubtful debts etc.

Illu.1 From the following details prepare the Balance Sheet with as many details as possible:

(a) Stock velocity	6
(b) Capital turnover ratio (on cost of sales)	2
(c) Fixed assets turnover ratio (on cost of sales)	4
(d) Gross profit turnover ratio	20%
(e) Debtors velocity	2 months
(f) Creditors velocity	73 days

**Gross Profit was Rs.60,000. Reserves and surplus amounted to Rs.20,000.
Closing stock was Rs.5,000 in excess of opening Stock.**

Solution 1:

(a) Gross profit Ratio =

$$= \frac{\text{Gross profit}}{\text{Net Sales}} \times 100; \frac{20}{100} = \frac{60,000}{\text{Net Sales}}$$

$$20 \text{ Sales} = 60,000 \times 100 = 20 \text{ sales} = \text{Rs.}60,00,000$$

$$\text{Sales} = \frac{60,00,000}{20} = \text{Rs.}3,00,000$$

Cost of Goods sold = Sales – Gross profit

$$3,00,000 - 60,000 = \text{Rs.}2,40,000.$$

(b) Stock Turnover Ratio =

$$= \frac{\text{Cost of goods sold}}{\text{Average Stock}}$$

$$6 = \frac{2,40,000}{\text{Average Stock}} = \text{Average Stock} = \frac{2,40,000}{6} = \text{Rs.}40,000$$

$$\text{Average Stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

$$40,000 = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

$$40,000 \times 2 = \text{Opening Stock} + \text{Closing Stock}$$

$$80,000 = \text{Opening Stock} + \text{Closing Stock}$$

$$\text{Closing Stock} = \text{Opening Stock} + \text{Closing Stock}$$

$$\text{Closing stock} = \text{Opening stock} + 5,000$$

$$80,000 = 2 \text{ Opening Stock} + 5,000$$

$$2 \text{ Opening Stock} = 80,000 - 5,000$$

$$\text{Opening Stock} = \frac{75,000}{2} = \text{Rs.}37,500$$

$$\text{Closing Stock} = 37,500 + 5,000 = \text{Rs.}42,500.$$

(c) Debtors Turnover =

$$= \frac{\text{Debtors}}{\text{Sales}} \times 12 \text{ months} = 2 \text{ months} = \frac{\text{Debtors}}{3,00,000} \times 12 \text{ months}$$

$$\text{Debtors} = \frac{3,00,000 \times 2}{12} = \text{Rs.}50,000$$

(d) Creditors Turnover =

$$= \frac{\text{Creditors}}{\text{Purchases}} \times 365 \text{ days}$$

$$\begin{aligned} \text{Credit purchases} &= \text{Cost of goods sold} + \text{increase in Closing Stock} \\ &= 2,40,000 + 5,000 = \text{Rs.}2,45,000 \end{aligned}$$

$$\text{Creditors} = \frac{73 \times 2,45,000}{365} = \text{Rs.}49,000$$

(e) Capital Turnover Ratio =

$$\begin{aligned} &= \frac{\text{Cost of Goods Sold}}{\text{Capital}} \\ &= \frac{\text{Cost of goods sold}}{\text{Fixed Assets}} \\ 2 &= \frac{2,40,000}{\text{Capital}} \\ 4 &= \frac{2,40,000}{\text{Fixed Assets}} \\ \text{Capital} &= \frac{2,40,000}{2} = \text{Rs.}1,20,000 \end{aligned}$$

(f) Fixed Assets turnover Ratio =

$$\text{Fixed Assets} = 2,40,000 / 4 = \text{Rs.}60,000$$

Proprietary Statement

	Rs.	Rs.
Current Assets;		
Cash in hand (Balancing Figure)	16,500	
Debtors	50,000	
Stock	42,500	1,09,000
Less: Current liabilities:		
Creditors		49,000
Working capital		60,000
Add: Fixed Assets		60,000
Total Capital employed		1,20,000
Net Worth:		
Share Capital	1,00,000	
Reserves, Surplus	20,000	
Capital Employed		1,20,000

Illu.2 The following are the summarised profit and loss account for the year ending 31st December 1994 and the balance sheet as on that date:

Trading and Profit & Loss Account

Dr.	Rs.	Cr.	Rs.
To Opening stock	1,00,000	By Sales	10,00,000
To Purchases	5,50,000	By Closing Stock	1,50,000
To Gross profit	5,00,000		
	11,50,000		11,50,000
To Administrative expenses	1,50,000	By Gross profit	5,00,000
To Interest	30,000		
To Selling expenses	1,20,000		
To Net profit	2,00,000		
	5,00,000		5,00,000

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Capital	10,00,000	Land and Buildings	5,00,000
P & L a/c	2,00,000	Plant and Machinery	3,00,000
Creditors	2,50,000	Stock	1,50,000
Bills payable	1,50,000	Sundry debtors	1,50,000
		Bills receivable	1,25,000

		Cash in hand & at Bank	1,75,000
		Furniture	2,00,000
	16,00,000		16,00,000

Additional information:

(a) Average debts, Rs.1,25,000

(b) Average credit purchases, Rs.8,00,000

You are required to calculate:

(1) Stock turnover ratio,

(2) Current Ratio

(3) Quick ratio

(4) Operating ratio and

(5) Return on equity.

Solution :

Cost of goods sold = Sales – Gross Profit

$$= 10,00,000 - 5,00,000 = 5,00,000$$

$$(i) \text{ Stock turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average stock}}$$

$$\begin{aligned} \text{Average stock} &= \frac{\text{Operating stock} + \text{closing stock}}{2} \\ &= \frac{1,00,000 + 1,50,000}{2} = \frac{2,50,000}{2} = 1,25,000 \end{aligned}$$

$$= \frac{5,00,000}{1,25,000} = 4 \text{ times}$$

$$(ii) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current Assets:

Stock	1,50,000
Debtors	1,50,000
Bills receivable	1,25,000
Cash and Bank	1,75,000

	6,00,000

Current Liabilities:	
Creditors	2,50,000
Bills payable	1,50,000

	4,00,000

	$= \frac{6,00,000}{4,00,000} = 1.5$

(iii) Quick Ratio = $\frac{\text{Quick Assets}}{\text{Current Liabilities}}$
 Quick assets = Current assets – Stock
 = 6,00,000 – 1,50,000 = 4,50,000
 Current Liabilities = 4,00,000

$$= \frac{4,50,000}{4,00,000} = 1.125$$

(iv) Operating ratio = $\frac{\text{Operating cost}}{\text{Sales}}$

Operating cost = Cost of goods sold + Operating expenses

Cost of goods sold = Sales – Gross profit

$$= 10,00,000 - 5,00,000 = 5,00,000$$

Operating expenses = Administrative expenses + Selling expenses

$$= 1,50,000 + 1,20,000 = 2,70,000$$

Sales = 10,00,000

$$= \frac{5,00,000 + 2,70,000}{10,00,000} = \frac{7,70,000}{10,00,000} = 0.77$$

(v) Return on equity = $\frac{\text{Profit after tax} - \text{Preference dividend}}{\text{Equity share capital}}$

Profit before taxes = 2,00,000

(-) Tax = NIL

2,00,000

(-) Preference dividend = NIL

2,00,000

Equity share capital = 6,00,000

$$= \frac{2,00,000}{6,00,000} = 0.33 \text{ (or) } 1/3$$

Illu.3 A Ltd. Company submitted the following particulars

Gross Profit	= Rs.1,00,000
Reserves & Surplus	= Rs.40,000
Cost of sales	= Rs.2,00,000
Fixed assets turnover	= 5
Capital turnover	= 2
Current liabilities	= Rs.10,000
Debentures	= Rs.20,000

Solution :

$$\text{Fixed assets turnover ratio} = \frac{\text{Sales}}{\text{Fixed assets}}$$

$$5 = \frac{3,00,000}{\text{Fixed Assets}}$$

Note: Sales = Cost of Sales + Gross profit

$$\text{Fixed assets} = \frac{3,00,000}{5} = 60,000$$

$$\text{Capital turnover ratio} = \frac{\text{Cost of sales}}{\text{working capital}}$$

(working capital turnover ratio)

$$2 = \frac{2,00,000}{\text{Working capital}}$$

$$\text{Working capital} = \frac{2,00,000}{2} = \text{Rs.1,00,000}$$

Working capital = Current assets – Current liabilities

1,00,000 = Current assets – 10,000

Current assets = 1,00,000 + 10,000 = 1,10,000

Dr.	Balance Sheet		Cr.
Liabilities	Rs.	Assets	Rs.
Share capital (B/f)	1,00,000	Fixed Assets	60,000
Reserves & Surplus	40,000	Current assets	1,10,000
Debentures	20,000		

Current liabilities	10,000		
	1,70,000		1,70,000

Illu.4 The following is the profit and Loss account to Electro Ltd. For the year ended 31st December 1995:

	<i>Rs.</i>		<i>Rs.</i>
To opening Stock	1,00,000	By Sales	5,60,000
To Purchases	3,50,000	By Closing Stock	1,00,000
To Wages	9,000		
To Gross profit	2,01,000		
	6,60,000		6,60,000
To Administrative expenses	20,000	By Gross Profit	2,01,000
To Selling & distribution expenses	89,000	By Interest on Investments (outside business)	10,000
To Non-operating expenses	30,000	By Profit on sale of investments	8,000
	2,19,000		2,19,000

You are required to calculate:

- (a) Gross Profit Ratio
- (b) Net Profit ratio
- (c) Operating Profit ratio
- (d) Operating ratio
- (e) Administrative Expenses ratio

Solution :

(a) Gross Profit ratio =

$$\begin{aligned}
 &= \frac{\text{Gross Profit}}{\text{Sales}} \times 100 \\
 &= \frac{2,01,000}{5,60,000} \times 100 = 36\%
 \end{aligned}$$

(b) Net Profit ratio =

$$\begin{aligned}
 &= \frac{\text{Net Profit}}{\text{Sales}} \times 100 \\
 &= \frac{80,000}{5,60,000} \times 100 = 14\%
 \end{aligned}$$

(c) Operating Profit ratio =

$$= \frac{\text{Operating Profit}}{\text{Sales}}$$

Operating profit = Gross profit – Operating expenses + Operating incomes

Gross profit = 2,01,000

(-) Operating expenses:

Administrative expenses	20,000	
Selling and distribution expenses	89,000	1,09,000
	-----	-----
		92,000

(+) Operating incomes:

NIL -

Operating profit		-----
		92,000

$$= \frac{92,000}{5,60,000} = 0.16(\text{or})16\%$$

(d) Operating ratio =

$$= \frac{\text{Cost of sales} + \text{Operating expenses}}{\text{Sales}}$$

Cost sales = Sales – Gross profit
= 5,60,000 – 2,01,000 = 3,59,000

Operating expenses = 1,09,000

$$= \frac{3,59,000 + 1,09,000}{5,60,000}$$

$$= \frac{4,68,000}{5,60,000} = 0.84(\text{or})84\%$$

(e) Administrative expenses ratio =

$$= \frac{\text{Administrative expenses}}{\text{Sales}}$$

$$= \frac{20,000}{5,60,000} = 0.036(\text{or})3.6\%$$

Illu.5 : From the following particulars, calculate (a) Gross Profit Ratio, (b) Net Profit ratio, (c) Return on total assets, (d) Inventory turnover, (e) Working capital turnover and (f) New worth to debt.

	Rs.
Sales	25,20,000
Cost of sales	19,20,000
Net Profit	3,60,000
Inventory	8,00,000
Other current assets	7,60,000
Fixed Assets	14,40,000
Net worth	15,00,000
Debt	9,00,000
Current Liabilities	6,00,000

Solution :

(a) Gross profit Ratio:

$$\text{Gross profit ratio} = \frac{\text{Gross profit}}{\text{Sales}}$$

$$\text{Gross Profit} = 25,20,000 - 19,20,000$$

$$= 6,00,000$$

$$\text{Sales} = 25,20,000$$

$$= \frac{6,00,000}{25,20,000} = 0.24 \text{ or } 24\%$$

(b) Net Profit ratio :

$$= \frac{\text{Net Profit}}{\text{Sales}}$$

Net Profit = 3,60,000

Sales = 25,20,000

$$= \frac{3,60,000}{25,20,000} = 0.14 \text{ or } 14\%$$

(c) Return on total assets ratio = Net Profit / Total assets

Net Profit = 3,60,000

Total Assets =

Inventory	8,00,000
Other Current assets	7,60,000
Fixed Assets	14,40,000

	30,00,000

$$= \frac{3,60,000}{30,00,000} = 0.12 \text{ or } 12\%$$

(d) Inventory turnover ratio = Cost of sales / Average Stock

Cost of sales = 19,20,000

Average stock = 8,00,000

$$= \frac{19,20,000}{8,00,000} = 2.4 \text{ times}$$

(e) Working capital turnover ratio = Cost of sales / Working capital

Cost of sales = 19,20,000

Working Capital =

Current assets

Inventory	8,00,000
Other current assets	7,60,000

	15,60,000
(-) Current liabilities	6,00,000

	9,60,000

$$= \frac{19,20,000}{9,60,000} = 2 \text{ times}$$

(f) Net Worth to debt: Net Worth / Debt

Net Worth = 15,00,000

$$\text{Debt} = 9,00,000$$

$$= \frac{15,00,000}{9,00,000} = 1.67 \text{ or } 167\%$$

Illu.6 : Make out Balance Sheet with as many details:

Gross Profit	Rs.80,000
Gross Profit / Sales	1/3
Stock velocity	6
Opening stock	Rs.36,000
Average collection period / velocity	72 days
Average payment velocity	90 days
No. of days in a year	360
Bills receivables	Rs.20,000
Bills payable	Rs.5,000
Fixed assets turn over ratio	8
Assets	Rs.1,40,000

Solution :

$$\begin{aligned} \text{Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Sales}} \\ &= \frac{80,000}{\text{Sales}} = 1/3 \quad \text{Sales} = \frac{80,000}{1/3} \\ &= 80,000 \times 3/1 = 2,40,000 \end{aligned}$$

$$\begin{aligned} \text{Stock Velocity} &= \frac{\text{Sales}}{\text{Average Stock}} \\ &= \frac{2,40,000}{\text{Average stock}} = 6 \\ \text{Average Stock} &= \frac{2,40,000}{6} \end{aligned}$$

$$\begin{aligned} \text{Average Collection period} &= \frac{\text{No. of days in a year}}{\text{Debtors turnover ratio}} \\ &= \frac{360}{\text{Debtors turnover ratio}} = 72 \text{ days} \end{aligned}$$

$$= 40,000$$

$$\begin{aligned} \text{Closing Stock} &= (40,000 \times 2) - 36,000 \\ &= 80,000 - 36,000 \\ &= 44,000 \end{aligned}$$

$$\text{Debtors turnover ratio} = 360/72 = 5 \text{ times}$$

$$\text{Debtors turnover ratio} = \frac{\text{Sales}}{\text{Average debtors}}$$

$$\text{Average debtors} = 2,40,000/5 = 48,000$$

$$\begin{aligned} \text{Average payment period} &= \frac{\text{No. of days in a year}}{\text{Creditors turnover ratio}} \\ &= \frac{360}{4} = 90 \text{ days} \end{aligned}$$

$$\text{Debtors} = 48,000 - 20,000 = 28,000$$

$$\text{Creditors turnover ratio} = 360/90 = 4 \text{ times}$$

$$\text{Creditors turnover ratio} = \text{Purchases} / \text{Average creditors}$$

$$\text{Purchases: Cost of goods sold} + \text{Closing Stock} - \text{Opening stock}$$

$$= \frac{360}{\text{Creditors turnover ratio}} = 90 \text{ days}$$

Cost of goods sold:

Sales	2,40,000
(-) Gross profit	80,000

	1,60,000

$$\text{Purchases} = 1,60,000 + 44,000 - 36,000$$

$$= 1,68,000$$

$$= 1,68,000 / \text{Average Creditors} = 4$$

$$\text{Average creditors} = 1,68,000 / 4 = 42,000$$

$$\text{Creditors} = 42,000 - 5,000 = 37,000$$

$$\text{Fixed Assets turnover ratio} = \frac{\text{Sales}}{\text{Fixed Assets}}$$

$$= 2,40,000 / \text{Fixed assets} = 8 \text{ times}$$

$$\text{Fixed Assets} = 2,40,000 / 8 = 30,000$$

Balance Sheet as on

Liabilities	Rs.	Assets	Rs.
Capital (B / F)	98,000	Cash (B/ f)	18,000
Creditors	37,000	Debtors	28,000
Bills payable	5,000	Bills receivable	20,000
		Stock	44,000
		Fixed Assets	30,000
	1,40,000		1,40,000

Illu.8 : Profit after taxes Rs.3, 00,000, fixed interest charges Rs.50, 000. Income tax paid is 50% on profit. Calculate interest coverage ratio.

Solution :

Profit after taxes is Rs.3, 00,000. Income tax 50%. Hence profit before tax is Rs.6,00,000.

$$\begin{aligned} \text{Interest Coverage ratio} &= \frac{\text{Profit before interest and tax}}{\text{Fixed interest charges}} \\ &= 6,00,000 + 1,00,000 / 1,00,000 = 7,00,000 / 1,00,000 = 7. \end{aligned}$$

Illu.9 : From the following information, calculate liquidity ratios for the two companies and give your interpretation of the liquidity position of the companies as revealed by the ratios:

	Company A Rs.	(Rs. In lakhs) Company B Rs.
Cash	180	140
Debtors	1,400	3,200
Inventory	2,000	6,000
Bills payable	300	1,000
Creditors	800	5,000
Accrued expenses	100	125
Tax payable	600	500

Solution :

Particulars	Company A	Company B
Current Assets:		
Cash	180	140
Debtors	1,400	3,200
Inventory	2,000	6,000
Total	3,580	9,340
Liquid Assets:		
(Current Assets – Inventory)	1,580	3,340
Absolute liquid Assets : (Cash only)	180	140
Current Liabilities:		
Bills payable	300	1,000
Creditors	800	5,000
Accrued Expenses	100	125
Tax payable	600	500
	1,800	6,625

Liquidity Ratios:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Company A} = \frac{3,580}{1,800} = 1.99 : 1$$

$$\text{Company B} = \frac{9,340}{6,625} = 1.40 : 1$$

The idle ratio is 2 : 1

It is satisfactory in the case of company A where as it slightly less in the case of Company B.

$$\text{Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$$

$$\text{Company A} = \frac{1,580}{1,800} = 0.87 : 1$$

$$\text{Company B} = \frac{3,340}{6,625} = 0.5 : 1$$

The idle ratio is 1 : 1. So, it is not satisfactory in both the companies.

$$\text{Absolute liquidity ratio} = \frac{\text{Absolute liquid Assets}}{\text{Current Liabilities}}$$

$$\text{Company A} = \frac{180}{1,800} = 0.01 : 1$$

$$\text{Company B} = \frac{140}{6,625} = 0.02 : 1$$

The absolute liquidity ratio is not satisfactory in both the companies as the idle ratio is 1 : 2 or 0.5 : 1.

Illu.10 : Find out the stock turnover ratio when Opening stock is Rs.58,000; Closing stock Rs.62,000; Sales Rs.6,40,000 and Gross profit 20% on Sales.

Solution :

Calculation of Stock Turnover Ratio:

$$\begin{aligned}\text{Average stock} &= \frac{\text{Opening stock} + \text{Closing stock}}{2} \\ &= \frac{58,000 + 62,000}{2} = \text{Rs.60,000}\end{aligned}$$

$$\begin{aligned}\text{Cost of the goods sold} &= \text{Sales} - \text{Gross profit} \\ &= 6,40,000 - 1,28,000 \\ &= 5,12,000\end{aligned}$$

$$\text{Stock turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average stock}}$$

$$\begin{aligned}\text{(i) Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\ &= \frac{5,12,000}{60,000} = 8.5\text{times}\end{aligned}$$

Illu.11 : From the following information determine:

- (i) Current Ratio**
- (ii) Quick Ratio**
- (iii) Stock turnover Ratio**
- (iv) Operating Ratio**
- (v) Rate of return on equity capital.**

Balance Sheet as at December 31, 2003

Liabilities	Rs.	Assets	Rs.
Equity share capital	20,00,000	Plant and Equipment	12,80,000
Profit & Loss a/c	7,36,000	Land and Buildings	1,60,000
Sundry creditors	2,08,000	Cash	3,20,000
Bills payable	4,00,000	Sundry Debtors	7,20,000
Other current liabilities	40,000	Less: Provision	6,40,000
		Stock	9,60,000
		Prepaid expenses	24,000
	33,84,000		33,84,000

Solution :

$$(i) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Current Ratio} = \frac{19,44,000}{6,48,000} = 3 : 1$$

Current Assets	Rs.	Current Liabilities	Rs.
Cash	3,20,000	Sundry Creditors	2,08,000
Debtors	6,40,000	Bills payable	4,00,000
Stock	9,60,000	Other current liabilities	40,000
Prepaid expenses	24,000		
	19,44,000		6,48,000

$$(ii) \text{ Quick Ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$$

$$\text{Quick Ratio} = \frac{9,60,000}{6,48,000} = 1.48 : 1$$

$$\text{Average Stock} = \frac{8,00,000 + 9,60,000}{2} = \text{Rs. } 8,80,000$$

$$\text{Stock turnover ratio} = \frac{61,60,000}{8,80,000} = 7 \text{ times}$$

$$(iii) \text{ Stock Turnover Ratio} = \frac{\text{Cost of goods sold}}{\text{Average stock}}$$

$$(iv) \text{ Operating ratio} = \frac{\text{Cost of goods sold} + \text{Operating expenses}}{\text{Net Sales}} \times 100$$

Quick Assets are cash and debtors = Rs.9,60,000

Cost of goods sold Rs.61,60,000

= 94%.

(v) Rate of return on capital employed:

= 12%

$$= \frac{61,60,000 + 13,60,000}{80,00,000} \times 100$$

Note: Profit and loss statement was not given in the above problem. It is assumed as follows:

$$= \frac{\text{Net Profit (after tax)}}{\text{Equity share capital}} \times 100$$

$$= \frac{2,40,000}{20,00,000} \times 100$$

	Rs.
Sales	80,00,000
Less: Cost of goods sold	61,60,000
	18,40,000
Less: Operating expenses	13,60,000
Net Profit	4,80,000
Less: operating expenses (50%)	2,40,000
Net profit after tax	2,40,000

Balances at the beginning of the year:

Sundry debtors	- Rs.6,00,000
Stock	- Rs.8,00,000

Illu.12 Find out (1) Current ratio and (2) Liquid ratio from the following information:

Stock Rs.30, 000, Prepaid expenses Rs.30, 000, other current assets Rs.2, 05,000, Current liabilities Rs.1, 65,000.

Solution :

$$\begin{aligned}
 \text{Current assets} &= \text{Stock} + \text{Prepaid expenses} + \text{Other Current assets} \\
 &= 30,000 + 30,000 + 2,05,000 \\
 &= \mathbf{Rs.2, 65,000}
 \end{aligned}$$

$$\begin{aligned}
 \text{Current Ratio} &= \\
 &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\
 &= \\
 &= \frac{2,65,000}{1,65,000} \\
 &= \mathbf{1.61 : 1}
 \end{aligned}$$

$$\begin{aligned}
 \text{Liquid assets} &= \text{Current assets} - (\text{Stock} + \text{Prepaid expenses}) \\
 &= 2,65,000 - (30,000 + 30,000) \\
 &= \mathbf{Rs.2, 05,000}
 \end{aligned}$$

$$\begin{aligned}
 \text{Liquid Ratio} &= \\
 &= \frac{\text{Liquid Assets}}{\text{Current Liabilities}} \\
 &= \\
 &= \frac{2,05,000}{1,65,000} \\
 &= \mathbf{1.24: 1}
 \end{aligned}$$

Illu.13 : Find out the following ratios from the following information:

- (1) Gross profit ratio
- (2) Net profit ratio
- (3) Operating ratio
- (4) Rate of return on capital employed.

	Rs.
Gross profit	6,00,000
Net sales	9,00,000
Profit after tax	1,85,000
Operating expenses	5,40,000
Profit before interest and tax	3,60,000
Capital employed	16,50,000

Solution :

$$(i) \text{ Gross profit Ratio} = \frac{\text{Gross profit}}{\text{Net Sales}} \times 100$$

$$= \frac{6,00,000}{9,00,000} \times 100$$

$$= \mathbf{67\%}$$

$$(ii) \text{ Net profit Ratio} = \frac{\text{Net profit}}{\text{Net Sales}} \times 100$$

$$= \frac{1,85,000}{9,00,000} \times 100$$

$$= \mathbf{20.55\%}$$

$$(iii) \text{ Operating Ratio} =$$

$$= \frac{\text{Cost of goods sold} + \text{Operating Expenses}}{\text{Net Sales}} \times 100$$

$$\begin{aligned} \text{Cost of goods sold} &= \text{Net Sales} - \text{Gross Profit} \\ &= 9,00,000 - 6,00,000 \\ &= \mathbf{Rs.3,00,000} \end{aligned}$$

$$\therefore \text{ Operating Ratio} = \frac{3,00,000 + 5,40,000}{9,00,000} \times 100$$

$$= \frac{8,40,000}{9,00,000} \times 100$$

$$(iv) \text{ Rate of return on capital employed}$$

$$= \frac{\text{Net Profit}}{\text{Capital employed}} \times 100$$

$$= \frac{1,85,000}{16,50,000} \times 100$$

$$= 11.21\%$$

Illu.13 The following is the Balance Sheet of a Company as on 31-12-2000.

Liabilities	Rs.	Assets	Rs.
Equity capital	2,00,000	Fixed assets	4,00,000
9% Preference capital	1,20,000	Short-term investments	10,000
Reserves	75,000	Stock	1,00,000
12% Debentures	1,00,000	Debtors	50,000
Current liabilities	1,05,000	Cash	25,000
		Preliminary expenses	15,000
	6,00,000		6,00,000

From the above information, find out the following ratios:

- (i) Current ratio,
- (ii) Liquid ratio
- (iii) Absolute liquid ratio

Solution :

$$(A) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Current Assets} = \text{Short – term investments} + \text{Stock} + \text{Debtors} + \text{Cash} +$$

$$\text{Preliminary expenses}$$

$$= 10,000 + 1,00,000 + 50,000 + 25,000 + 15,000$$

$$\text{Current Assets} = \text{Rs.2,00,000}$$

$$\text{Current Liabilities} = \text{Rs.1,05,000}$$

$$\therefore \text{Current Ratio} = \frac{2,00,000}{1,05,000} = 1.9 : 1$$

$$\text{Current Ratio} = \mathbf{1.6 : 1}$$

$$\text{(B) Liquid Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Quick assets} &= \text{Current Assets} - (\text{Stock} + \text{Preliminary expenses}) \\ &= 2,00,000 - (1,00,000 + 15,000) \\ &= 2,00,000 - 1,15,000 \end{aligned}$$

$$\text{Quick Assets} = \mathbf{Rs.85,000}$$

$$\begin{aligned} \text{Liquid Ratio} &= 85,000 / 1,05,000 \\ &= \mathbf{0.81 : 1} \end{aligned}$$

$$\text{(C) Absolute Liquid Ratio} = \frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \therefore \text{Absolute Liquid assets} &= \text{Cash} + \text{Short-term investments} \\ &= 25,000 + 10,000 = \mathbf{Rs.35,000} \end{aligned}$$

$$\therefore \text{Absolute liquid ratio} = \frac{35,000}{1,05,000} = 0.33 : 1$$

Illu.14 The following figures are extracted from the Balance sheet of X Limited as on 31st December 2002, 2003.

	2002	2003
	Rs.	Rs.
Stock	25,000	40,000
Debtors	10,000	16,000
Cash at Bank	5,000	4,000
Creditors	8,000	15,000
Bills payable	2,000	3,000
Provision for taxes	5,000	7,000
Bank overdraft	5,000	15,000

Calculate the Current Ratio and Acid Test Ratio for the two years and give comment on the liquidity position of the company.

Solution :

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current Assets:	2002	2003
Stock	25,000	40,000
Debtors	10,000	16,000
Cash at Bank	5,000	4,000
Current Liabilities:		
Creditors	8,000	15,000
Bills payable	2,000	3,000
Provision for taxes	5,000	7,000
Bank O.D	5,000	15,000
Total	20,000	40,000
Current Ratio =	40,000 ----- = 2: 1 20,000	60,000 ----- = 1.5:1 40,000

Acid Test Ratio (Quick Ratio) = Quick Assets ÷ Quick Liabilities

Quick Assets:	2002	2003
Debtors	10,000	16,000
Cash at Bank	5,000	4,000
Total	15,000	20,000
Quick Liabilities:		
Creditors	8,000	15,000
Bills payable	2,000	3,000
Provision for taxes	5,000	7,000
Total	15,000	25,000
Acid Test Ratio =	15,000 ----- = 1 :1 15,000	20,000 ----- = 0.8 : 1 25,000

Comment: An ideal current ratio is '2'. The current ratio for 2002 is 2 and for 2003 is 1.5. An ideal acid test ratio is '1'. The acid test ratio for 2002 is 1.5 and for 2003 is 0.8. Thus the company's liquid position in 2002 is better than the liquid position in 2003.

Illu. 15 : You have been asked by the management of a firm to project a Trading and Profit and Loss account and the Balance Sheet on the basis of the following estimated figures and ratios, for the next financial year:

Ratio of gross profit – 20%

Stock turnover ratio – 5times

Average debt collection period – 3months

Creditors – 3 months

Current ratio –2

Proprietary ratio (Fixed assets to Capital employed) 75%

Capital gearing ratio (Pref. Shares and debentures to equity) 30%

Net profit to issued equity capital – 10%

General Reserve and Profit and Loss to issued equity capital – 25%

Preference share capital to Debentures –2

Cost of sales consists of 50% of materials

Gross profit Rs.6, 25,000.

Solution :

(1) Ratio of gross profit =

$$\begin{aligned}
 &= \frac{\text{Gross Profit}}{\text{Sales}} \\
 20\% &= \frac{6,25,000}{\text{Sales}} \\
 \text{Sales} &= \frac{6,25,000}{20\%} \\
 &= \frac{6,25,000}{20/100} \\
 &= 6,25,000 \times \frac{100}{20} = 31,25,000
 \end{aligned}$$

(2) Stock turnover ratio =

$$\begin{aligned}
 &= \frac{\text{Cost of Sales}}{\text{Average stock}} \\
 5 \text{ times} &= \frac{31,25,000 - 6,25,000}{\text{Average Stock}}
 \end{aligned}$$

$$\text{Average Stock} = \frac{25,00,000}{5} = 5,00,000$$

∴ Opening Stock = 5,00,000

∴ Closing Stock = 5,00,000

(3) Average debt Collection period =

$$= \frac{\text{Months in a year}}{\text{Debtors Turnover Ratio}}$$

$$\text{Debtors} = 4 \text{ times}$$

$$3 \text{ months} = \frac{12 \text{ months}}{\text{Debtors Turnover Ratio}}$$

$$\text{Debtors Turnover Ratio} = \frac{12}{3}$$

$$4 \text{ times} = \frac{31,25,000}{\text{Average Debtors}}$$

$$\text{Creditors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Debtors}}$$

$$\text{Average Debtors} = \frac{31,25,000}{4} = 7,81,250$$

$$\text{Creditors Turnover Ratio} = \frac{\text{Credit Purchases}}{\text{Average Creditors}}$$

(4) Creditors collection period =

Credit Purchases:

$$= \frac{\text{Months in a year}}{\text{Creditors turnover ratio}}$$

$$3 \text{ months} = \frac{12 \text{ months}}{\text{Creditors Turnover Ratio}}$$

$$\text{Debtors Turnover Ratio} = \frac{\text{Credit Purchases}}{\text{Average Creditors}}$$

$$\text{Creditors Turnover Ratio} = \frac{12 \text{ months}}{3 \text{ months}} = 4 \text{ times}$$

Cost of Sales	25,00,000
Add: Closing Stock	5,00,000

	30,00,000
Less: Opening Stock	5,00,000

Purchases	25,00,000

$$\text{Material Purchased} = 25,00,000 \times \frac{50}{100} = 12,50,000$$

$$\therefore \text{Manufacturing expenses} = 25,00,000 - 12,50,000 = 12,50,000$$

$$4 \text{ times} = \frac{12,50,000}{\text{Average creditors}}$$

$$\text{Average creditors} = \frac{12,50,000}{4} = 3,12,500$$

Current Assets:

Stock	5,00,000
Debtors	7,81,250

	12,81,250

$$(5) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$2 = \frac{12,81,250}{\text{Current Liabilities}}$$

$$\text{Current Liabilities} = \frac{12,81,250}{2} = 6,40,625$$

$$75\% = \frac{\text{Fixed Assets}}{25,00,000}$$

$$\therefore \text{Bank OD.} = 6,40,625 - 3,12,500 \text{ (Creditors)}$$

$$= 3,28,125$$

(6) Proprietary ratio =

$$= \frac{\text{Fixed Assets}}{\text{Capital employed}}$$

$$= 18,75,000$$

(7) Capital gearing ratio =

$$= \frac{\text{Preference Shares + Debentures}}{\text{Equity Shareholder's Funds}}$$

$$\text{Fixed Assets} = 25,00,000 \times \frac{75}{100}$$

$$\text{Pre. Shares + Debentures} = 25,00,000 \times \frac{30}{100} = 7,50,000$$

Capital employed = Pre. Shares + Debentures + E.S. H. Funds

$$100 = 30 + \text{E.S.H. funds}$$

$$\text{E.S.H. Funds} = 100 - 30 = 70$$

(8) E.S.H. funds = E.S. Capital + Gen. Reserve + P & L a/c balance

$$\text{E.S.H. Funds} = 25,00,000 \times \frac{70}{100} = 17,50,000$$

E.S. Capital + (Gen. Reserve + P & L a/c balance) = 17,50,000

$$100 + 25 + 125 = 17,50,000$$

$$\begin{aligned} \text{General Reserve + P \& L A/c} &= 17,50,000 \times \frac{25}{125} \\ &= 3,50,000 \end{aligned}$$

$$\text{E.S. Capital} = 17,50,000 \times \frac{100}{125} = 14,00,000$$

(9) Net Profit to issued capital =

$$= \frac{\text{Net Profit}}{\text{E.S. Capital}}$$

$$10\% = \frac{\text{Net Profit}}{14,00,000}$$

$$\text{Net profit} = 14,00,000 \times \frac{10}{100} = 1,40,000$$

$$\therefore \text{General Reserve} = 3,50,000 - 1,40,000 = 2,10,000$$

(10) Preference Share capital to Debentures = 2

$$\text{Preference share capital + Debentures} = 7,50,000$$

$$2 + 1 = 7,50,000$$

$$\text{Pre. Share capital} = 7,50,000 \times \frac{2}{3} = 5,00,000$$

$$\text{Debentures} = 7,50,000 \times \frac{1}{3} = 2,50,000$$

Dr.		Trading P & L Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
To Opening Stock	5,00,000	By Sales	31,25,000		
To Purchases	12,50,000	By Closing Stock	5,00,000		
To Manufacturing expenses	12,50,000				
To Gross Profit (Bal. Fig)	6,25,000				
	36,25,000				36,25,000
To Business expenses (Bal. fig)	4,85,000	By Gross profit	6,25,000		
To Net Profit (Bal. Fig)	1,40,000				
	6,25,000				6,25,000

Dr.		Balance Sheet		Cr.	
Liabilities	Rs.	Assets	Rs.		
Equity share capital	14,00,000	Fixed assets	18,75,000		
Preference share capital	5,00,000	Stock	5,00,000		
General Reserve	2,10,000	Debtors	7,81,250		
P & L a/c	1,40,000				
Debentures	2,50,000				
Creditors	3,12,500				
Bank OD	3,28,125				
O/S expenses (Bal. Fig)	15,625				
	31,56,250				31,56,250

Note: In this problem the item capital employed Rs.25, 00,000 missed in printing. Assume capital employed is existed.

17.7 QUESTIONS

1. What do you understand by Accounting Ratios? How does the ratio analysis technique help in the financial analysis?

2. Discuss the uses and limitation of Accounting Ratios
3. "A device for making financial data more meaningful is to reduce them to ratios." Elucidate.
4. Discuss the importance of Ratio Analysis for inter firm and intra firm comparisons, including circumstances responsible for its limitation, if any
5. Describe the various profitability ratios. How are they worked out?
6. The return of capital employed is often taken as measure of efficiency of an organisation" Comment.
7. Discuss the significance of the ratio analysis as a decision making technique.
8. Ratio are mechanical and incomplete. Explain
9. What does the rate of return on assets employed tell about management?
10. What do you understand by liquidity ratio , Leverage ratio, profitability ratio & Activity ratio?

17.8 EXERCISES

1. Following are the trading and Profit and Loss Account and Balance Sheet of Praneeth Ltd.

Trading and Profit & Loss Account for the year ended 31st March, 2003

Dr.	Rs.	Cr.	Rs.
To Opening Stock	5,80,000	By Sales	30,00,000
To Purchases	24,40,000	By Closing Stock	6,20,000
To Gross Profit c/d	6,00,000		
	36,20,000		36,20,000
To Sundry expenses	3,20,000	By Gross Profit b/d	6,00,000
To Net Profit	2,80,000		
	6,00,000		6,00,000

Balance Sheet as on 31-12-2003

<i>Liabilities</i>	Rs.	<i>Assets</i>	Rs.
Share Capital	28,00,000	Net fixed Assets	22,00,000
Reserve and Surplus	2,00,000	Stock	6,20,000

Profit for the year	2,80,000	Debtors	3,20,000
Bank Overdraft	1,40,000	Cash	8,80,000
Creditors	6,00,000		
	40,20,000		40,20,000

Calculate (1) Current Ratio, (2) Quick Ratio, (3) Gross Profit ratio, (4) Stock Turnover Ratio, (5) Debtors Turnover Ratio, (6) Net profit to paid – up Capital Ratio.

2. The following are extracts from the financial statements of M/s. Swetha Ltd., as on 31-12-1998 and 31-3-1999:

<i>Items</i>	31-3-98	31-3-99
	Rs.	Rs.
Stock	20,000	50,000
Debtors	40,000	40,000
Bills Receivable	20,000	10,000
Advances	4,000	-
Cash in hand	36,000	30,000
Bills Payable	30,000	40,000
Creditors	50,000	60,000
Bank overdrafts	-	4,000
9% Debentures	10,00,000	10,00,000
Sales for the year	7,00,000	6,00,000
Gross profit	1,40,000	1,00,000

You are required to compute (1) Current Ratio, (2) Quick Ratio, (3) Stock turnover Ratio and (4) Debtors Turnover Ratio for two years.

3. From the following information's, prepare a Balance Sheet:
- Current Ratio: 2.5
 - Liquid ratio: 1.5
 - Proprietary ratio: 0.75 (Fixed assets / Proprietary fund)

- d. Working capital: Rs.60, 000
- e. Reserve & Surplus: Rs.40, 000
- f. There is no long – term loans or fictitious assets.

4. From the following Balance Sheet of Popular & Co. as on 30-6-2005. Calculate (a) Liquid Ratio, (b) Current Ratio, (c) Fixed assets ratio and (d) Debt – equity ratio:

Liabilities	Rs.	Assets	Rs.
Equity Share Capital	1,00,000	Fixed Assets	1,80,000
9% preference share capital	50,000	Stores	25,000
8% Debentures	50,000	Debtors	55,000
Reserves	20,000	Bills receivable	3,000
Creditors	45,000	Bank	2,000
	2,65,000		2,65,000

5. From the following particulars calculate a) Gross profit ratio b) Net Profit ratio.
Sales Rs.10, 00,000, Cost of goods sold Rs.5,00,000; other establishment charges Rs.2, 50,000.
6. From the following information relating to Moon Light Ltd., Prepare Balance sheet as on 31-12-04.
- a. Current ratio 2.5
 - b. Liquid ratio 1.5
 - c. Networking capital Rs.3, 00,000
 - d. G.P. Ratio 20%
 - e. Cost of sales/ Closing stock 8 times
 - f. Average debt collection period 1.5 times
 - g. Fixed assets / shareholders net worth 0.75
 - h. Reserves and surplus / share capital 0.50
7. Current ratio is 2/5; Quick ratio is 1:5; Working capital Rs.30, 000; Calculate stock value.
8. From the following data, calculate:

- (a) Gross profit ratio,
- (b) Return on total assets,
- (c) Inventory turnover ratio,
- (d) Working capital turnover ratio and
- (e) Net worth to debt ratio.

<i>Particulars</i>	<i>Rs.</i>	<i>Particulars</i>	<i>Rs.</i>
Sales	25,20,000	Cost of goods sold	19,20,000
Net profit	3,60,000	Inventory	8,00,000
Fixed assets	14,40,000	Other current assets	7,60,000
Net Worth	15,00,000	Debentures	9,00,000
Liabilities	6,00,000		

9. Current ratio is 2.6 : 1 and Current liabilities are Rs.80,000. Find out Current Assets.
10. A company sells goods on cash as well as on credit. The following particulars are extracted from their books of accounts.

	Rs.
Gross total sales	8,00,000
Cash sales	1,60,000
Sales Returns	56,000
Debtors at the end	72,000
B /R at the end	16,000

Calculate debtors turnover ratio.

11. With the help of following ratios and further information, calculate

(i) Sales	(ii) Gross Profit	(iii) Net Profit	(iv) Current assets
(v) Total capital	(vi) Total liability and	(vii) Outsiders liability	
Gross profit ratio		25%	
Net Profit Ratio		20%	
Sales / inventory		8	
Fixed Assets / Current assets		$\frac{3}{4}$	
Fixed Assets / Total Capital		$\frac{3}{2}$	
Capital / outside Liabilities		$\frac{2}{5}$	
Fixed Assets		Rs.15,00,000	

Closing Stock

Rs.2,00,000

12. From the following information, find out Current Assets, Current Liabilities and Value of Inventory.

- (a) current ratio 3.5
- (b) Liquid ratio 2.5
- (c) Working capital RS.2,00,000

13. The following are summarised profit and loss account of X Ltd. for the year ending 31-12-2003 and the balance sheet as at that date.

Trading and Profit and Loss Account

Particulars	Rs.	Particulars	Rs.
To Opening Stock	20,000	By Sales	2,00,000
To Purchases	1,10,000	By Closing stock	30,000
To Gross Profit	1,00,000		
	2,30,000		2,30,000
To Administrative expenses	30,000	By Gross Profit	1,00,000
To Interest	6,000		
To Selling expenses	24,000		
To Net Profit	40,000		
	1,00,000		1,00,000

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Capital	2,00,000	Land and Buildings	1,00,000
P & L a/c	40,000	Plant and Machinery	60,000
Creditors	50,000	Stock	30,000
Bills payable	30,000	Sundry Debtors	30,000

		Bills receivable	25,000
		Cash at Bank	35,000
		Furniture	40,000
	3,20,000		3,20,000

Additional Information :

1. Average debtors Rs.25,000
2. Average credit purchases Rs.80,000

You are required to calculate :

- (a) Net profit ratio (b) Operating ratio (c) Debtors turnover ratio (d) Creditors Turnover ratio (e) Current ratio (f) Sales to Fixed Assets ratio (g) Acid Test Ratio

14. Following is the balance sheet of Rudramamba company Limited:

Liabilities	Rs.	Assets	Rs.
Equity capital	5,00,000	Land and Buildings	3,50,000
5% Debentures	2,00,000	Machinery	2,50,000
Bank loan	1,50,000	Cash in hand	25,000
Creditors	75,000	Cash at Bank	55,000
Bills payable	50,000	Debtors	85,000
Outstanding expenses	5,000	Bills receivable	1,05,000
		Stock	1,00,000
		Prepaid expenses	10,000
	9,80,000		9,80,000

With the help of above particulars calculate:

- (i) Current ratio
- (ii) Quick Ratio
- (iii) Debt- equity ratio
- (iv) Proprietary ratio

15. The following are the profit and loss account of a company for the year ended 31-12-2003 and the balance sheet as on that date.

Dr. Trading and Profit and Loss Account

Cr.

Particulars	Rs.	Particulars	Rs.
To Opening Stock	99,500	By Sales	8,50,000
To Purchases	5,45,250	By Closing stock	1,49,000
To Incidental charges	14,250		
To Gross profit	3,40,000		
	9,99,000		9,99,000
To Operating expenses	1,95,000	By Gross profit	3,40,000
To Non-operating expenses	4,000	By Non-operating income :	
To Net profit	1,50,000	Interest	3,000
		Profit on sale of shares	6,000
	3,49,000		3,49,000

Balance Sheet

Liabilities	Rs.	Assets	Rs.
Capital	2,00,000	Fixed assets	2,30,000
Reserve	90,000	Current assets	2,50,000
Profit & loss account	60,000		
Current liabilities	1,30,000		
	4,80,000		4,80,000

You are required to calculate :

- (i) Gross profit ratio
- (ii) Net profit ratio
- (iii) Current ratio
- (iv) Operating ratio

16. From the following calculate:

- (a) Gross profit ratio
- (b) Operating ratio
- (c) Return on assets
- (d) Return on equity capital

Equity capital Rs.6,00,000

Total Assets: Rs.16,00,000

8% Borrowed capital: 50% of total assets

Direct costs for the year: Rs.9.6 lakhs

Operating expenses: Rs.1.6lakhs

Goods are sold to customer at 150% of direct costs.

Tax rate: 50%.

17. From the following details prepare the balance sheet of Sri Damodara & Co. as on 31st December 2004.

Stock of velocity	:	6 times
Capital turnover ratio	:	2 times
Fixed assets turnover ratio	:	4 times
Gross profit	:	20%
Debtors collection period	:	2 months
Creditors payments period	:	73 days
The Gross profit was		Rs.6,00,000

18. The following is the Trading and Profit and Loss Account of a firm.

Trading and Profit and Loss a/c

Particulars	Rs.	Particulars	Rs.
To Opening stock	10,000	By Sales	1,00,000
To Purchases	55,000	By Closing stock	15,000
To Gross profit c/d	50,000		
	1,15,000		1,15,000
To Administration expenses	15,000	By Gross profit b/d	50,000
To Interest	3,000		
To Selling expenses	12,000		
To Net profit	20,000		
	50,000		50,000

Calculate the following ratios :

(a) Inventory turnover ratio (b) Gross profit ratio (c) Net profit ratio (d) Operating ratio

19. Using the following data, complete the Balance Sheet below

Gross profit (20% of Sales)	:	Rs.60,000
Shareholder's equity	:	Rs.50,000
Credit sales to total sales	:	80%
Total assets turnover	:	3 times
Inventory turnover (to cost of sales)	:	8 times
Average debtors collection period (360 days a year)	:	18 days
Current ratio	:	1:6
Long-term debt to equity	:	40%

Balance Sheet

	Rs.		Rs.
Creditors	...	Cash	...
Long term debt	...	Debtors	...
Shareholder's equity	...	Inventory	...
		Fixed Assets	...

17.9 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
3. Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.
4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
5. Ramachandran, Accounting for Management, Scitech Publications (India) Pvt. Ltd., 2003
6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter – 18

Funds Flow Analysis

Objectives :

After reading this unit we should be able to :

- Understand the meaning of funds flow statement
- Know how to prepare the funds flow statement
- Prepare the statement of changes in working capital

Structure :

18.1 Introduction

18.2 Meaning of Funds Flow Statement

18.3 Preparation of Funds Flow Statement

18.4 Statement of Changes in Working capital

18.5 Questions

18.6 Exercises

18.7 Suggested Readings

18.1 INTRODUCTION :

A funds flow statement is a valuable aid to financial manager or a creditor in evaluating the uses of funds by a firm and in determining how these funds are financed. Such a statement provides an efficient method for the financial Manager to assess the growth of the firm and its resulting financial needs and to determine the best way to finance those needs. In nut-shell, funds statements are very useful in planning, intermediate and long-term financing. It is an important tool of working capital analysis also.

18.2 MEANING OF FUNDS FLOW STATEMENT :

The funds flow statement is an attempt to report the flow of funds between various assets and liabilities and owner's capital during an accounting period. In the words of Smith and Brown, 'Funds flow statement is prepared to indicate in summary form, changes (and trends if prepared regularly) occurring in items of financial position between two different balance sheet dates.' Such a statement is prepared to indicate the increases and utilisation of resources of a business during an accounting period. A funds flow statement is also known by various other names such as 'Statement of Sources and Application of Funds,' 'Where Gone statement,' 'Statement of Funds Generated and Expended' etc.

The funds statement is a method by which we study the net funds flow between two points in time. These points conform to beginning and ending financial statements, dates for whatever period of examination is relevant – quarter or a year. Here, the term funds denotes the 'working capital'. Working capital is often regarded as the differences of current assets and current liabilities. Hence, the term 'funds' and working capital, both are synonymous.

18.2.1 Meaning of Funds :

The term funds has been defined in a number of ways. Some interpret funds as cash only and fund flow statement prepared on this basis is called a cash flow statement. IN this type of statement only inflow and outflow of cash is taken into account. For its preparation the net income is adjusted for the amount of the increase or decrease in accounts receivable, accounts payable, inventories, accrued revenue and expenses, etc., This type of statement is prepared specially for the use of management in predicting future cash requirements.

On the other hand, in a funds flow statement, a broader approach is adopted interpreting the term, 'funds'. It is conceived as all financial resources and it extends the concept to include all the current assets of financial resources. The narrower definition of fund, such as cash flow often leads to the omission of such items which do not directly affect cash or working capital. But in a broader sense, the assets of a firm represent the net uses of funds and its liabilities and net worth represents net resources. Thus, the term funds flow refers to changes in working capital. Changes in working capital position of a business units are significant considerations in the analysis of operating results and financial condition. The sources of working capital, the disposition of working capital and

the composition of the working capital at the end of the period, are all important factors in evaluating past activities and in judging a company's ability to prosper in the future. A funds flow statement helps a lot in such appraisal.

In view of this definition of 'funds' it becomes necessary to understand the terms of 'current assets', 'current liabilities,' non current assets' non current liabilities.

Current Assets : For accounting purposes, the term current assets means cash and such other assets which are reasonably expected to be realised in cash or sold or consumed during the normal operating cycle of the business. Thus, the term current assets includes the following.

1. Cash and bank balances
2. Accounts receivable i.e., debtors and bills receivable
3. Stocks of raw material, work in progress and finished goods
4. Temporary investments or short term investments
5. Prepayment, e.g., prepaid rent, unexpired insurance etc.
6. Accrued incomes

Current Liabilities : The term current liabilities includes all such obligations which are likely to mature within one year in the normal course of business operations and which are paid out of current assets or by creating current liabilities. The broad categories of current liabilities are :

1. Accounts payable, i.e., creditors and bills payables
2. Outstanding expenses, e.g., wages, rent, commission etc.
3. Bank overdrafts
4. Income received in advance
5. Dividend payable
6. Provision for doubtful debts
7. Provision for taxation – may be current or non current
8. Proposed dividends – may be current or non current

Provision against current against current assets, such as, provision for bad and doubtful debts, etc., are also treated as current liabilities because such provisions reduce the amount of current assets.

Non Current assets : All those assets which are not current asset are termed as non current assets. Examples are :

1. Goodwill
2. Land and buildings
3. Plant and machinery
4. Furniture
5. Long term investments
6. Profit and loss account (debit balance)
7. Preliminary expenses
8. Patent rights and trade marks
9. Discount on the issue of shares and debentures

Non-Current Liabilities : This category includes all those liabilities which are not current liabilities. Examples are :

1. Share capital – equity and preference
2. Debentures and long term loans
3. Profit and loss account (credit balance)
4. Provision and reserves e.g., capital reserves, general reserves, sinking fund etc.
5. Proposed dividends
6. Share premium account
7. Share forfeiture accounts.

18.3. PREPARATION OF FUNDS FLOW STATEMENT

Broadly speaking the funds flow statement consists of two parts – (1) Schedule of changes in working capital and (2) statement of sources and uses of funds.

18.3.1. Form of Funds Flow statement :

Generally, this statement is prepared in two formats – in Report Form or in an account form.

Report form Funds Flow Statement

Sources of Funds	Rs.
1. From operation	X x x
2. Issue of Share capital	X x x
3. Issue of Debentures	X x x
4. Long term loans	X x x
5. Sales of fixed assets	X x x
6. Non Trading Receipts, e.g., dividends or donation received	X x x
7. Decrease in working capital (as per schedule	X x x
Total	X x x
Application of Funds	
1. Trading losses	X x x
2. Redemption of Pref. Share capital/Debentures	X x x
3. Repayment of long term debts	X x x
4. Purchase of any fixed assets	X x x
5. Non trading payments	X x x
6. Increase in working capital (as per schedule)	X x x
Total	X x x

Account Form of Funds Flow statement

Sources of Funds	Rs.	Applications of Funds	Rs.
1. Funds from operations	X x x	1. Trading loss (if any)	X x x
2. Issue of share capital	X x x	2. Redemption of Pref. Shares	X x x
3. Issue of Debentures	X x x	3. Repayment of Loans	X x x
4. Long term loans	X x x	4. Purchase of any fixed asset	X x x
5. Sale of fixed assets	X x x	5. Non-trading payments	X x x
6. Non trading receipts	X x x	6. Increase in working capital	X x x
7. Decrease in working capital	X x x		
	X x x		X x x

18.3.2. Sources of Funds :

The transactions that increase working capital are sources of funds. Some of them are :

(1) Funds from Operations : Sales are the main source of funds inflow and at the same time fund flow out for expenses and costs of goods sold. Thus, funds are increased if inflow from sales exceeds the outflow for expenses and goods sold. It can be calculated as under :

Calculations of Funds from Operations :

		Rs.	Rs.
	Net profit shown as Profit & Loss a/c		X x x
Add :	1. Depreciation and Depletion	X x x	
	2. Amortization of Fictitious and Intangible assets	X x x	
	3. Provision for taxation	X x x	
	4. Appropriation of Retained Earnings	X x x	
	5. Dividend (if any paid out of current year's profit)	X x x	
	6. Loss on sale of any asset (if debited) to Profit & Loss a/c	X x x	
	7. Any other non cash expenditure	X x x	X x x
			X x x
Less :	1. Dividend received from outside	X x x	
	2. Retransfer of excess provisions`	X x x	
	3. Profit on sale of fixed assets (if already credited to P & L a/c)	X x x	
	4. Appreciation in the value of fixed assets (if credited in P & L a/c)	X x x	X x x
	Funds From Operations		X x x

a) Depreciation and Depletion : The treatment of depreciation and depletion of non current assets like building and machinery is a difficult problem. These items are non fund items because they are nothing to do with current assets and current liabilities. So to delete their effect, their amount should be credited to current year's profit in order to find out the amount of funds.

- b) Amortization of non fund items :** This also does not affect the flow of funds. The amortization of some items belonging to the category of deferred revenue expenditure or intangible assets is simply a write off entry. This affects the profits as per financial accounts but does not affect the funds from profit. Profit, therefore should be corrected by adding all such writing-off in order to calculate correct amount of funds from profit.
- c) Provision for taxation :** Provision for taxes made from current year's profit also does not affect the flow of funds. So it must be added back to the profits.
- d) Appropriation of Retained Earnings** It is simply a transfer entry. It must also be added back to the profit in order to compute funds from incomes.

The following items are deducted from profits –

- (i) **Dividends Received from outside :** Generally, it is credited in P & L a/c. As it is a non-business income, it is shown separately as a source of funds so, here, it must be deducted from profits.
- (ii) **Retransfer of Excess Provisions :** It does not create any inflow of funds, while profits are increased. Hence, it must be deducted.
- (iii) **Profit or Gain on Sale of Assets :** Any profit or gain on the sale of non current assets (which has been credited to P & L a/c) must be eliminated from the amount of profit.
- (iv) **Appreciation in the Value of Fixed Assets :** If any fixed asset has been appreciated during the year and credited to Profit and Loss a/c, it must also be deducted from the profit.

- (2) Issue of Share capital :** Increase in Share capital increases funds but shares issued and allotted for other than cash consideration do not generate fund.
- (3) Issue of Debentures or Long term loans :** Issue of debentures accepted public deposits and long term loans, all results in the increase of funds. If debentures like shares have been allotted to somebody for other than cash consideration, they will not be taken into account.
- (4) Sale of Fixed Assets :** When any fixed assets (like land, building, machinery, furniture or long term investments) is sold cash or account receivable is increased without increasing current liability, it results in the generation of funds.
- (5) Non Trading Receipts :** Any non trading receipt like dividends, rent, interest etc., received in cash also increased funds.

18.3.3 Application of Funds :

The following are the examples for the application of fund

1. **Purchase of Any fixed Asset** : If any fixed asset is purchased for cash, it is an application of funds.
2. **Payment of Loans etc.** : Any repayment of loan or redemption of preference shares is also an application of funds.
3. **Payment of Dividend** : Payment of dividend reduces the working capital and is an application of funds. But mere declaration of dividend (proposed dividends) is not an application of fund.
4. **Increase in working capital** : Increase in working capital is also an application of funds because it increase the investment in current sales.

18.4 STATEMENT OF CHANGES IN WORKING CAPITAL

The Statement of changes in working capital denotes the movement of working capital. The variation or change in working capital is shown by a schedule of working capital. As working capital represents the excess of current assets over current liabilities, the schedule of working capital shows the aggregate of current assets, current liabilities at the end of two years and then the increase or decrease in working capital is measured by comparing the net working capital. Its performance is as follows :

Schedule of Changes in Working Capital

Particulars	Previous Year	Current Year	On Working capital	
			Increase	Decrease
	Rs.	Rs.		
Current assets :				
1.				
2.				
3.				
4.				
Total current Assets				
Current Liabilities				
1.				

2.				
3.				
4.				
Total Current Liabilities				
Net Working capital				
Increase/Decrease in working capital				

Illu.1 : The following are the summarised balance sheet of Good Luck Ltd., as on 31st December 2002 and 31st December 2003.

Liabilities	2002	2003	Assets	2002	2003
Share creditors	1,03,000	96,000	Cash and bank balance	90,000	90,000
Outstanding expenses	13,000	12,000	Temporary investment	1,10,000	14,000
8% Debentures	90,000	70,000	Sundry debtors	67,000	43,000
Depreciation fund	40,000	44,000	Prepaid expenses	1,000	2,000
Reserve for contingencies	60,000	60,000	Stock in trade	82,000	1,06,000
Profit and loss a/c	16,000	23,000	Land & Buildings	1,50,000	1,50,000
Capital	2,30,000	2,30,000	Machinery	52,000	70,000
	5,52,000	5,35,000		5,52,000	5,35,000

You are required to prepare a schedule of changes in working capital.

Solution :

Schedule showing changes in working capital

Particulars	2002	2003	Increase	Decrease
Current assets:				
Cash & Bank	90,000	90,000	-	-
Temporary investment	1,10,000	74,000	-	36,000
Sundry Debtors	67,000	43,000	-	24,000
Prepaid expenses	1,000	2,000	1,000	-

Stock in trade	82,000	1,06,000	24,000	-
Total current Assets (A)	3,50,000	3,15,000		
Current Liabilities:				
Sundry Creditors	1,09,000	96,000	7,000	-
Outstanding expenses	13,000	12,000	1,000	-
Total Current Assets (B)	1,16,000	1,00,000		

Working Capital (A) – (B) = 2,34,000 2,07,000

Decrease in working capital = 2,34,000 – 2,07,000 = Rs.27,000

Illu.2 : Prepare a statement of changes in working capital from the following Balance Sheets of Manjit and Company Limited.

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Equity capital	2,50,000	2,50,000	Fixed assets	3,00,000	3,50,000
Debentures	1,85,000	2,25,000	Long – term Investments	1,00,000	50,000
Tax payable	38,500	21,500	Work in progress	40,000	45,000
Accounts payable	48,000	96,000	Stock – in – trade	75,000	1,12,500
Interest payable	18,500	22,500	Accounts receivable	35,000	70,000
Dividend payable	25,000	17,500	Cash	15,000	5,000
	5,65,000	6,32,500		5,65,000	6,32,500

Solution :

Schedule showing changes in working capital

Particulars	2002 Rs.	2003 Rs.	Increase/ Decrease Rs.	Increase/ Decrease Rs.
Current assets:				
Work – in – progress	40,000	45,000	5,000	-
Stock in trade	75,000	1,12,500	37,500	-
Accounts receivable	35,000	70,000	35,000	-

Cash	15,000	5,000	-	10,000
Total current Assets (A)	1,65,000	2,32,500		
Current Liabilities:				
Tax payable	38,500	21,500	17,000	-
Accounts payable	48,000	96,000	-	48,000
Interest payable	18,600	22,500	-	4,000
Dividend payable	25,000	17,500	7,500	-
Total Current liabilities (B)	1,30,000	1,57,500		
Working capital (A) – (B)	35,000	75,000		

Net increase in working capital = 75,000 – 35,000 = Rs.40,000

Illu.3 : Prepare a statement of changes in working capital:

Assets	2000 Rs.	2001 Rs.	Liabilities	2000 Rs.	2001 Rs.
Cash	60,000	94,000	Capital	4,00,000	5,00,000
Debtors	2,40,000	2,30,000	Creditors	1,40,000	90,000
Stock	1,60,000	1,80,000	P & L a/c	20,000	46,000
Land	1,00,000	1,32,000			
	5,60,000	6,36,000		5,60,000	6,36,000

Solution :

Statement of changes in working capital

Particulars	2000 (Rs.)	2001 (Rs.)	Changes in Working Capital	
			Increase Rs.	Decrease Rs.
Current Assets:				
Cash	60,000	94,000	34,000	-
Debtors	2,40,000	2,30,000	-	10,000
Stock	1,60,000	1,80,000	20,000	-
Total Current Assets (A)	4,60,000	5,04,000		

Current Liabilities:				
Creditors	1,40,000	90,000	50,000	-
Total Current Liabilities (B)	1,40,000	90,000		
Working Capital (A) - (B)	3,20,000	4,14,000	-	-
Net increase in working capital	94,000	-	-	94,000
Total	4,14,000	4,14,000	1,04,000	1,04,000

Illu.4 : The following were comparative balance sheets of XYZ co. as on 31st March 2002 and 2003:

Liabilities	31-3-2002 Rs.	31-3-2003 Rs.	Assets	31-3-2002 Rs.	31-3-2003 Rs.
Share capital	50,000	53,000	Fixed Assets	50,000	60,000
Profit & Loss a/c	28,000	37,000	Investments	6,000	9,000
General Reserve	10,000	12,000	Stock	31,000	36,000
12% Debentures	16,000	23,000	Accounts Receivable	24,000	27,000
Creditors	20,000	21,000	Cash	20,000	25,000
Provision for tax	12,000	15,000	Preliminary expenses	5,000	4,000
	1,36,000	1,61,000		1,36,000	1,61,000

Additional Information:

- (a) Depreciation provided on fixed assets Rs.15,000
- (b) Tax paid during the year Rs.13,000
- (c) Interim dividend paid Rs.5,000

Prepare Funds Flow Statement.

Solution :

Schedule of changes in working capital

	31-3-2002 Rs.	31-3-2003 Rs.	Increase (+) Rs.	Decrease (-) Rs.
Current Assets:				
Cash	20,000	25,000	5,000	

Accounts Receivable	24,000	27,000	3,000	
Stock	31,000	36,000	5,000	
	75,000	88,000		
Current Liabilities:				
Creditors	20,000	21,000		1,000
Working capital	55,000	67,000		
Net increase in working capital	12,000			12,000
	67,000	67,000	13,000	13,000

Dr.		Share Capital Account		Cr.	
	Rs.				Rs.
To Balance c/d	53,000	By Balance b/d			50,000
		By Bank			3,000
	53,000				53,000

Dr.		General Reserve Account		Cr.	
	Rs.				Rs.
To Balance c/d	12,000	By Balance b/d			10,000
		By Profit & Loss a/c			2,000
	12,000				12,000

Dr.		12% Debentures Account		Cr.	
	Rs.				Rs.
To Balance c/d	23,000	By Balance b/d			16,000
		By Bank			7,000
	23,000				23,000

Dr.		Provision for taxation Account		Cr.	
	Rs.				Rs.
To Bank (Tax)	13,000	By Balance b/d			12,000
To Balance c/d	15,000	By Profit & Loss a/c			16,000
	28,000				28,000

Dr. Fixed Assets Account Cr.

	Rs.		Rs.
To Balance b/d	50,000	By Depreciation (P& L a/c)	15,000
To Bank a/c	25,000	By Balance c/d	60,000
	75,000		75,000

Dr. Investment Account Cr.

	Rs.		Rs.
To Balance b/d	6,000	By Balance c/d	9,000
To Bank a/c	3,000		
	9,000		9,000

Dr. Preliminary Expenses Account Cr.

	Rs.		Rs.
To Balance b/d	5,000	By P & L a/c	1,000
		By Balance c/d	4,000
	5,000		5,000

Calculation of funds from operations:

	Rs.	Rs.
Balance of P & L a/c (31-3-2003)		37,000
Add: Non – cash and non – operating items:		
i. Transfer to general reserve	2,000	
ii. Provision for tax	16,000	
iii. Depreciation fixed assets	15,000	
iv. Interim dividend paid	5,000	
v. Preliminary expenses written off	1,000	39,000
		76,000
Less: P & L a/c balance on 31-3-2002		28,000
Funds from operations		48,000

Funds Flow Statement for the year ending 31-3-2003

Sources	Rs.	Application	Rs.
Issue of shares	3,000	Purchase of Fixed Assets	25,000
Issue of Debentures	7,000	Purchase of Investments	3,000
Funds from operations	48,000	Tax paid	13,000
		Interim Dividend paid	5,000
		Net increase in working capital	12,000
	58,000		58,000

Illu.5 : Extracts from Balance Sheets:

Particulars	As on 31-3-1999 Rs.	As on 31-3-2000Rs.
Equity shares capital	4,00,000	5,00,000
8% preference share capital	2,00,000	1,50,000

Additional information:

- (i) Equity shares were issued during the year against the purchase of machinery Rs.50,000
- (ii) 8% preference shares worth Rs.1,00,000 were redeemed during the year.

Prepare necessary accounts to find out sources / applications of funds.

Solution :

Dr. Equity Share Capital Account

Cr.

Particulars	Rs.	Particulars	Rs.
To Balance c/d	5,00,000	By Balance b/d	4,00,000
		By Machinery a/c	50,000
		By Cash	50,000
	5,00,000		5,00,000

Dr. 8% Preference Share Capital Account

Cr.

Particulars	Rs.	Particulars	Rs.
To Cash	1,00,000	By Balance b/d	2,00,000

To Balance c/d	1,50,000	By Cash	50,000
	2,50,000		2,50,000

Working Notes:

1. Issue of shares against the purchase of Machinery is neither a source nor application of funds.
2. Issue of shares worth Rs.50,000 for cash a source of funds.
3. Redemption of preference shares of Rs.50,000 is a source of funds.

Illu.6 The following are the summarised balance sheets of Y co. Ltd., on 31st December 2002 and 31st December 2003.

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Share capital	9,00,000	12,00,000	Plant & Machinery (at cost)	6,00,000	9,67,500
Debentures	3,00,000	4,50,000	Land & Building (at cost)	4,50,000	6,00,000
Profit & Loss a/c	1,87,500	3,75,000	Stock	4,50,000	5,25,000
Creditors	1,72,500	1,35,000	Bank	30,000	60,000
Provision for bad and doubtful debts	9,000	4,500	Preliminary expenses	10,500	9,000
Provision for Depreciation on land & building	30,000	36,000	Debtors	1,03,500	91,500
On plant and Machinery	45,000	52,500			
	16,44,000	22,53,000		16,44,000	22,53,000

You are required to ascertain:

- (a) Changes in working capital for 2003 and
- (b) Funds Flow statement.

Addition information:

- (i) During the year a part of machinery costing Rs.1,05,000 (accumulated depreciation thereon Rs.3,000) was sold for Rs.9,000

- (ii) Dividends of Rs.75,000 were paid during the year.

Solution :

Dr.		Provision for Depreciation Land & Building A/c		Cr.	
	Rs.			Rs.	
To Balance c/d	36,000	By Balance b/d		30,000	
		By P & L Adj. A/c (B /f)		6,000	
	36,000			36,000	

Dr.		Land & Buildings a/c		Cr.	
	Rs.			Rs.	
To Balance b/d	4,50,000	By Balance c/d		6,00,000	
To Bank a/c	1,50,000				
	6,00,000			6,00,000	

Dr.		Plant and Machinery Account		Cr.	
	Rs.			Rs.	
To Balance b/d	6,00,000	By Bank a/c (sale)		9,000	
To Bank a/c (Purchase) (B/F)	4,72,500	By Provision for department on Plant & Machinery		3,000	
		By P & L Adj. A/c (Loss)		93,000	
		By Balance c/d		9,67,500	
	10,72,500			10,72,500	

Dr.		Provision for depreciation on Plant & Machinery a/c		Cr.	
	Rs.			Rs.	
To Plant & Machinery	3,000	By Balance b/d		45,000	
To Balance c/d	52,500	By P & L Adj. A/c (B /f)		10,500	
	55,500			55,500	

Schedule showing changes in working capital

Particulars	2002	2003	Increase	Decrease
Current assets:				
Stock	4,50,000	5,75,000	75,000	-
Bank	30,000	60,000	30,000	-
Debtors	1,03,500	91,500	-	12,000
Total Current Assets (A)	5,83,500	6,76,500		
Current Liabilities:				
Creditors	1,72,500	1,35,000	37,500	
Provision for bad and doubtful debts	9,000	4,500	4,500	
Total Current Liabilities (B)	1,81,500	1,39,500		

Working capital (A) – (B) 4,02,000 5,37,000

Net increase in working capital = 5,37,000 – 4,02,000 = **Rs.1,35,000**

Dr.	Profit & Loss Account		Cr.
	Rs.		Rs.
To Provision for depreciation Land & Building	6,000	By Balance b/d	1,87,500
To Lost on sale of machinery	93,000	By Funds from operation (B / f)	
To Preliminary expenses	1,500		
To Dividends	75,000		
To Balance c/d	3,75,000		
	5,61,000		5,61,000

Funds Flow Statement

Sources	Rs.	Applications	Rs.
Funds from operations	3,72,500	Purchase of Plant & Machinery	4,72,500
Issue of Share capital	3,00,000	Purchase of Land & Buildings	1,50,000
Issue of Debentures	1,50,000	Dividend paid	75,000

		Net Increase in working capital	1,35,000
	8,32,500		8,32,500

Illu.7 : The following is the Balance Sheet of X Ltd. on 31st December 1992 and 1991: -

Liabilities	1991	1992	Assets	1991	1992
Equity share capital	3,00,000	4,00,000	Goodwill	1,15,000	90,000
Preference shares	1,50,000	1,00,000	Land and Buildings	2,00,000	1,70,000
General Reserve	40,000	70,000	Machinery	80,000	2,00,000
Profit & Loss a/c	30,000	48,000	Sundry debtors	1,60,000	2,00,000
Proposed Dividend	42,000	50,000	Stock	77,000	1,09,000
Sundry Creditors	55,000	83,000	Bills receivable	20,000	30,000
Bills payable	20,000	16,000	Cash in hand and at Bank	25,000	18,000
Provision for taxation	40,000	50,000			
	6,77,000	8,17,000		6,77,000	8,17,000

Additional Information:

- (a) Depreciation written off on Machinery and Buildings in 1992 were Rs.10,000 and Rs.20,000 respectively.
- (b) During the year 1992 Dividends Rs.20,000 were paid
- (c) The income tax paid during the year was Rs.35,000.

Prepare Funds Flow Statement.

Solution :

Working Notes:

Dr.	Equity Share Capital Account		Cr.
Particulars	Rs.	Particulars	Rs.
31-12-1992		1-1-1992	
To Balance b/d	4,00,000	By Balance b/d	3,00,000
		31-12-1992	

		By Cash (Bal. Fig)	1,00,000
	4,00,000		4,00,000

Dr. 8% Redeemable Preference share Capital Cr.

Particulars	Rs.	Particulars	Rs.
31-12-1992		1-1-1992	
To Cash (Bal. Fig)	50,000	By Balance b/d	1,50,000
To Balance c/d	1,00,000		
	1,50,000		1,50,000

Dr. General Reserve Account Cr.

Particulars	Rs.	Particulars	Rs.
31-12-1992		1-1-1992	
To Balance c/d	70,000	By Balance b/d	40,000
		31-12-1992	
		By P & L a/c (Bal. Fig)	30,000
	70,000		70,000

Dr. Provision for taxation Account Cr.

Particulars	Rs.	Particulars	Rs.
31-12-1992		1-1-1992	
To Cash Balance c/d	35,000	By Balance b/d	40,000
To Balance c/d	50,000	31-12-1992	
		By P & L a/c (Bal. Fig)	45,000
	85,000		85,000

Dr. Goodwill Account Cr.

Particulars	Rs.	Particulars	Rs.
1-1-1992		31-12-1992	
To Balance b/d	1,15,000	By P & L a/c (Bal. Fig)	25,000
		By Balance c/d	90,000
	1,15,000		1,15,000

Dr.		L & B Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
1-1-1992		31-12-1992			
To Balance b/d	2,00,000	By P & L a/c (Dep.)		20,000	
		By Cash (sale) (bal. Fig)		10,000	
		By Balance c/d		1,70,000	
	2,00,000			2,00,000	

Dr.		Machinery Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
1-1-1992		31-12-1992			
To Balance b/d	80,000	By P & L a/c (Dep.)		10,000	
31-12-1992		By Balance c/d		2,00,000	
To Cash (Bal. Fig)	1,30,000				
	2,10,000			2,10,000	

Cash from Operations:

Particulars	Rs.	Rs.
Balance of profit as per P & L a/c for the year ended 31-12-1992		48,000
Add: Non- Cash and Non – operating expenses:		
General Reserve	30,000	
Proposed dividend	50,000	
Interim dividend	20,000	
Provision for taxation	45,000	
Depreciation on Machinery & Buildings	30,000	
Goodwill written off	25,000	2,00,000
		2,48,000
Less: Non – Cash and Non – operating incomes		
NIL	-	-
		2,48,000

Less: Balance of Profit as per P & L a/c for the year ended 31-12-1991		30,000
Cash from operations		2,18,000

Statement of Sources and Uses for the year ended 31st December 1992

Particulars	Rs.	Rs.
Cash & Bank Balance as on 31-12-1991		25,000
Sources:		
Issue of equity shares	1,00,000	
Sale of building	10,000	
Increase in Creditors	28,000	
Cash from operations	2,18,000	3,56,000
		3,81,000
Uses:		
Redemption of 8% Preference shares	50,000	
Proposed dividend of 1991 paid (assumed)	42,000	
Income – Tax paid	35,000	
Plant purchased	1,30,000	
Increase in Debtors	40,000	
Increase in Stock	32,000	
Increase in Bills receivable	10,000	
Decrease in Bills payable	4,000	
Interim dividend paid	20,000	3,63,000
Cash and Bank balance on 31-12-2000		18,000

Illu.8 : Prepare a funds statement from the following particulars:

Assets	2000 Rs.	1999 Rs.	Liabilities	2000 Rs.	1999 Rs.
Cash	36,000	60,000	Trade creditors	1,70,000	1,94,000
Debtors	1,08,000	1,00,000	Accrued Expenses	38,000	26,000
Stock	1,60,000	1,40,000	Mortgages	60,000	40,000
Investment (Marketable)	-	20,000	Capital	2,60,000	2,00,000

Fixed assets	3,40,000	2,80,000	Retained earnings	68,000	59,000
Accumulated depreciation	(48,000)	(1,01,000)			
Fixed assets (Net)	2,92,000	1,79,000			
Goodwill	-	20,000			
	5,96,000	5,19,000		5,96,000	5,19,000

Additional information:

- (a) Depreciation provided during 2000 amounted to Rs.27,000
(b) Dividends paid in 2000 amounted to Rs.14,000.

Solution :**Schedule of Changes in working capital**

	1999 Rs.	2000 Rs.	Increase in W. C.	Decrease in W. C.
Current Assets:				
Cash	60,000	36,000	-	24,000
Debtors	1,00,000	1,08,000	8,000	-
Stock	1,40,000	1,60,000	20,000	-
Investments	20,000	-	-	20,000
	3,20,000	3,04,000		
Current Liabilities:				
Trade Creditors	1,94,000	1,70,000	24,000	-
Accrued Expenses	26,000	38,000	-	12,000
	2,20,000	2,08,000		
Working capital (C. A. – C. L)	1,00,000	96,000		
Net Decrease in W. C.	-	4,000	4,000	
	1,00,000	1,00,000	56,000	56,000

Dr.	Funds Flow Statement		Cr.
Sources	Rs.	Applications	Rs.
Issue of shares ²	60,000	Purchase of fixed Assets ¹	1,40,000

Raising of Mortgages ³	20,000	Payment of Dividend	14,000
Funds from operations ⁴	70,000		
Net Decrease in W. C.	4,000		
	1,54,000		1,54,000

Working Notes:

(1)

Dr.		Net Fixed Assets Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
To Balance b/d	1,79,000	By Depreciation	27,000		
To Cash – Purchases (Balancing figure)	1,40,000	By Balance c/d	2,92,000		
	3,19,000				3,19,000

(2)

Dr.		Share Capital Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
To Balance c/d	2,60,000	By Balance b/d	2,00,000		
		By Cash – Issue (balancing figure)	60,000		
	2,60,000				2,60,000

(3)

Dr.		Mortgages Accounts		Cr.	
Particulars	Rs.	Particulars	Rs.		
To Balance c/d	60,000	By Balance b/d	40,000		
		By Cash – raised (Balancing figure)	20,000		
	60,000				60,000

Dr.		Adjusted Profit and loss Account		Cr.	
Particulars	Rs.	Particulars	Rs.		
To Depreciation	27,000	By Balance b/d	59,000		
To Goodwill written off	20,000	BY Funds from operations (balancing figure)	70,000		
To Dividend paid	14,000				

To Balance c/d	68,000		
	1,29,000		1,29,000

Illu.9 : From the following balances extracted from Messrs. Surya Tiles Ltd. as on 31st March 2001 and 2002, you are required to prepare (a) Schedule of changes in working capital and (b) Funds Flow Statement.

Liabilities	31 st March 2001 Rs.	31 st March 2002 Rs.	Assets	31 st March 2001 Rs.	31 st March 2002 Rs.
Share capital	1,00,000	1,10,000	Buildings	40,000	38,000
General Reserve	14,000	18,000	Plant & Machinery	37,000	36,000
P & L a/c	16,000	13,000	Investment	10,000	21,000
Creditors	8,000	5,400	Stock	30,000	23,400
Bills payable	1,200	800	Bills receivable	2,000	3,200
Provision for tax	16,000	18,000	Debtors	18,000	19,000
Provision for doubtful debts	400	600	Cash at Bank	6,600	15,200
			Preliminary expenses	12,000	10,000
	1,55,600	1,65,800		1,55,600	1,65,800

Additional Information:

- (i) Depreciation charged on Plant was Rs.4,000
- (ii) Provisions for taxation Rs.19,000 was made during the year 2002.
- (iii) Interim dividend of Rs.8,000 was paid during the year.
- (iv) A piece of machinery was sold for Rs.8,000 during the year 2002. It has costed Rs.12,000. Depreciation of Rs.7,000 has been provided for it.

Solution :

Schedule of changes in working capital

Particulars	2001 Rs.	2002 Rs.	Increase (+) Rs.	Decrease (-) Rs.
Current assets:				
Cash at Bank	6,600	15,200	8,600	-
Debtors	18,000	19,000	1,000	

Bills receivable	2,000	3,200	1,200	
Stock	30,000	23,400		6,600
Total Current Assets (A)	56,000	60,800		
Current liabilities:				
Provision for doubtful debts	400	600		200
Bills payable	1,200	800	400	
Sundry creditors	8,000	5,400	2,600	
Total Current Liabilities (B)	9,600	6,800		
Working Capital			13,800	6,800

Net increase in working capital = 13,800 – 6,800 = 7,000

Funds Flow Statement for the year ended

Sources:	
Net in working capital	7,000
Funds from operations	29,000
Sales of machinery	8,000
	44,000
Applications:	
Purchase of plant	8,000
Taxes paid	17,000
Investments purchases	11,000
Interim dividend paid	8,000
	44,000

Working Notes: Funds from operations –	Rs.
Profit & Loss account balance on 31-12-02	13,000
Add: items which do not decrease funds from Operations:	
Preliminary expenses written off	2,000
Provision for taxation	19,000
Depreciation: Plant	4,000
Buildings	2,000
Interim dividend	8,000

	48,000
Less: Profit on sale of machinery	3,000

	45,000
Less: Profit & Loss a/c balance on 31-12-2001	16,000 -----
Funds from operations	29,000 -----
 Purchase of Plant:	
Balance as on 31-12-2001	37,000
Less: Depreciation	4,000 -----
	33,000
Less: Books value of machinery sold (12,000 – 7,000)	5,000 -----
	28,000
Less: Balance as on 31-12-2002	36,000 -----
Purchase of Plant	8,000 -----
 Taxes Paid:	
Provision for tax as on 31-12-01	16,000
Add: Provision created for 2002	19,000 -----
	35,000
Less: Provision for taxes on 31-12-2002	18,000 -----
Taxes Paid	17,000 -----

Note: investments have not been treated as current asset.

Illu.10 : Prepare funds flow statement from the following information:

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Capital	77,000	81,200	Buildings	52,000	60,100
Creditors	10,500	14,800	Machinery	25,000	20,000
Creditors for machinery	25,000	25,000	Motorcar	21,000	16,800
Bank Loan	5,000	26,000	Furniture	1,500	2,300
B /P	14,000	16,000	Stock	12,000	37,400
Provision for			Debtors	4,000	12,600

bad debts	1,000	800			
			B / R	14,800	11,020
			Cash in hand	2,100	3,500
			Petty Cash	100	80
	1,32,500	1,63,800		1,32,500	1,63,800

- (i) Rs.5,000; on motorcar Rs.4,200 and on furniture Rs.300.
- (ii) Drawings of Mr. X were Rs.15,000
- (iii) Additional capital introduced during the year was Rs.10,000

Solution :

Schedule of changes in working capital of Mr. X as on 31st December 2003

Particulars	2002 (Rs.)	2003 (Rs.)	Changes in Working Capital	
			Increase	Decrease
Current Assets:				
Stock	12,000	37,400	25,400	-
Debtors	4,000	12,600	8,600	-
B / R	14,800	11,020	-	3,780
Cash in Hand	2,100	3,500	1,400	-
Petty Cash	100	80	-	20
Total Current Assets (A)	33,000	64,600		
Current Liabilities:				
Creditors	10,500	14,800	-	4,300
B / P	14,000	16,000	-	2,000
Provision for bad debts	1,000	800	200	-
Total Current Liabilities (B)	25,500	31,600		
Working Capital (A) – (B)	7,500	33,000		
Increase in working capital	25,500	-	-	25,500
Total	33,000	33,000	35,600	35,600

Calculation of Funds from operations:

		Rs.
Profit during the year 2003		9,200
Add: Non –operating funds debited to P & L a/c:		
Depreciation on Building	5,200	
Depreciation on Machinery	5,000	
Depreciation on Motorcar	4,200	
Depreciation on Furniture	300	14,700
Funds from operations		23,900

Funds Flow Statement of 'X' as on 31-12-2003

Sources	Amount (Rs.)	Uses	Amount (Rs.)
Funds from operations	23,900	Drawings	15,000
Additional Capital Introduced	10,000	Purchase of Buildings	13,300
Additional Bank Loan raised	21,000	Purchase of Furniture	1,100
		Increase in working capital	25,500
	54,900		54,900

Working Notes:

Dr.	Buildings a/c		Cr.
Particulars	Rs.	Particulars	Rs.
To Opening Balance	52,000	By Depreciation	5,200
To Cash (Buildings purchased)	13,300	By Closing balance	60,100
	65,300		65,300

Dr.	Furniture A/c		Cr.
Particulars	Rs.	Particulars	Rs.
To Opening Balance	1,500	By Depreciation	300
To Cash (Furniture purchased)	1,100	By Closing Balance	2,300
	2,600		2,600

Dr.	Capital A/c		Cr.
Particulars	Rs.	Particulars	Rs.
To Drawings (Cash)	15,000	By Opening Balance	77,000
To Closing Balance	81,200	By Additional Capital introduced (Cash)	10,000
		By P & L a/c (2003 ear profit) (B / F)	9,200

	96,200		96,200
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Illu.11 : From the following Balance – Sheet of Mr. Kumar you are requested to prepare a schedule of changes in working capital and statement of Funds Flow.

Liabilities	1999 Rs.	2000 Rs.	Assets	1999 Rs.	2000 Rs.
Capital	80,000	85,000	Land & Buildings	50,000	50,000
Profit & Loss a/c	14,500	24,500	Plant	24,000	34,000
Creditors	9,000	5,000	Stock	9,000	7,000
Mortgage	-	5,000	Debtors	16,500	19,500
			Cash	4,000	9,000
	1,03,500	1,19,500		1,03,500	1,19,500

Solution :

Statement showing changes in Working Capital

	1999	2000	Increase	Decrease
Current Assets:	9,000	7,000		2,000
Debtors	16,500	19,500	3,000	
Cash	4,000	9,000	5,000	
Current Liabilities:				
Creditors	9,000	5,000	4,000	
			12,000	2,000

Net increase in Working capital = Rs.12,000 – 2,000 = Rs.10,000.

Funds from operations

	Rs.
Balance of profit in 2000	24,500
Less: Balance of profit in 1999	14,500
Funds from operations	10,000

Funds Flow Statement

		Rs.
Sources of funds		
Funds from operations	10,000	
Issue of Capital	5,000	
New Mortgage	5,000	20,000
Application of Funds		
Purchase of Plant		10,000
Net Increase in working Capital		10,000

Illu.12 : The Balance Sheet of Shri. Constructions Ltd. were as follows:

Liabilities	31-12-98	31-12-99	Assets	31-12-98	31-12-99
Share Capital	70,000	74,000	Cash	9,000	7,800
Debentures	12,000	6,000	Debtors	14,900	17,700
Provision for bad debts	700	800	Stock	49,200	42,700
Creditors	10,360	11,840	Land	20,000	30,000
P & L a/c	10,040	10,560	Goodwill	10,000	5,000
	1,03,100	1,03,200		1,03,100	1,03,200

Additional Information:

- (a) Dividend paid Rs.3,500
- (b) Land Purchased Rs.10,000
- (c) Goodwill written off Rs.5,000
- (d) Debentures redeemed Rs.6,000

Prepare funds flow statement.

Solution :**Schedule of Changes in Working Capital**

	1998 Rs.	1999 Rs.	Increase in W. C. Rs.	Decrease in W. C. Rs.
Current Assets:				
Cash	9,000	7,800	-	1,200
Debtors	14,900	17,700	2,800	-
Stock	49,200	42,700	-	6,500
	73,100	68,200	-	-
Current Liabilities:				
Trade Creditors	10,360	11,840	-	1,480
Reserve for Doubtful debts	700	800	-	100
	11,060	12,640		
Working Capital (C. A. – C. L.)	62,040	55,560		
Net Decrease in W. C.	-	6,480	6,480	
Working Capital	62,040	62,040	9,280	9,280

Fund Flow Statement (for the year ended 31-12-1999)

Sources	Rs.	Use of Funds	Rs.
Issue of Share Capital (74,000 – 70,000)	4,000	Redemption of Debentures Rs. (12,000 – 6,000)	6,000
Funds from operations	9,020	Purchase of land Rs. (30,000 – 20,000)	10,000
Net Decrease in working capital	6,480	Payment of Dividend	3,500
	19,500		19,500

Funds from operations

	Rs.
Closing Balance of P/ L a/c (1999)	10,560
Add: Non – fund and non – operating items which have already been debited to P/ L A/c:	
Goodwill Written off	5,000
Dividend paid	3,500

	19,060
Less: Opening balance of P & L a/c (1998)	10,040
Funds from operations	9,020

Illu.13 :The following is the summarised balance sheet of Mr. Ramesh & co.

Liabilities	1997 Rs.	1998 Rs.	Assets	1997 Rs.	1998 Rs.
Equity share capital	3,00,000	3,50,000	Fixed Assets (net)	5,10,000	6,20,000
Preference capital	2,00,000	1,00,000	Investments	30,000	80,000
Debentures	1,00,000	2,00,000	Current Assets	2,40,000	3,75,000
Reserve	1,00,000	2,70,000	Discount on debentures	10,000	5,000
Provision for doubtful debts	10,000	15,000			
Current liabilities	80,000	1,45,000			
	7,90,000	10,80,000		7,90,000	10,80,000

Additional Information:

- (a) A machine costing Rs.70,000 whose book value was Rs.30,000 was disposed off Rs.25,000.
- (b) Preference share redemption was carried out at a premium of 5%.
- (c) The provision for depreciation stock at Rs.1,50,000 on 31-12-87 and at Rs.1,90,000 on 31-12-88.

Prepare Funds Flow Statement.

Solution :

Schedule of Changes in Working Capital

	1997 Rs.	1998 Rs.	Increase	Decrease
Current Assets	2,40,000	3,75,000	1,35,000	65,000
Less: Current liabilities	80,000	1,45,000		65,000
Working capital	1,60,000	2,30,000	1,35,000	65,000
Net Increase in Working capital	70,000			70,000
	2,30,000			1,35,000

Calculation of Funds from operations.

	Rs.
Depreciation provided on Fixed Assets	80,000
Loss on sale of machinery	5,000
Discount Issue of Debenture 's written off	5,000
Premium on redemption of preference share capital	5,000
Transfers to Reserves	1,70,000
Provision for doubtful debts provided	5,000
Funds from operations	2,70,000

Dr.	Funds flow Statements		Cr.
Sources	Rs.	Applications	Rs.
Issue of equity share capital	50,000	Redemption of preference capital	1,00,000
Issue of Debentures	1,00,000	Premium on Redemption	5,000
Sale of machinery	25,000	Purchase of machinery	2,20,000
Funds from operations	2,70,000	Investment purchase	50,000
		Investments in working capital	70,000
	4,45,000		4,45,000

Working Notes:

(1)

Dr.	Fixed Assets Account		Cr.
To Balance b/d	5,10,000	By Bank 25,000	
To Bank (Bal. Fig) Purchase	2,20,000	By Loss on sales 5,000	30,000
		By Depreciation Provision a/c	80,000
		By Balance c/d	6,20,000
	7,30,000		7,30,000

Dr.	Provision for Depreciation Account		Cr.
To Fixed Assets a/c (accumulated depreciation on machinery sold) (70,000 – 30,000)	40,000	By Balance b/d	1,50,000

To Balance c/d	1,90,000	By Loss on sales Depreciation (Bal. Fig)	80,000
	2,30,000		2,30,000

(2) Investments purchased = Rs.80,000 – 30,000 = Rs.50,000

(3) Discount on Debentures written off = Rs.10,000 – 5,000 = Rs.5,000

(4) Issue of Equity share capital = Rs.3,50,000 – 3,00,000 = Rs.50,000.

(5) Redemption of Preference Share capital = Rs.2,00,000 – Rs.1,00,000 = 1,00,000

(6) Premium on redemption of preference share capital
= 5% on Rs.1,00,000 = Rs.5,000

(7) Issue of Debentures = Rs.2,00,000 – 1,00,000 = Rs.1,00,000

(8) Transfer to Reserve = Rs.2,70,000 – 1,00,000 = Rs.1,70,000

(9) Provision for doubtful debts provided = Rs.15,000 – 10,000 = Rs.5,000.

18.5 QUESTIONS:

1. What is Funds Flow Analysis?
2. What are the sources and Applications of Funds
3. Draw a Proforma Funds Flow Statement
4. How do you the Statement of Changes in Working Capital position help in Funds flow Analysis?
5. What are the uses of Funds Flow Statement? What are its disadvantages?
6. Income statement concentrates on operating part while Funds Flow statement throws light on the activities and the direction of operations. Comment.

18.6 EXERCISES :

1. Calculate funds from operations from the following:

Net profit for the year Rs.80,000

Administrative expenses Rs.20,000

Depreciation Rs.42,000

Loss on sale of Machinery Rs.10,000

Interest on investments Rs.5,000

Selling and distribution expenses Rs.15,000

[Ans.: Funds from Operations Rs.1,27,000]

2. The following were the Balance Sheet of XYZ Co. Ltd. as on 31st March 2002 and 2003.

Liabilities	31-3-02 Rs.	31-3-03 Rs.	Assets	31-3-02 Rs.	31-3-03 Rs.
Share capital	2,64,000	3,96,000	Land & Buildings	1,66,200	3,39,600
General Reserve	18,000	27,000	Machinery	1,06,800	1,53,900
P & L a/c	58,500	62,400	Furniture	7,200	4,500
12% Debentures	10,000	78,000	Stock	66,300	78,000
Provision for Tax	29,400	37,700	Debtors	1,09,500	1,17,300
Creditors	1,00,500	1,09,200	Cash at Bank	14,400	12,000
			Preliminary expenses	10,000	5,000
	4,80,400	7,10,300		4,80,400	7,10,300

You are required to prepare funds flow statement after taking into account the following:

- (a) Depreciation written off during year
 On Buildings Rs.20,400
 On Machinery Rs.38,400
 On Furniture Rs.1,200
- (b) Interim dividend paid during the year Rs.26,000
- (c) Income tax paid Rs.30,000.

[Ans.: Net increase in working capital Rs.8,400; Funds from operations Rs.1,42,200]

3. The following are the summarised balance sheets of M/s Vivek Ltd. on 31st December, 2003 and 31st December, 2004.

Liabilities	2003 (Rs.)	2004 (Rs.)
Share capital	12,00,000	16,00,000
Debentures	4,00,000	6,00,000
Profit & Loss Account	2,50,000	5,00,000
Creditors	2,30,000	1,80,000
Provision for :		
Bad and doubtful debts	12,000	6,000
Depreciation on land and buildings	40,000	48,000
Depreciation on plant & Machinery	60,000	70,000
	21,92,000	21,92,000
Assets :		
Plant and Machinery (at cost)	8,00,000	12,90,000

Land and buildings (at cost)	6,00,000	8,00,000
Stock	6,00,000	7,00,000
Bank	40,000	80,000
Preliminary expenses	14,000	12,000
Debtors	1,38,000	1,22,000
	21,92,000	30,04,000

Additional Information :

- (a) During the year a part of the machinery costing Rs.1,40,000 (accumulated depreciation thereon Rs.4,000) was sold for Rs.12,000.
- (b) Dividend for Rs.1,00,000 was paid during the year.

Ascertain :

- (i) Change in working capital for 2004
- (ii) Funds Flow statement for 2004.

[Ans.: Net increase in working capital Rs.1,74,000; Funds from operations Rs.4,92,000]

4. From the following Balance Sheets of B Ltd., prepare a source and uses of funds statement for 2004.

Assets	31 st December, 2004 (Rs.)	31 st December, 2003 (Rs.)
Cash	75,000	35,000
Accounts receivable	90,000	98,000
Merchandise inventory	1,20,000	87,000
Long term investments	10,000	15,000
Land	30,000	20,000
	3,25,000	2,55,000
Liabilities and Stockholders		
Equity accounts payable	45,000	50,000
Notes payable (short term)	35,000	20,000
Notes payable (due December, 2005)	20,000	-
Capital stock	1,50,000	1,25,000
Retailed earnings	75,000	60,000
	3,25,000	2,55,000

[Ans.: Increase in working capital Rs.35,000; Funds from operations Rs.15,000]

5. Seeta Mahalakshmi Ltd., presents the following financial statements for 2000 and 2001. Prepare a source and Application of funds statement:

	2000 Rs.	2001 Rs.
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Assets		
Cash	1,06,000	62,000
Investments	1,74,000	-
Sundry Debtors	6,92,000	10,56,000
Stock in trade	8,64,000	13,66,000
Net fixed assets	22,26,000	27,96,000
	40,62,000	52,80,000
Liabilities		
Sundry Creditors	8,26,000	12,54,000
Bills payable	4,52,000	6,28,000
Loan from bank	2,00,000	4,70,000
Reserves and surplus	13,84,000	17,28,000
Share capital	12,00,000	12,00,000

Depreciation of Rs.3,78,000 was written off for 2001 on fixed assets.

[Ans.: Increase in working capital Rs.44,000; Funds from operations Rs.7,22,000]

6. From the following Balance Sheet as on 31st December 2003 and 31st December 2004 you are required to prepare a schedule of changes in the working capital and a funds flow statement taking the provision for tax and proposed dividends as non – current liabilities.

Liabilities	As on 2003 Rs.	31st Dec. 2003 Rs.	Assets	As on 2003 Rs.	31st Dec. 2003 Rs.
Share capital	10,000	15,000	Fixed Assets	10,000	20,000
Profit and loss a/c	4,000	6,000	Current	13,000	14,500
Provision for tax	2,000	3,000			
Proposed Dividends	1,000	1,500			
Sundry Creditors	4,000	6,000			
Outstanding expenses	2,000	3,000			
	23,000	34,500		23,000	34,500

Additional Information:

- (a) Tax paid during 2004 Rs.2,500
- (b) Dividends paid during 2004 Rs.1,000

[Ans.: Net decrease in working capital Rs.1,500; Funds from operations Rs.7,000]

18.7 SUGGESTED READINGS :

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
3. Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.
4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
5. Ramachandran, Accounting for Management, Scitech Publications (India) Pvt. Ltd., 2003
6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter - 19

Cash Flow Analysis

Objectives :

After reading this lesson you should be able to :

- Know the meaning of cash flow analysis
- Classify cash flow on the basis of operations investment and financing
- Discuss the treatment of some items in the preparation of cash flow statement.
- Prepare a Cash flow statement using the direct and indirect methods

Structure :

19.1 Introduction

19.2 Meaning of Cash Flow

19.3 Classification of Cash flow

19.4 Treatment of other items

19.5 Preparation of Cash Flow Statement

19.6 Calculation of Cash Flows from operations or
Operating Activities

19.7 Questions

19.8 Exercises

19.9 Suggested Readings

19.1 INTRODUCTION :

A cash flow statement presents a summary of investment, dividend and financing decisions with a focus on movements in cash and cash equivalents during the reporting period. A fund flow statement explains changes in working capital, while a cash flow statement explains changes in the cash balance (including cash equivalents). Balance in the cash credit account and bank overdraft account should be treated as a part of the cash balance. Cash flow statement is considered superior to fund flow statement in terms of 'decision usefulness'. A cash flow statement helps to assess the ability of the firm to

generate and use cash to the benefit of shareholders. It helps to estimate the amount, timing and uncertainty of future cash flows.

A cash flow statement is not very much different from a funds flow statement. In fact, the main difference between funds flow statement and cash flow statement relates to meaning and concept of the term 'fund'. The term 'fund' as used in funds flow statement means not working capital i.e., the difference between current assets and current liabilities. But in a cash flow statement the term 'fund' means cash.

19.1.1. Concept of Cash Flow :

As per Accounting Standard (AS – 3) issued by the Institute of Chartered Accountants of India, the term cash includes :

1. Cash in hand,
2. Demand deposits with banks.
3. Cash equivalents. These are short term highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.

19.2 MEANING OF CASH FLOW :

Cash flow means inflow and outflow of cash. An inflow i.e., source of cash increases the total cash available at the disposal of the firm while an outflow i.e., use of cash decreases it. The difference between cash inflows and cash outflow is known as net cash flow which can be either net cash inflow or net cash outflow.

It should be noted that cash flow statement deals with flow of cash fund but does not consider movement among cash, bank balance and cash equivalents. This is in line with funds flow statement which exclude movements between items that constitute working capital i.e., current assets and current liabilities.

19.3 CLASSIFICATION OF CASH FLOWS :

Accounting Standard (As – 3) requires that cash flow statement should report cash flow during the period classified by operating, investing and financing activities.

1. Operating Activities : Operating activities are the principal revenue activities of the enterprise. Cash flows from these activities result from transactions and other events that enter into the determination of net profit or loss. Examples of cash flow from operations are :

- (i) Cash receipts from the sale of goods and the rendering of services usually forms a major share of cash inflow.
- (ii) Cash receipts from royalties, fees, commission and other revenue.
- (iii) Cash payment to suppliers for goods and services, such as payment of expenses like lighting and power, rent, insurance etc.
- (iv) Cash payment of wages and salaries to employees.
- (v) Cash payments or refunds of income taxes unless they can be specifically identified with financing and investing activities, etc.

2. Investing Activities : These are the acquisitions and disposal of long term assets (such as plant, machinery, furniture, land and building etc.) and other investments not included in cash equivalents. Examples of cash flow arising from investing activities are :

- (i) Cash receipts from disposal of fixed assets.
- (ii) Cash payments to acquire fixed assets.
- (iii) Cash payment to acquire shares / debentures of other enterprises.
- (iv) Cash receipts from disposal of shares, debentures of other enterprises.
- (v) Cash advances and loans made to third parties.
- (vi) Cash receipts from repayment of advances and loans made to third parties.

3. Financing Activities : These are the activities that result in changes in the size and composition of the owner's capital and borrowings of the enterprise. Examples of cash flows arising from financing activities are :

- (i) Cash receipts from issue of shares and debentures
- (ii) Cash receipts from loans raised.
- (iii) Cash payments for redemption of preference shares and debentures.

19.4 TREATMENT OF OTHER ITEMS :

1. Interest and Dividends :

- (i) In case of a financing enterprise, cash flows from interest paid and interest and dividend received should be treated as cash flows from operating

activities. Dividends paid should be classified as cash flows from financing activities.

- (ii) In the case of other enterprises, cash flows arising from interest and dividend paid should be classified as cash flows from financing activities while interest and dividend received should be classified as cash flows from investing activities.

Net profit is adjusted for non-operating expenses and incomes for calculating operating profits as shown below :

Net profit
Add: Non – operating expenses
Less: Non – operating incomes

Net operating profit

- 2. Income Tax :** Cash flows arising from income tax should be classified as flows from operating activities unless they can be specifically identified with financing and investing activities. For example, capital gain tax on sale of land can be identified with investing activity and therefore in the cash flow statement, it should be shown as outflow from investing activities.
- 3. Extra ordinary items :** The cash flows associated with extra ordinary items should be classified as arising from operating, investing or financing activities as appropriate and separately disclosed. For example, legal claim, cost of winning a law suit or lottery, receipt of claim from an insurance company etc. are extra ordinary items.
- 4. Non Cash Transactions :** There are certain transactions which do not involve cash inflow or cash outflow. Although they do effect the capital and assets of an enterprise, they are excluded from cash flow statement for obvious reasons. Examples non – cash transactions are :
- (i) Acquisition of assets by issue of shares / debentures.
 - (ii) Conversion of convertible debentures into shares.
 - (iii) Acquisition of a fixed asset, say machinery, on credit etc.

19.5 PREPARATION OF CASH FLOW STATEMENT :

The procedure used for the preparation of a cash flow statement is as follows :

- Calculation of net increase or decrease in cash and cash equivalents accounts – The difference between cash and cash equivalents for the period may be computed by comparing these accounts given in the comparative balance sheets. The results will be cash receipts and payments during the period responsible for the increase or decrease in cash and cash equivalent items.
- Calculation of the net cash provided or used by operating activities – It is by the analysis of profit and loss account, comparative balance sheet and selected additional information.
- Calculation of the net cash provided or used by investing and financing activities. All other changes in the Balance sheet items must be analysed taking into account the additional information and effect on cash may be grouped under the investing and financing activities.
- Preparation of a cash flow statement. It may be prepared by classifying all cash inflows and outflows in terms of operating, investing and financing activities. The net cash flow provided or used in each of these three activities may be highlighted.
- Ensure that the aggregate of net cash flows from operating, investing and financing activities is equal to net increase or decrease in cash and cash equivalents.
- Report any significant investing, financing transactions that did not involve cash or cash equivalents in a separate schedule to the cash flow statement.

As – 3 has not prescribed any specific format of cash flow statement but SEBI requires the cash flow statement to be prepared in the following form.

Proforma of Cash Flow Statement

	Rs.	Rs.
Cash Flows from Operating Activities :		
Net profit before tax and extra ordinary items adjustment for :		
Depreciation	-	
Interest income	-	
Dividend income	-	
Interest expense	-	
Foreign exchange loss	-	

Operating profit before working capital changes	-	
Adjustments for changes in current assets and current liabilities	-	
Cash generated from or used in operations before tax	-	
Income tax paid	-	
Cash flow before extra ordinary items	-	
Extra ordinary items	-	
Net cash from (or used in) operating activities	-	
Cash Flows from Investing activities	-	-
Purchase of fixed assets	-	
Proceeds from sale of fixed assets	-	
Interest and dividend received	-	
Net cash from (or used in) investing activities	-	
Cash Flows from Financing Activities	-	
Proceeds from issue of shares / debentures	-	
Proceeds from long term borrowings	-	
Repayment of long term borrowings	-	
Interest paid	-	
Dividends paid	-	
Net cash from (or used in) financing activities	-	
Net increase (or Decrease) in Cash and cash equivalents		-
Cash and cash equivalents at the beginning of the period		-
Cash and cash equivalents at the end of the period		-

19.6 CALCULATION OF CASH FLOWS FROM OPERATIONS OR OPERATING ACTIVITIES :

There are two methods of calculating cash flows from operating activities :

(a) Direct method, and (b) Indirect method.

(a) Direct method : Under this method, cash receipts from operating revenues and cash payments for operating expenses are calculated and shown in the cash flow statement. The difference between the total cash receipts and total cash payments as shown as the net cash flow from operating activities. Examples of usual cash receipts and payments resulting from operating activities are :

- (i) Cash sales of goods and services.
- (ii) Cash received from debtors.

- (iii) Cash payment for purchase of inventories.
- (iv) Cash payment to creditors.
- (v) Cash payment for wages, salaries and other operating expenses.
- (vi) Cash payment of income tax, etc.

There are many items which appear in the Profit and Loss Account on accrual basis. Necessary adjustments are made to these items to convert them into cash based items.

(b) Indirect Method : Under the indirect method, the net cash from operating activities is determined by making necessary adjustments in the net profit (or loss) as disclosed by Profit and Loss Account. Adjustments in net profit or loss are for the effects of :

- (a) Non – cash items like depreciation;
- (b) Changes during the period in inventories and operating receivables and payable;
- (c) All other items for which cash effects are investing and financing cash flows.

The indirect method is also known as 'Reconciliation Method' as it involves a reconciliation of the net profit with net cash flows operating activities.

The method of calculating cash from operating activities is as follows :

	Rs.
Net Profit for the year	
Add: Non cash and non – operating expenses	
- Depreciation	
- Goodwill written off	
- Preliminary expenses written off	
- share discount written off	
- loss on sale of fixed assets, investments, etc.	
- Provision for taxation	
Less : Non cash and non – operating incomes	
Profit on sale of fixed assets, investments, etc.	
Net profit after adjustment for non – cash items	-
Adjustments for changes in current operating assets (except cash and cash equivalents) and current operating liabilities (except bank overdraft)	
Add: 1. Increase in current liabilities	
2. Decrease in current assets	
Less: 1. Increase in current assets	
2. Decrease in current liabilities	
Less: Income tax paid	
Cash from operating activities	-

Illu.1 : From the following balance sheets prepare Cash Flow Statement:

Liabilities	31-3-2005 Rs.	31-3-2006 Rs.	Assets	31-3-2005 Rs.	31-3- 2006 Rs.
Share capital	20,000	28,000	Goodwill	16,000	13,000
Profit & Loss a/c	10,000	13,000	Land	10,000	20,000
General Reserve	8,000	10,000	Machinery	25,000	50,000
12% Debentures	25,000	35,000	Investments	10,000	12,000
Creditors	26,000	30,000	Stock	20,000	15,000
Provision for tax	10,000	14,000	Debtors	10,000	13,000
			Cash	8,000	7,000
	99,000	1,30,000		99,000	1,30,000

Additional Information:

- (a) Investments costing Rs.5,000 sold for Rs.6,000 during the year.
- (b) Depreciation charged on Machinery was Rs.5,000

Solution :

**Cash Flow Statement
(for the year ended 31st March 2006)**

	Rs.	Rs.
Cash flows from operating activities:		
Increase in balance of P & L a/c	3,000	
Adjustments for non- cash and non – operating items:		
Transfer to general reserve	2,000	
Depreciation Machinery	5,000	
Profit on sale of investments	(-) 1,000	
Goodwill written off	3,000	
Operating profit before working capital changes	12,000	
Adjustments for changes in current assets and current liabilities:		
Increase in creditors	4,000	
Increase in provision for tax	4,000	
Increase in debtors	(3,000)	
Decrease in stock	5,000	

Cash generating from operations	22,000	
Income tax paid	-	
Net cash from operating activities		22,000
Cash flows from investing activities:		
Purchase of Land	(10,000)	
Purchase of Machinery	(30,000)	
Purchase of Investments	(7,000)	
Sale of investments	6,000	
Net cash used in investing activities		41,000
		(-) 19,000
Cash flows from financing activities:		
Proceeds from issue of shares	8,000	
Proceeds from 12% Debentures	10,000	
Net cash used in financing activities		18,000
Net decrease in cash and cash equivalents		(-) 1,000
Cash and cash equivalent at the beginning		8,000
Cash and Cash equivalent at the end		7,000

Illu.2 : Balance Sheets of M/s. A and B as on 1st January and 31st December 2006 were as follows:

Liabilities	1-1-06	31-12-06	Assets	1-1-06	31-12-06
Capital	2,25,000	2,85,000	Cash	30,000	39,000
Mrs. B 's Loan	45,000	-	Debtors	81,000	1,14,000
Loan from state			Stock	72,000	63,000
Bank of India	90,000	1,20,000			
Sundry creditors	75,000	84,000	Furniture	3,000	3,000
			Machinery	1,35,000	97,500
			Land	54,000	67,500
			Building	60,000	1,05,000
	4,35,000	4,89,000		4,35,000	4,89,000

During the year a machine costing Rs.18,000 (accumulated depreciation on Rs.6,000) was sold for Rs.7,500. The provision for depreciation against machinery as on 1st January 2006 was Rs.36,000 and on 1st December 2006 Rs.55,500. Net profit for

the year 2006 amounted to Rs.90,000. You are required to prepare cash flow statement.

Solution :

Particulars		Rs.	Rs.
Cash flow from operating activities:			
1.	Net Profit as gives (for the year 2006) adjustment of non cash and non operating activities	90,000	
	Depreciation	25,500	
	Loss on sale of machinery	4,500	
	Operating profit before work in price changes	1,20,000	
	Decrease is stock (72,000 – 63,000)	9,000	
	Increase in creditors (84,000 – 75,000)	9,000	
	Increase in debtors (1,14,000 – 81,000)	(33,000)	
	Net cash flow from operating activities		1,05,000
ii)	Cash flow from investing activities:		
	Sale of machinery	7,500	
	Purchase of land (67,500 – 54,000)	(13,500)	
	Purchase of Buildings (1,05,000 – 60,000)	(45,000)	
	Net cash flow from investing activities		(-) 51,000
iii)	Cash flow from financing activities		
	Loan from State Bank of India	30,000	
	Mrs. B 's loan repaid	(45,000)	
	Drawings	(30,000)	
	Net Cash flow from financing activities		(-) 45,000
	Net increase (decrease) is cash and cash equivalent)		9,000
	Cash and cash equivalentents as the beginning of the period		30,000
	Cash and cash equivalentents at the end off the period		39,000

Working Notes:

Calculation of drawings:	Rs.
Capital as on 1-1-06	2,25,000
Add: Net profit	90,000

	3,15,000
Less: Capital as on 31-12-06	2,25,000

Drawings	30,000

Calculation of depreciation charged	Rs.
Depreciation on 1-1-06	36,000
Less: Depreciation transferred on assets sole	6,000

	30,000
Less: Depreciation as on 31-12-06	55,500

Depreciation charged	25,500
Doubtful	-----

Illu.3 : Following are the Comparative Balance Sheet of XYZ Ltd. as on 31st December 2005 and 2006:

Liabilities	2005 Rs.	2006 Rs.	Assets	2005 Rs.	2006 Rs.
Share capital	3,50,000	3,70,000	Assets	1,00,000	1,50,000
Profit & Loss a/c	50,400	52,800	Stocks	2,46,000	2,13,500
9% debentures	60,000	30,000	Goodwill	50,000	25,000
Creditors	51,600	59,200	Cash and Bank Bal.	45,000	39,000
			Debtors	71,000	84,500
	5,12,000	5,12,000		5,12,000	5,12,000

Other particulars provided to you are:

(a) Dividends declared and paid during the year Rs.17,500

(b) Land was revalued during the year at Rs.1,50,000 and the profit on revaluation transferred to profit and Loss account.

You are required to prepare a cash flow statement for the year ended 31-12-2005.

Solution :

Cash from operations

Particulars	Rs.	Rs.
Balance of profit as per P & L a/c on 31-12-2006		52,800
Add: Non – cash and Non – operating expenses		
Dividends declared	17,500	
Goodwill written off	25,000	42,500
		95,300
Less: Non – Cash and non – operating incomes		
Profit on revaluation of land	50,000	50,000
		45,300
Less: Balance of profit as per P & L a/c on 31-12-2005		50,400
Cash lost in operations		(-) 5,100

Cash Flow Statement

Particulars	Rs.	Rs.
Balance of cash and bank on 1-1-2006		45,000
Sources:		
Issue of shares	20,000	
Increase in Creditors	7,600	
Decrease in Stocks	32,500	60,100
		1,05,100
Applications:		
Redemption of debentures	30,000	
Increase in debtors	13,500	
Dividends paid	17,500	
Cash lost from operations	5,100	66,100
Balance of cash and bank on 31-12-2006		39,000

Illu.4 : From the following condensed comparative Balance sheet of Mysore Mills Ltd., and additional information, prepare a cash flow statement for the year 2004.

Liabilities	2005 Rs.	2006 Rs.	Assets	2005 Rs.	2006 Rs.
Share Capital	70,000	80,000	Plant & machinery	62,000	66,000
Share premium	9,000	11,000	Accumulated Depreciation on Plant and Machinery	(37,000)	(26,200)
Retained Earnings	23,820	30,820	Building	95,000	1,16,000
7% Mortgage loan	-	20,000	Accumulation depreciation on buildings	(42,000)	(45,000)
Creditors	6,900	6,000	Land	10,000	12,000
Outstanding salaries	2,000	1,400	Stock	10,220	9,620
Provision for taxation	1,000	1,400	Debtors	8,600	7,600
			Prepaid expenses	720	800
			Cash	6,180	9,800
	1,12,720	1,50,620		1,12,720	1,50,620

Additional Information :

1. Plant costing Rs.16,000 (accumulated depreciation Rs.14,800) was sold during the year for Rs.1,200.
2. Building was acquired during the year at a cost of Rs.21,000. In addition to cash payment of Rs.1,000, a 7% mortgage loan was raised for the balance.
3. Dividend of Rs.8,000 was paid during the year.
4. A sum of Rs.13,900 was transferred to provision for taxation account in 2006.

Solution :**Cash flow statement for the year 2006**

			Rs.	Rs.
(i)	Cash Flow from operating activities			
	Net profit during the year			28,900
	Add : Depreciation – Building	2,000		
	Plant	4,000		
	Decrease in stock	600		
	Decrease in debtors	1,000	7,600	
	Less : Decrease in Creditors	900		
	Decrease in outstanding salaries	600		
	Increase in prepaid expenses	80		
	Income tax paid	13,500	(-) 15,080	(-) 7,480
	Net Cash inflow from operating activities			21,420
(ii)	Cash flow from investing activities			
	Purchase of Building	1,000		
	Purchase of plant and machinery	20,000		
	Purchase of land	2,000	23,000	
	Sale of plant		1,200	
	Net cash outflow from investing activities			(-) 21,800
(iii)	Cash flow from financing activities			
	Issue of shares		10,000	
	Share premium		2,000	
	Dividend paid		(-) 8,000	4,000
	Net increase in cash			3,620
	Cash in the beginning			6,180
	Cash at the end of 2006			9,800

Working Notes :**Retained Earnings a/c**

	Rs.		Rs.
To Dividend paid	8,000	By Balance b/d	23,820
To Balance c/d	30,820	By Profit during the year (Balancing figure)	15,000
	38,820		38,820

Plant and Machinery a/c

	Rs.		Rs.
To Balance b/d	62,000	By Sale of plant	1,200
To Bank purchase (Balancing figure)	20,000	By Depreciation on plant sold	14,800
		By Balance c/d	66,000
	82,000		82,000

Accumulated Depreciation on Plant and Machinery a/c

	Rs.		Rs.
To Plant (Depreciation)	14,800	By Balance b/d	37,000
To Balance c/d	26,200	By Profit & Loss a/c (Depreciation)	4,000
	41,000		41,000

Buildings a/c

	Rs.		Rs.
To Balance b/d	95,000	By Balance c/d	1,16,000
To Bank (Purchase)	1,000		
To Mortgage Loan (Purchase)	20,000		
	1,16,000		1,16,000

Accumulated Depreciation on Buildings a/c

	Rs.		Rs.
To Balance c/d	45,000	By Balance b/d	43,000
		By P & L a/c (Depreciation)	2,000
	45,000		45,000

Provision for Taxation a/c

	Rs.		Rs.
To Income tax paid (Balancing figure)	13,500	By Balance b/d	1,000
To Balance c/d	1,400	By Profit & Loss a/c (provision during the year)	13,900
	14,900		14,900

Illu.5 : From the following Balance Sheet of PK Ltd. for the year ending 31-12-2005 and 31-12-2006, prepare cash flow statement.

Liabilities	2005 Rs.	2006 Rs.	Assets	2005 Rs.	2006 Rs.
Share capital	2,15,000	2,75,000	Goodwill	-	20,000
Reserves	40,000	40,000	Plant and Machinery	1,12,950	1,16,200
Profit & Loss a/c	39,690	41,220	Land and Buildings	1,48,500	1,44,250
Provision for tax	40,000	50,000	Current assets	1,98,530	1,70,730
Bank loan	59,510	-	Cash	7,500	7,700
Current liabilities	73,280	52,660			
	4,67,480	4,58,880		4,67,480	4,58,880

The following information is also provided.

1. A dividend of Rs.26,000 was paid during the year 2006
2. Profit before tax for the year was Rs.62,530
3. During the year 2006, the company paid tax of Rs.25,000
4. During the year, the company purchased another company and paid Rs.60,000 in share capital. It acquired stock Rs.21,640 and plant Rs.18,360.
5. It purchases machinery costing Rs.5,650 during the year.

Solution :

Cash flow statement for the year 31-12-2006

	Rs.
(i) Cash Flow from operating activities	
Profit during the year	62,530
Add : Depreciation on :	
Land and buildings (Rs.1,48,500 – 1,44,250)	4,250
Plant and machinery	20,760
Decrease in current assets	27,800
Stock acquired on purchase of business	21,640
	1,36,980
Less : Tax paid	(-) 25,000
Decrease in current liabilities	(-) 20,620

	Cash inflow from operating activities	91,360
(ii)	Cash flow from investing activities	
	Purchase of plant and machinery	(-) 5,650
(iii)	Cash flows from financing activities	
	Payment of dividend	(-) 26,000
	Repayment of bank loan	(-) 59,510
	Net increase in cash	200
	Add : Cash balance in the beginning	7,500
	Cash balance at the end of the year	7,700

Working Notes :

1. Issue of share capital for Rs.6,000 for purchasing another company is a non-cash transaction and thus has not entered in cash flow statement.
2. Plant and machinery account :

Plant and Machinery a/c

	Rs.		Rs.
To Balance b/d	1,12,950	By Depreciation (Balancing figure)	20,760
To Cash	5,650	By Balance c/d	1,16,200
To Purchase (non-cash)	18,360		
	1,36,960		1,36,960

19.7 QUESTIONS :

1. Explain the concept of "Cash Flow". Discuss the objectives of cash flow analysis.
2. Explain clearly the difference between funds flow and cash flow statement.
3. Explain the procedure of preparing a cash flow statement.
4. Discuss the procedures of ascertaining cash from operations as required for the preparation of a cash flow statement.
5. Draw a cash flow statement with the help of imaginary figures
6. Explain the major sources and applications of cash with examples
7. What is the utility of preparing cash flow statement.
8. Write short notes on :
 - (a) Notional cash and
 - (b) Non cash items

19.8 EXERCISES :

1. Calculate cash from operations from the following information.

Sales Rs.2,00,000

Purchases Rs.1,60,000

Expenses Rs.20,000

Debtors at the beginning of the year Rs.12,000

Debtors at the end of the year Rs.22,000

Creditors at the beginning of the year Rs.20,000

Creditors at the end of the year Rs.30,000

[Ans.: Cash from operations Rs.20,000]

2. Calculate cash from operations from the following Profit & Loss account.

Profit and Loss account
For the year ending 31st March, 2006

	Rs.		Rs.
To Wages	25,000	By Gross profit	1,12,500
To Salaries	37,500	By Profit on sale of land	10,000
To Depreciation	2,500	By Income tax refund	10,000
To Loss on sale of plant	5,000		
To Goodwill written off	10,000		
To proposed dividend	12,500		
To Provision for taxation	12,500		
To Net profit	27,500		
	1,32,500		1,32,500

[Ans.: Rs.60,000]

3. The following are the comparative balance Sheets of a company.

Liabilities	31-3-05	31-3-06	Assets	31-3-05	31-3-06
Share capital	1,00,000	1,50,000	Land	1,00,000	85,000
General Reserve	30,000	35,000	Machinery	80,000	90,000
P & L a/c	20,000	22,000	Stock	65,000	1,10,000
10% Debentures	80,000	75,000	Debtors	20,000	25,000

Creditors	65,000	58,000	Investments	5,000	10,000
Provision for tax	5,000	10,000	Cash	12,000	10,000
			Goodwill	18,000	10,000
	3,00,000	3,50,000		3,00,000	3,50,000

Additional Information :

- (i) Depreciation charged on Machinery Rs.8,000
- (ii) Dividend paid during the year Rs.16,000
- (iii) Tax paid during the year Rs.6,000

You are required to prepare cash flow statement.

[Ans.: Rs.10,000]

4. From the following Trading and Profit & Loss a/c for the year ended 31st March 2006 calculate Cash from operations:

Dr.		Cr.	
Particulars	Rs.	Particulars	Rs.
To Purchases	1,27,600	By Sales	1,91,000
To Wages	31,900		
To Gross profit	31,500		
	1,91,000		1,91,000
To Salaries	6,600	By Gross Profit b/d	31,500
To Rent	3,190	By Profit on sale of building (Book value Rs.40,000)	25,000
To Depreciation	9,570		
To Loss on sale of investments	3,200		
To Goodwill written off	3,940		
To Net profit	30,000		
	56,500		56,500

[Ans.: Rs.21,710]

5. Balance sheet of XY & Co. Ltd., as at March 31st, 2005 and 2006.

Liabilities	2005 Rs.	2006 Rs.	Assets	2005 Rs.	2006 Rs.
Share capital	2,00,000	2,50,000	Buildings	2,00,000	1,60,000
General reserve	50,000	60,000	Machinery	1,50,000	1,69,000
P & L a/c	30,500	30,600	Stock	1,00,000	75,000
Long term loan	80,000	-	Debtors	50,000	54,200
Creditors	1,20,000	1,00,400	Cash and Bank	500	2,800
Provision for taxation	20,000	25,000	Goodwill		5,000
	5,00,500	4,66,000		5,00,500	4,66,000

Additional Information :

1. During the year ended 31-3-2006 a dividend of Rs.23,000 was paid
 2. Assets were purchased for Rs.45,000 payable in shares of XY Co. Ltd. The assets were
 3. Stock Rs.20,000 and Machinery Rs.25,000
 4. Further Purchase of Machinery for Cash Rs.10,000
 5. Machinery is depreciated by Rs.14,000
 6. Income tax provided during the year Rs.30,000
 7. There was loss on sale of machinery Rs.1,000 which was written off to general reserve.
- You are required to prepare Cash flow statement.

[Ans.: Cash from operating activities Rs.1,39,300; Net increase in cash Rs.2,300]

19.9 SUGGESTED READINGS

1. Bhattacharyya, S.K., John Dearden, Costing for Management, Vikas Publishing House Pvt. Ltd., 2002
2. Jayanta Mitra, Cost & Management Accounting, Books & Allied (P) Ltd., Calcutta.
3. Lall Nigam, B.M., Cost Accounting Principles and practices, Prentice Hall of India Private Limited, New Delhi.
4. Pandey, I.M., Management Accounting, Vikas Publishing House Pvt. Ltd., 2001
5. Ramachandran, Accounting for Management, Scitech Publications (India) Pvt. Ltd., 2003
6. Sahaf, M.A., Management Accounting, Principles and Practices, Vikas Publishing House Pvt. Ltd. New Delhi, 2004

Chapter - 20

Reporting to Management

Objectives :

After reading this lesson you should be able to :

- Know the importance of cost reports in reporting to the management
- Understand the requisite of an ideal report to the management
- Prepare an effective report

Structure :

20.1 Cost Reports - Meaning, Importance

20.2 Requisite of an Ideal Report

20.3 Effective Reporting Steps

20.4 Form of Reporting

20.5 Types of Reports

20.6 Questions

20.7 Suggested Readings

20.1 COST REPORTS : MEANING IMPORTANCE :

Cost Accounting has three important elements, viz., cost ascertainment, cost control and cost presentation. In order to exercise control, it is necessary to present cost information, collected from diverse sources, in a meaningful form. Without an efficient system of reporting, a costing system fails to prove itself as an effective means of control. A cost report is a formal statement prepared with a view to present, analyse and review cost data. The term 'reporting to management' refers to the formal system whereby relevant information is passed on to management through cost reports. Cost reports serve the following important purposes :

1. Reports measure executive performance, and enable management to initiate remedial steps when performance is not along desired directions.

2. Reports help a firm to combat market changes effectively, through systematic analysis and advance planning.
3. Reports are effective means of control. They help management to check unnecessary and undesirable deviations from predetermined standards and put activities on the right track at the right time.
4. Reports facilitate coordination at various levels in an organisation. All executive must it together and analyse performance before furnishing reports to management.

20.2 Requisites of an Ideal Report :

An ideal report must have certain basic qualities, as discussed below :

- (i) **Form** : A good report must have a suggestive title, headings, sub-heading, and paragraph divisions. Distinct forms may be used to convey information relating to various items. The title should be brief Columnar heading and abbreviations must be explained suitably at the end of the report. The report must reveal the period covered by it. It must be presented in a neat form, preferably types or pointed.
- (ii) **Contents** : The report must be presented in a simple and clear language, split into paragraphs and sub-titles highlighting the matter. Only important deviations may be reported. Matters demanding the attention of higher levels of management must be suitably highlighted. Visual aids like charts, diagrams may be employed for this purpose. The report, more importantly, contains facts rather than opinions. The report must be properly addressed to the recipient for whom it is meant. It must be signed by the person responsible for it.
- (iii) **Timing** : Reports should be made available to those for whom they are meant soon after the occurrence of an event, so as to initiate suitable remedial steps immediately.
- (iv) **Accuracy** : A report must contain accurate information. The degree of accuracy, however, depends on the purpose for which the information is put to use. Minor deviations, approximations and inaccuracies may be tolerated. But beyond a point, these need to be checked. Otherwise, the very purpose of reporting gets defeated.

- (v) **Appropriateness** : The report should be appropriate for the person for whom it is meant. It should be related to the responsibilities of the recipients. For example, the Marketing Manager should be provided with only such reports which relate to his area of control. In addition, the report should also be designed to suit the level of management for whom it is meant. Top management need to be presented with significant deviations, demanding immediate attention. Reports meant for middle management should be more detailed, covering section wise performance and deviations.

- (vi) **Comparability** : Reports should serve as means of control. To this end, they should invariably show data in a comparable manner, viz., figures of the same period last year, actual figures presented along with budgeted ones etc.

- (vii) **Review** : The reporting system must be subjected to periodic review. The benefits must be compared with the costs involved. The usefulness of building reports in a particular way must be examined in the light of changes that surround business operations. The reporting system, in any case, should not degenerate into a mechanical exercise.

20.3 EFFECTIVE REPORTING : STEPS

Effective reporting is a product of careful planning of operations, systematic analysis and presentation of cost data in a meaningful form. The flow of work must be planned carefully. Duplication of work should be avoided. Journals, ledgers, statements must be made available without difficulty. Codification and mechanisation help in speeding up of reports. They help personnel involved in preparing reports to come out with concise reports, without wasting time and energy. Prof. J. Batty has suggested the following questions to check whether the management reporting system is effective or not. The checklist is presented below :

Checklist for Effectiveness of Accounting Reports

Tick in the appropriate column and then assess your reporting system.		Yes	No
I.	In respect of each report :		
	Purpose of report		
1.	Is the purpose of the report :		
	(a) To Provoke action ?		
	(b) To provoke discussion ?		
	(c) To provide background information?		
	(d) Other (specify) ?	✓	
2.	Does the report result in :		
	(a) The required action being taken ?		
	(b) Constructive discussions being provoked?		
	(c) The information provided assisting managers to make decisions .		
	(d) Other (specify) ?	✓	
	Content of Report :		
3.	Does the report show, where appropriate :		
	(a) A comparison of actual with plan or budget?		
	(b) The deviations from plan or budget?		
	(c) The person responsible for corrective action?		
	(d) Items requiring immediate attention?		
4.	With regard to the responsibilities of the recipients does the report contain :		
	(a) Insufficient detail?		
	(b) Too much detail ?		
	(c) Irrelevant material?		
5.	Does any information presented unnecessarily duplicate the content of another report ?	✓	
	Design and layout of report		
6.	Are the important facts presented so as to reflect their significance?		
7.	Is the amount of information presented in the report :		
	(a) Too great to assimilate?		
	(b) So little that the context of the key facts is not apparent?		

8.	Is the report in the most appropriate format for the recipients; is the content best presented :		
	(a) As a table of figures?		
	(b) As a graph?		
	(c) As a chart?		
	(d) In some other way (specify) ?	✓	
9.	Are the following clearly shown on the report :		
	(a) The title?		
	(b) The periods covered?		
	(c) The date of preparation?		
	(d) The units in which figures are expressed?		
	(e) Where appropriate, the content of each :		
	(i) Column?		
	(ii) line?		
	(f) Where appropriate, the title of each axis of a graph or chart, or the title of any representational area and the nature of the figures ?		
	(g) The distribution ?		
	(h) The source of the information and who prepared the report?		
	(i) Cross – reference to other reports where appropriate ?		
	Frequency preparation and distribution of the report		
10.	Is the report produced :		
	(a) Sufficiently frequently ?		
	(b) Too frequently ?		
	(c) Should it be presented :		
	(i) daily ?		
	(ii) weekly ?		
	(iii) Monthly ?		
	(iv) quarterly ?		
	(v) annually ?		
	(vi) at some other interval (specify) ?		
	(d) promptly after the close of the period to which it relates ?	✓	
11.	Is there a time – table for the work required to prepare the report ?		
12.	Is the degree of accuracy of the figures presented satisfactory?		

	Would the report be more effective if :		
	(a) More approximate methods were used in its preparation to speed presentations?		
	(b) More care was taken in the preparation of the figures to ensure greater accuracy?		
	(c) Figures were rounded?		
13.	Is the distribution of report appropriate :		
	(a) Do all those who should receive a copy in fact receive one?		
	(b) Do any of the recipients not use the report ?		
II.	In respect of each manager :		
	Reports for responsibilities		
14.	Does the manager receive reports which highlight the results within each of his principal areas of responsibility?		
15.	Are there any other key items of information which would be of real use to the manager in his job?		
16.	Does each control report which the manager receives provide:		
	(a) Sufficient detail to enable him to control the overall result of his activities ?		
	(b) Only facts relevant to his responsibilities ?		
17.	From the reports provided, and his own job knowledge, can the manager :		
	(a) Explain the reasons for and deviations from planned performance shown to his superiors ?		
	(b) Obtain the answers he requires on questions of routine performance sufficiently quickly, and within the action time scale ?		
	Appropriateness of content		
18.	Should the manager receive information in terms of :		
	(a) The organisation as a whole?		
	(b) His own unit only?		
	(c) Subsidiary units ?		
	(d) Product or service groups?		
	(e) Individual products or services ?		
19.	Taking into account the manager's level of responsibility, is he aware, at the appropriate level of detail, in respect of the organisation and each of its main product groups, service		

	groups or product or services, of :		
	(a) Profit margins?		
	(b) Contributions?		
	(c) Sales volumes and values ?		
	(d) costs :		
	(i) Variable?		
	(ii) Contributions?		
	(iii) Controllable ?		
	(iv) 'allocated' fixed ?		
	(v) apportioned		
20.	Taking into account the manager's level of responsibility, is he aware, at the appropriate level of detail, for the activities which he controls, of :		
	(a) Customers who are the principal sources of profit?		
	(b) Most profitable, products or services ?		
	(c) Least profitable products or services ?		
	(d) Significant items of cost which he can control ?		
	(e) His planned performance ?		
	(f) Deviations from plan ?		
	Conflicting reports :		
21.	Do any of the reports emanating from different sources in the organisation received by the manager present conflicting pictures of a situation ?		
III.	Overall coverage of reports		
22.	Does the report package as a whole;		
	(a) Cover each principal activity of the organisation adequately ?		
	(b) Provide the information necessary for each level of management ?		
	(c) Form a coordinated set?		

Commentary : Where ticks appear in boxes, further information as to the nature of the answer would need to be reported. Other answers either provide information as to the effectiveness of the report or reports, or indicate where action is needed to improve that effectiveness.

20.4 FORM OF REPORTING :

Reporting may be done orally (personal meetings or by telephone) or through written Communications (descriptive, tabular or graphical). Descriptive Reports, report matters in a narrative form. The language is simple and reporting somewhat direct, using suitable paragraphs and sub-headings. Important aspects are summarised and presented in a distinctive format. These reports are less effective and followed in the case of research projects. Tabular Reports present data in the form of tables or columnar statements. They present data relating to cost, sales, output in a comparable form. Graphic Reports present data through graphs and diagrams with a view to create a distinct visual impact on the reader. Bar charts, pie charts, zee charts, Gantt chart, profit – volume – graph, scatter graph are presented into service for this purpose. Graphic presentations are more effective in that they are easily understood. They do not have the language barrier. They attract attention easily and have a great memorising value.

20.5 TYPES OF REPORTS :

Reports are of two types, viz., routine reports and special reports. Routine reports deal with matters repetitive in nature. Reports on production, stock and income belong to this type. Routine reports are prepared at periodic intervals, say daily, weekly, fortnightly or monthly, depending on convenience and requirements in the organisation. Special Reports, on the other hand, pertain to special problems, specific proposals or particular aspects of routine reports. These aid decision making at higher levels. Reports regarding the development of a new product, idle time, excessive spoilage, purchase of a new machine etc. belong to this category. These are prepared, depending on specific requirements of the situation. They are not done periodically.

Although it is difficult to enumerate here all types of reports, a few of them have been listed below :

On Materials :

- (1) Inventory level reports
- (2) Supply position reports
- (3) Material consumption report
- (4) Waste, scrap, defectives report
- (5) Material productivity report

- (6) Material cost variance statement

On Labour :

- (1) Recruitment and Training cost report
- (2) Wage analysis
- (3) Idle time report
- (4) Overtime report
- (5) Labour turnover report
- (6) Labour productivity report
- (7) Analysis of accidents
- (8) Analysis of absenteeism
- (9) Labour cost variances.

On Overhead :

- (1) Monthly overhead expenditure statement
- (2) Factory overhead recovery rates – Distribution summary
- (3) Administration cost reports
- (4) Selling and distribution cost report
- (5) Overhead absorption report
- (6) Overhead variance analysis
- (7) Power consumption cost report
- (8) Plant maintenance cost report
- (9) Plant depreciation statement

Other Reports :

- (1) Plant utilisation Report
- (2) Plant productivity
- (3) Statement of actual output against budgeted
- (4) Statement of actual sales against budgeted
- (5) Market analysis
- (6) Cash flow and fund flow statement
- (7) Analysis of capital expenditure

Special Reports on –

- (1) Investment plans
- (2) Make or buy decision

- (3) Acceptance of bulk order at reduced price
- (4) Cost reduction schemes
- (5) 'stop or continue' business during depression
- (6) Choice of profitable product mix.

20.6 QUESTIONS

1. What do you mean by Management Reporting? Discuss its importance in modern business.
2. Explain the principles of good reporting system.
3. Reporting is one of the main duties of a management accountant." Comment
4. Discuss various managerial reports prepared by business firms.
5. What do you understand by internal reports? How they are different from external reports?
6. Explain in detail the various kinds of internal reports.
7. Discuss the suitable measures to control managerial reports.
8. Define a special report. Discuss its importance in a trading concern.

20.7 SUGGESTE READINGS

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