

DJB3E - MANAGEMENT ACCOUNTING

Unit – I

Management Accounting – Definition – Function – Budgetary Control – definition – Objectives – merits and limitations – Steps in Budgetary Control – Types of Budgets.

Unit –II

Standard costing – definition – Standard Costing and Budgetary control – Merits and limitations – Analysis of Variances – Material, Labour, Overhead and sales variances.

Unit – III

Marginal costing – definitions – merits and limitations. Break even analysis – applications of Marginal costing.

Unit IV

Interfirm comparison – meaning – types – merits and limitations – Ratio Analysis – meaning – types of ratios – merits and limitations.

Unit – V

Reporting for Management – definition – objectives – Types – principles – Models of reporting.

Note:

Questions – 50% from Theory
50% from Problem

Reference Books:

1. Management Accounting – Manmohan & S.N. Goyal
2. Management Accounting and Financial Control – S.N. Maheswari
3. Cost Accounting – Banerjee
4. Management Accounting – Dr. M. Wilson
5. Management Accounting – T.S. Reddy and Y. Hari Prasad Reddy

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Management Accounting

Introduction

In ordinary language, accounting which assists management in carrying out its functions may be termed as Management Accounting. Managing Accounting is concerned with the accounting to management. Financial Accounting and Cost Accounting are not able to provide the relevant information to management for managerial planning and decision making. Financial Accounting is providing the historical data in account form as Profit & Account and Balance Sheet. Cost Accounting analyses the different elements related to the cost of production. But these information are not sufficient for managerial planning and control. Hence, a new accounting system, called Managing Accounting emerged as an accounting system purely for providing the accounting information for planning, decision making and control of cost.

The term Managing Accounting was first used by a team of accountants who attended the Anglo-American Council on Productivity during 1950. Hence, the subject is of recent origin when compared to the other accounting system.

Meaning

Management Accounting generally means accounting for management. The functions of management accounting are planning, forecasting, organizing, directing, co-coordinating and controlling. Management Accounting includes every accounting technique which may be useful to management in discharging its functions i.e. planning, organizing directing, coordinating communicating and controlling.

Management accounting is a systematic approach to planning and control functions of management. It generates information for establishing plans & controls and provides information for systems of setting standards plans or targets and reporting variances between plans and actual performance for corrective actions. In this way that part of accounting system which facilities the Management process of decision making is called Management Accounting.

Definitions

According to the Institute of Management Accountants (IMA): "Management accounting is a profession that involves partnering in management decision making, devising planning and performance management systems, and providing expertise in financial reporting and control to assist management in the formulation and implementation of an organization's strategy".

According to R.N.Anthony, "Management Accounting is concerned with accounting information that is useful to management.

According to J.Batty, "Management Accounting is the term used to describe the accounting method, systems and techniques which coupled with special knowledge and ability, assist management in its task of maximizing profit or minimizing losses".

According to Brown and Howard, "The essential aim of Management Accounting should be to assist management in decision making and control.

The Institute of Certified Management Accountants (CMA) states, "A management accountant applies his or her professional knowledge and skill in the preparation and presentation of financial and other decision oriented information in such a way as to assist management in the formulation of policies and in the planning and control of the operation of the undertaking".

Functions of Management Accounting

The basic function of management accounting is to assist the management in performing its functions effectively. The functions of the management are planning, organizing, directing and controlling. Management accounting helps in the performance of each of these functions in the following ways:

(i) Provides Data: Management accounting serves as a vital source of data for management planning. The accounts and documents are a repository of a vast quantity of data about the past progress of the enterprise, which are a must for making forecasts for the future.

(ii) Modifies Data: The accounting data required for managerial decisions is properly compiled and classified. For example, purchase figures for different months may be classified to know total purchases made during each period product-wise, supplier-wise and territory-wise.

(iii) Analyses and Interprets Data: The accounting data is analyzed meaningfully for effective planning and decision-making. For this purpose the data is presented in a comparative form. Ratios are calculated and likely trends are projected.

(iv) Serves as a means of Communicating: Management accounting provides a means of communicating management plans upward, downward and outward through the organization. Initially, it means identifying the feasibility and consistency of the various segments of the plan. At later stages it keeps all parties informed about the plans that have been agreed upon and their roles in these plans.

(v) Facilitates Control: Management accounting helps in translating given objectives and strategy into specified goals for attainment by specified time and secures effective accomplishment of these goals in an efficient manner. All this is made possible through budgetary control and standard costing which is an integral part of management accounting.

(vi) Uses also Qualitative Information: Management accounting does not restrict itself to financial data for helping the management in decision making but also uses such information which may not be capable of being measured in monetary terms. Such information may be collected from special surveys, statistical compilations, engineering records, etc.

Advantages of Management Accounting

1. It helps in decision making such as pricing, accepting additional offer, selecting a suitable product mix and so on.
2. It increases the efficiency of the business functions by fixing targets.
3. The business activities can be planned with the help of budgeting and forecasting.
4. Various tools have provided the validity and reliability of the business concern.
5. It is useful to control or eliminate wastage, production defectives etc.
6. It helps in communicating up-to-date information to various parties related with the business concern.
7. It aims to control the cost of production, which will increase the profit.
8. It analyses the socio and economic forces and government policies, which will help to access the impact of the business concern.
9. It helps to increase the efficiency of the business.

Disadvantages of Management Accounting

1. It is concerned with financial and cost accounting. If these records are not reliable, it will affect the effectiveness of management accounting.
2. Decisions taken by management accountant may or may not be executed by the management.
3. It is very costly. Only big concerns can adopt this.
4. New rules and regulations are to be framed, hence there is a possibility of opposition from employees.
5. It is only in the development stage.
6. It provides only data and not decisions.
7. It is a tool to the management not an alternative of management.

Characteristics or Nature of Management Accounting

The task of management accounting involves furnishing of accounting data to the management for basing its decisions on it. It also helps in improving efficiency and achieving organizational goals. The following are the main characteristics of management accounting:

1. **Providing Accounting Information:** Management accounting is based on accounting information. The collection and classification of data is the primary function of accounting department. The information so collected is used by the management for taking policy decisions. Management accounting involves the presentation of information in away it suits managerial needs. The accounting data is used for reviewing various policy decisions. Management accounting is a service function and it provides necessary information to different levels of management.
2. **Cause and Effect Analysis:** Financial accounting is limited to the preparation of profit and loss account and finding out the ultimate result, i.e., profit or loss management accounting goes a step further. The 'cause and effect' relationship is discussed in management accounting. If there is a loss, the reasons for the loss are probed. If there is a profit, the factors different expenditures, current assets, interest payables, share capital, etc. So the study of cause and effect relationship is possible in management accounting.
3. **Use of Special Techniques and Concepts:** Management accounting uses special techniques and concepts to make accounting data more useful. The techniques usually used include financial planning and analysis, standard costing, budgetary control, marginal costing, project appraisal, control accounting, etc. The type of technique to be used will be determined according to the situation and necessity.
4. **Taking Important Decisions:** Management accounting helps in taking various important decisions. It supplies necessary information to the management which may base its decisions on it. The historical data is studied to see its possible impact on future decisions. The implications of various alternative decisions are also taken into account while taking important decisions.
5. **Achieving of Objectives:** In management accounting, the accounting information is used in such a way that it helps in achieving organizational objectives. Historical data is used for formulating plans and setting up objectives. The recording of actual

performance and comparing it with targeted figures will give an idea to the management about the performance of various departments. In case there are deviations between the standards set and actual performance of various departments corrective measures can be taken at once. All this is possible with the help of budgetary control and standard costing.

6. **Increase in Efficiency:** The purpose of using accounting information is to increase efficiency of the concern. The efficiency can be achieved by setting up goals for each department. The performance appraisal will enable the management to pin point efficient and inefficient spots. An effort is made to take corrective measures so that efficiency is improved. The constant review of working will make the staff cost – conscious. Everyone will try to control cost on one’s own part.
7. **Supplies Information and not Decision:** The management accountant supplies information to the management. The decisions are to be taken by the top management. The information is classified in the manner in which it is required by the management. Management accountant is only to guide and not to supply decisions. ‘How is the data to be utilized’ will depend upon the caliber and efficiency of the management.
8. **Concerned with Forecasting:** The management accounting is concerned with the future. It helps the management in planning and forecasting. The historical information is used to plan future course of action.

Scope of Management Accounting

1. **Financial Accounting:** Financial Accounting deals with the historical data. The recorded facts about an organization are useful for planning the future course of action. Though planning is always for the future but still it has to be based on past and present data. The control aspect too is based on financial data. The performance appraisal is based on recorded facts and figures. So management accounting is closely related to financial accounting.

2. **Cost Accounting:** Cost Accounting provides various techniques for determining cost of manufacturing products or cost of providing service. It uses financial data for finding out cost of various jobs, products or processes. The systems of standard costing, marginal costing, differential costing and opportunity costing are all helpful to the management for planning various business activities.

3. **Financial Management:** Financial Management is concerned with the planning and controlling of the financial resources of the firm. It deals with rising of funds and their effective utilization so to maximise earnings. Finance has become so important for every business that all managerial activities are connected with it. Financial viability of various propositions influences decisions on them. Therefore management accounting includes and extends to the operation of financial management also.

4. **Budgeting and Forecasting:** Budgeting means expressing the plans, policies and goals of the enterprise for a definite period in future. The targets are set for different departments and responsibility is fixed for achieving these targets. The comparison of actual performance with budgeted figures will give an idea to the management about the performance of different departments. Forecasting, on the other hand, is a prediction of what will happen as a result of a given set of circumstances. Both budgeting and forecasting are useful for management accountant in planning various activities.

5. **Inventory Control:** Inventory is used to denote stock of raw materials, goods in the process of manufacture and finished products. Inventory has a special significance in accounting for determining correct income for a given period. Inventory control is significant as it involves large sums. The management should determine different levels of stocks, i.e. minimum level, maximum level, re- ordering level for inventory control. The control of inventory will help in controlling costs of products. Management accountant will guide management as to when and from where to purchase and how

much to purchase. So the study of inventory control will be helpful for taking managerial decisions.

6. **Reporting to Management:** One of the functions of management accountant is to keep the management informed of various activities of the concern so as to assist it in controlling the enterprise. The reports are presented in the form of graphs, diagrams, index numbers or other statistical techniques so as to make them easily understandable. The management accountant sends interim reports to the management and these reports may be monthly, quarterly, half – yearly. The reports may cover profit and loss statement, cash and found flow statements, stock reports, absentee reports and reports on orders in hand, etc. These reports are helpful in giving a constant review of working of the business.
7. **Interpretation of Data:** The management accountant interprets various financial statements to the management. These statements give an idea about the financial and earning position of the concern. These statements may be studied in comparison to statements of earlier periods or in comparison with the statements of similar other concerns. The significance of these reports is explained to the management in a simple language. If the statements are not properly interpreted then wrong conclusions may be drawn. So interpretation is also important as compiling of financial statements.
8. **Control procedures and Method:** Control procedures and methods are needed to use various factors of production in a most economical way. The studies about cost, relationship of cost and profits are useful for using economic resources efficiently and economically.
9. **Internal Audit:** Internal audit system is necessary to judge the performance of every department. The actual performance of every department and individual is compared with the pre-determined standards. Management is able to know deviations in

performance. Internal audit helps management in fixing responsibility of different individuals.

10. **Tax Accounting:** In the present complex tax systems, tax planning is an important part of management accounting. Income statements are prepared and tax liabilities are calculated. The management is informed about the tax burden from central government, state government and local authorities. Various tax returns are to be filed with different departments and tax payments are to be made in time. Tax accounting comes under the purview of management accountant's duties.

Tools of Management Accounting.

The following are the various tools of Management Accounting.

1. Marginal Costing
2. Standard Costing
3. Budgetary Control
4. Ratio Analysis
5. Fund Flow Analysis
6. Cash Flow Analysis

Distinguish between Financial Accounting and Management Accounting

	Financial Accounting	Management Accounting
1	It supplies information to shareholders, creditors and government authorities.	It supplies information the management for internal use.
2	It makes use of historical data. Hence, it is a post mortem analysis of past activities	It makes the use of descriptive and statistical data for present and future analysis.
3	It deals with the position of the business as a whole.	It deals with assessing different units or departments.
4	It records only monetary transactions.	It records both monetary and non-monetary truncations.
5	It is compulsory to prepare accounts for joint stock companies.	It is voluntary.

6	Reports can be prepared at the end of the year.	Reports are prepared as and when required for management.
7	It is objective and based on measurement.	It is subjective and based on judgement.
8	All transactions' are recorded at actual amount.	Sometimes approximate figure are recorded.
9	Accounting principles and conventions are followed.	No such principles and conventions.
10	The methodology of accounting records are revenues, income, personal accounts etc.	The methodologies of accounting records are cost and revenue.

Difference between Cost Accounting and Management Accounting

	Cost Accounting	Management Accounting
1	It is to determine and record the cost of production of a product or service.	It is to provide information for planning and controlling
2	It is based on past and present facts and figures.	It deals with future plans.
3	It requires some principles and procedures	No such procedures.
4	Only quantitative data are used.	Both quantitative & qualitative data are used.
5	Facts provided are useful for outsiders and management.	Facts provided are useful to management only.

Budget and Budgetary Control

Budget

Meaning

The term budget is derived from French word *baguette*, which denotes leather in which the funds are appropriated for meeting anticipated expenses for a forthcoming accounting period. A budget is an organizational plan stated in monetary terms.

A Budget is a financial plan for a defined period of time, usually a year. It may also include planned sales volumes and revenues, resource quantities, costs and expenses, assets, liabilities and cash flows. Companies, governments, families and other organizations use it to express strategic plans of activities or events in measurable terms.

Definitions

According to CIMA, England, “Budget is a financial and/or quantitative statement, prepared prior to defined period time, of the policy to be pursued during that period for the purpose of a given objectives.”

“A budget is the sum of money allocated for a particular purpose and the summary of intended expenditures along with proposals for how to meet them. It may include a budget surplus, providing money for use at a future time, or a deficit in which expenses exceed income.”

Budgeting

Meaning

Budgeting is a forward planning and involves the preparation in advance of the quantitative as well as financial statements to indicate the intension of the management in respect of the various aspects of the business.

Definition

According to W.J.Vatter, “Budgeting is a kind of future accounting in which the problems of future are met on the paper before the transactions actually occur.”

Budgeting is the formulation of plans for future activity that seek to substitute carefully constructed objectives for hit and miss performances and provide yardsticks by which deviations from planned achievements can be measured”.

Budgetary Control

Meaning

Budgetary control is the process of determining various actual results with budgeted figures for the enterprise for the future period and standards set then comparing the budgeted figures with the actual performance for calculating variances, if any. First of all, budgets are prepared and then actual results are recorded.

The comparison of budgeted and actual figures will enable the management to find out discrepancies and take remedial measures at a proper time. The budgetary control is a continuous process which helps in planning and co-ordination. It provides a method of control too. A budget is a means and budgetary control is the end-result.

Definitions

According to CIMA, England, “Budgetary Control is the establishment of budgets relating the responsibilities of executive to the requirement of a policy and the continuous comparison of actual with budgeted results, either to secure by individual action the objective of that policy or to provide a firm basis for the revision

“According to Brown and Howard, “Budgetary control is a system of controlling costs which includes the preparation of budgets, coordinating the departments and establishing responsibilities, comparing actual performance with the budgeted and acting upon results to achieve maximum profitability.”

Weldon characterizes Budgetary Control as planning in advance of the various functions of a business so that the business as a whole is controlled.

Objectives of Budgetary Control

Budgetary control is essential for policy planning and control. It also acts an instrument of co-ordination.

The main objectives of budgetary control are the follows:

1. To ensure planning for future by setting up various budgets, the requirements and expected performance of the enterprise are anticipated.

2. To combine the ideas of all levels of management in the preparation of budget.
3. To operate various cost centres and departments with efficiency and economy.
4. To eliminate wastes, reduce expenditure and increase in profitability.
5. To anticipate capital expenditure for future.
6. To ensure the availability of working capital.
7. To assure a better return on capital employed
8. To co-ordinate the activities of various departments.
9. To fix responsibilities on different departmental heads.
10. To centralise the control system.
11. To pinpoint to the management where a remedial action is required.
12. To correct the deviations from the established standards.
13. To act as means of communication.

Advantages of Budgetary Control

The budgetary control system helps in fixing the goals for the organization as whole and concerted efforts are made for its achievements. It enables 'economies in the enterprise.

The following are the advantages of budgetary control:

1. Maximization of Profits

The budgetary control aims at the maximization of profits of the enterprise. To achieve this aim, a proper planning and co ordination of different functions is undertaken. There is a proper control over various capital and revenue expenditures. The resources are put to the best possible use.

2. Co-ordination

The working of different departments and sectors is properly coordinated. The budgets of different departments have a bearing on one another. The co-ordination of various executives and subordinates is necessary for achieving budgeted targets.

3. Specific Aims

The plans, policies and goals are decided by the top management. All efforts are put together to reach the common goal, of the organization. Every department is given a target to be achieved. The efforts are directed towards achieving some specific aims. If there is no definite aim then the efforts will be wasted in pursuing different aims.

4. Tool for Measuring Performance

By providing targets to various departments, budgetary control provides a tool for measuring managerial performance. The budgeted targets are compared to actual results and deviations are determined. The performance of each department is reported to the top management. This system enables the introduction of management by exception.

5. Economy

The planning of expenditure will be systematic and there will be economy in spending. The finances will be put to optimum use. The benefits derived for the concern will ultimately extend to industry and then to national economy. The national resources will be used economically and wastage will be eliminated.

6. Determining Weaknesses

The deviations in budgeted and actual performance will enable the determination of weak spots. Efforts are concentrated on those aspects where performance is less than the stipulated.

7. Corrective Action

The management will be able to take corrective measures whenever there is a discrepancy in performance. The deviations will be regularly reported so that necessary action is taken at the earliest. In the absence of a budgetary control system the deviations can be determined only at the end of the financial period.

8. Consciousness

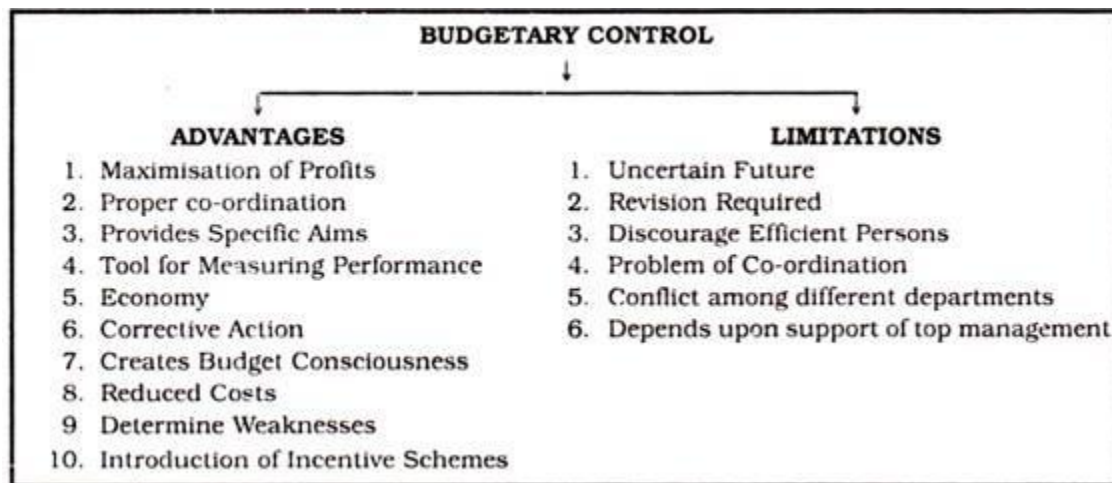
It creates budget consciousness among the employees. By fixing targets for the employees, they are made conscious of their responsibility. Everybody knows what he is expected to do and he continues with his work uninterrupted.

9. Reduces Costs

In the present day competitive world budgetary control has a significant role to play. Every businessman tries to reduce the cost of production for increasing sales. He tries to have those combinations of products where profitability is more.

10. Introduction of Incentive Schemes

Budgetary control system also enables the introduction of incentive schemes of remuneration. The comparison of budgeted and actual performance will enable the use of such schemes.



Limitations of Budgetary Control

Despite of many good points of budgetary control there are also some limitations of this system.

The following are the limitations of budgetary control:

1. Uncertain Future

The budgets are prepared for the future period. Despite best estimates made for the future, the predictions may not always come true. The future is always uncertain and the situation which is presumed to prevail in future may change. The change in future conditions upsets the budgets which have to be prepared on the basis of certain assumptions. The future uncertainties reduce the utility of budgetary control system.

2. Budgetary Revision Required

Budgets are prepared on the assumptions that certain conditions will prevail. Because of future uncertainties, assumed conditions may not prevail necessitating the revision of budgetary targets. The frequent revision of targets will reduce the value of budgets and revisions involve huge expenditures too.

3. Discourage Efficient Persons

Under budgetary control system the targets are given to every person in the organization. The common tendency of people is to achieve the targets only. There may be some efficient persons who can exceed the targets but they will also feel contented by reaching the targets. So budgets may serve as constraints on managerial initiatives.

4. Problem of Co-ordination

The success of budgetary control depends upon the co-ordination among different departments. The performance of one department affects the results of other departments. To overcome the problem of coordination a Budgetary Officer is needed. Every concern cannot afford to appoint a Budgetary Officer. The lack of co-ordination among different departments results in poor performance.

5. Conflict among Different Departments

Budgetary control may lead to conflicts among functional departments. Every departmental head worries for his department goals without thinking of business goal. Every department tries to get maximum allocation of funds and this raises a conflict among different departments.

6. Depends Upon Support of Top Management

Budgetary control system depends upon the support of top management. The management should be enthusiastic for the success of this system and should give full support for it. If at any time there is a lack of support from top management then this system will collapse.

Essential of Effective Budgetary Control

The following are requirements of a good system of budgetary control in the organization:

1. Quick Reporting

A good system of budgetary control in the organisation requires the establishment of such procedures, which will provide reports on the performance of various operations. The reports should reach the persons concerned with the implementation of budgets without any delay so that quick actions may be taken wherever necessary in the organization.

2. Detailed Organization Structure

There should be a detailed organization structure with precisely designed authorities, responsibilities and lines of communication so that everybody in the organisation understands the significance of objectives in detail.

3. Frequent Comparison

There should be frequent comparison between budget estimates and operating results in the organisation. The main essence of budgetary control in an organization is the careful analysis of both operating results and budget estimates.

4. Definite Plan

There should be comprehensive planning in the enterprise. All the operations in the organisation should be planned in clear terms. The administration of the budgets should also be properly planned in the organisation. It must be pre-determined who is to be held responsible for the implementation of budget in the organisation.

5. Responsibility Matched by the Authority

Those assigned with the responsibility to implement the budgets should also be given the necessary authority to achieve the budgeted targets in the organisation. Lack of sufficient authority will make the implementation of budgets ineffective in the organisation.

6. Participation

The purpose of budgetary control is to achieve coordination of various functions of the business in the organisation. Therefore, it is essential that participation up to the lowest level in the enterprise be ensured to make the people committed to the budgets. Everybody in the organisation should understand his role in achieving the budgeted targets.

7. Support of the Management

The top management in the organisation supports a good system of budgetary control. Top management in the organisation should take the preparation of budgets and their implementation seriously in order to achieve the objectives of the enterprise.

8. Flexibility

Budgets should not be rigid, but flexible enough to allow altering or remodelling in the light of any change in circumstances in the organization. Budgets are a means to an end. They must be flexible to achieve the desired objectives in the organisation. A good system of budgetary control allows sufficient flexibility to the persons concerned with the implementation of budgets in the organisation.

Steps involved in Budgetary Control

The following steps are involved in a budgetary control system:

1. Organisation for Budgetary Control

The proper organization is essential for the successful preparation, maintenance and administration of budgets. A budgetary committee is formed which comprises the departmental heads of various departments. All the functional heads are entrusted with the

responsibility of ensuring proper implementation of their respective departmental budgets. A budget officer is the convener of the budget committee who co-ordinates the budgets of different departments. The managers of different departments are made responsible for their Departmental budgets.

2. Budget Officer

A budget committee is formed to assist the budget officer. The heads of all the important departments' are made members of this committee. The committee is responsible for preparation and execution of budgets. The members of this committee put up the case of their respective departments and help the committee to take collective decisions, if necessary. The budget committee is responsible for reviewing the budgets prepared by various functional heads. The Budget Officer acts as coordinator of this committee.

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4. Budget Centers

A budget center is that part of the organization for which the budget is prepared. A budget center may be a department, section of a department, or any other part of the department. Ideally, the head of every center should be a member of the Budget Committee. However, it must be ensured that each budget center at least has an indirect representation in the Budget Committee. The budget centers are also necessary for cost control purposes.

5. Budget Manual

A budget manual is a document that spells out the duties and responsibilities of the various executives concerned with it specialties among various functional areas. A budget manual clearly defines the objectives of budgetary control system. It also gives the benefits and principles of this system. The duties and responsibilities of various persons dealing with preparation and execution of budgets are also given in a budget manual. It gives information about the sanctioning authorities of various budgets.

6. Budget Period

A budget period is the length of time for which a budget is prepared. It depends upon a number of factors. The choice of a budget period depends upon the following considerations:

- The type of budget (long/short)
- The nature of demand for the products.
- The timings of the availability of the finance.
- The economic situations of the cycles.

7. Determination of Key Factor

A factor, which influences all other budgets, is known as "key factor or principal factor". The key factor may not necessarily remain the same. The raw materials supply may be limited: at one time but it may be easily available at another time. Similarly, other factors may also improve at different times. The key factor highlights the limitations of the enterprise. This will enable the management to improve the working of those departments where scope for improvement exists.

Difference between Forecast and Budget

	Forecast	Budget
1	It concerned with probable events likely to be happened	It concerned with planned events to be followed in future
2	It is prepared for long periods	It is prepared for short period of one year
3	It is a tentative estimate, that can be revised	It is unchanged during the budget period
4	It results in planning	Planning results in budgeting

5	It is a prediction, which may or may not affect the business plans.	If forecast are given a shape and approved by the management they become budgets
6	It is not used for performance evaluation	It is always used for performance evaluation
7	It is an event over which there is no control	It is an endeavour to control the events
8	The function of forecast ends with the likely events	The process of budgets starts where forecast ends

Classification or Types of Budgets

The Budgets may be classified as follows:

I Classification on the basis of Time

1. Long Term Budgets
2. Short Term Budgets
3. Current Budgets

II Classification on the basis of Function

1. Sales Budget
2. Production Budget
3. Materials Budget
4. Labour Budget
5. Overheads Budget
6. Cash Budget
7. Capital Expenditure Budget
8. Research and Development Budget
9. Master Budget

III Classification on the basis of Flexibility

1. Fixed Budget
2. Flexible Budget

I Classification on the basis of Time

- 1. Long-Term Budget:** The period of long-term budget varies between five to ten years. It is based on long term planning and prepared by top level management. Long-term budgets are prepared for the management. E.g. Capital expenditure, Research and Development etc.
- 2. Short-Term Budget:** The period of short-term budget is one or two years. The consumer goods industries like textile, cotton, sugar, coffee, cosmetics etc., prepare short-term budget.
- 3. Current Budget:** The period of current budget is generally of weeks or a month or few months

III Classification on the basis of Function

1. Sales Budget

This is the most important and fundamental budget on which all the budgets are built up. Generally sales become a key factor for majority of the business. This budget is an estimate of future sales, often broken down into both units and currency. It is used to create company sales goals. The following factors should be taken into consideration while preparing the Sales Budget.

- i. Analysis of the sales of the previous years
- ii. Estimation of salesman
- iii. Plant capacity
- iv. Trade prospects and potential market
- v. Seasonal fluctuations
- vi. Availability of funds
- vii. Competition and consumer's preference
- viii. Government restrictions
- ix. Advertising and cost of distribution

2. Production Budget

This budget provides an estimate of the total volume of production and a forecast of the closing finished stock for a budget period. It shows the quantity of units to be produced. Generally it is based on the sales, but in case of companies in which; the sales could not be changed due to style and fashion, it is based on the past experience. The production budget also estimates the various costs involved with manufacturing those units, including labor and material.

3. Material Budget

This budget exhibits the estimated quantities of most of the raw materials and components required for production demanded through the production budget. It should be noted that the raw material budget generally deals with only the direct materials whereas indirect materials and supplies are included in the overhead cost budget. It serves the following purposes:

1. It assists the purchasing department in planning the purchases.
2. It helps in the preparation of purchase budget.
3. It provides data for raw material control.

4. Labour Budget: The direct labour budget is used to calculate the number of labour hours that will be needed to produce the units itemized in the production budget. A more complex direct labour budget will calculate not only the total number of hours needed, but will also break down this information by labour category.

5. Overheads Budget:

- a. Factory / Manufacturing / Works Overhead Budget:** It estimates the costs of indirect materials, labour and factory expenses during the budgeted period. It can be classified into fixed, variable and semi-variable. The preparation of budget is based on the previous year's records for fixed overheads.
- b. Office / Administrative Overhead Budget:** This budget covers the expenses of all administrative works and management salaries. The administration cost of each budget centre is drawn separately and incorporated in administrative cost budget.

- c. **Selling and Distribution Overhead Budget:** This budget includes all expenses relating to selling, advertising, delivery of goods to customers and so on. It is prepared by the sales manager for territory wise. The preparation of budget will depend on the analysis of market situation, advertising policies, research programmes and the fixed and variable elements.

- 6. **Cash Budget:** Cash Budget is a prediction of future cash receipts and expenditures for a particular time period. It usually covers a period in the short-term future. The cash flow budget helps the business to determine when income will be sufficient to cover expenses and when the company will need to seek outside financing.

- 7. **Capital Expenditure Budget:** Capital Expenditure Budgets are used to determine whether an organization's long-term investments such as new machinery, replacement machinery, new plants, new products, and research development projects are worth pursuing.

- 8. **Research and Development Budget:** This budget established for long term basis. It provides an estimate of the expenditure to be incurred on research and development, after considering the research project in hand and new research and development projects to be taken up. This budget is prepared by the budget committee and approved by the chief executives.

- 9. **Master Budget:** It is also known as Summarised Budget or Finalised Profit Plan. It is a summary of all functional budgets in capsule form and gives overall estimated profit position of the firm for the budget period. It is prepared and approved by the budget committee. It produces a Budgeted Profit and Loss Account and a Balance Sheet as at the end of budget period. This budget is very useful for the top management because it is usually interested in the summarized meaningful information provided by this budget.

III Classification on the basis of Flexibility

1. **Fixed Budget:** A fixed budget is a budget that does not change or flex when sales or some other activity increases or decreases. A fixed budget is also referred to as a static budget. It has a very limited use because, in practical life there may be internal and external factors which force the level of activity to change.
2. **Flexible Budget:** A flexible budget is a budget that adjusts or flexes for changes in the volume of activity. This is a dynamic budget. The flexible budget is more sophisticated and useful than a static budget, which remains at one amount regardless of the volume of activity.

Zero Base Budgeting (ZBB)

Zero-based budgeting is a method of budgeting in which all expenses must be justified for each new period. ZBB allows top-level strategic goals to be implemented into the budgeting process by tying them to specific functional areas of the organization. It has clear advantage when the limited resources are to be allocated carefully and objectively. ZBB based on an idea that there is no given base year for a budget. A fresh budgeted figure is to be determined keeping in view the circumstances and requirements. The concept of ZBB is:

- a) Every budget starts with zero base
- b) No previous figures is to be taken as a base for adjustments,
- c) Each activity is to be examined afresh.
- d) Every budget allocation is to be justified in the light of anticipated circumstances.
- e) Alternatives are to be given due consideration

Advantages of ZBB

1. Effective cost control can be exercised
2. Careful planning is facilitated
3. Management by objectives becomes a reality
4. Uneconomical activities are identified
5. Scarce resources are used beneficially
6. Each activity is thoroughly examined

Limitations of ZBB

1. Paper work will increase periodically due to number of decision making
2. The cost of various decision making packages may be very high
3. Ranking of decision packages may give risk to conflicts
4. Resistance from the managerial persons
5. It is very difficult to quantify the qualitative activities like research and development
6. Cost and benefits on each package must be updated, when new packages are to be developed as soon as new activities emerged.

PROBLEMS SALES BUDGET

Problem: 1

Ram manufacturing Company submits the following figures of a product for the first quarter of 2016:

Sales (in units)	January	20,000
	February	25,000
	March	35,000
Selling price per unit	Rs.20	

Target of first quarter in 2017:

Sales quantity increase	10%
Sales price increase	10%

Prepare a Sales Budget for the first quarter of 2017

Solution:

Sales Budget for the first quarter of 2017

Months	Units	Price per unit	Value
January	33,000	22	7,26,000
February	27,500	22	6,05,000

March	38,500	22	8,47,000
	99,000		21,78,000

Workings: E.g. Sales January = 30,000 + 10% of 30,000 = 33,000

Selling Price = Rs.20 + 10% of 20 = Rs.22

Problem: 2

X Ltd. produces and sell three products, viz., a) Snow cream, b) Powder and c) Hair Oil. The company has divided its market into two zones: Zone A and Zone B. The actual figures for the previous year sales were as follows:

	Zone A		Zone B	
	Units	Unit Price	Units	Unit Price
i) Snow Cream	4,00,000	Rs. 12	2,50,000	Rs. 12
ii) Powder	2,50,000	15	3,50,000	Rs. 15
iii) Hair Oil	3,00,000	16	3,00,000	Rs. 16

For the current year i.e. 2007, it is estimated that sale of Snow cream will go by 10% in Zone B and of Hair oil by 25000 units in Zone A. The company plans to introduce a publicity film for Powder in the TV Network. The budgeted figures for Powder are to be increased by 20% in the both the Zones.

The prices of Snow cream and Hair oil are to be maintained but for Powder, a bonus cut off Re.1 will be announced.

You are required to prepare a Sales Budget for the current year 2007.

Solution:

Sales Budget for 2007

Products	Snow Cream		Powder		Hair Oil	
	Rs.12		Rs.14 (15-1)		Rs.16	
Sales Price	Units	Amount	Units	Amount	Units	Amount
Zone A	4,00,000	48,00,000	3,00,000	42,00,000	3,25,000	52,00,000
Zone B	2,75,000	33,00,000	4,20,000	58,80,000	3,00,000	48,00,000
Total	6,75,000	81,00,000	7,20,000	1,00,80,000	6,25,000	1,00,00,000

Workings:

Snow Cream

Zone A: No change i.e. 4,00,000

Zone B 2,50,000 + 10% = 2,75,000

Powder

Zone A: 2,50,000 + 20% = 3,00,000
 Zone B 3,50,000 + 20% = 4,20,000

Hair Oil
 Zone A: 3,00,000 + 25,000 = 3,25,000
 Zone B No change 3,00,000

PRODUCTION BUDGET

Problem: 3

Prepare a Production Budget for three months ending on 31st March, 2014 for a factor producing 4 products, on the basis of the following information:

Type of Product	Estimated Stock on 1 st January, 2014(units)	Estimated Sales during January, 2014 (units)	Desired Closing Stock on March 31, 2014(units)
A	2,000	10,000	5,000
B	3,000	15,000	4,000
C	4,000	13,000	3,000
D	5,000	12,000	2,000

Solution:

Production Budget

Particulars	A (units)	B (units)	C (units)	D (units)
Estimated Sales	10,000	15,000	13,000	12,000
Add: Desired Closing Stock	5,000	4,000	3,000	2,000
	15,000	19,000	16,000	14,000

Less: Opening Stock	2,000	3,000	4,000	5,000
Estimated Production	13,000	16,000	12,000	9,000

Problem: 4

The following information are related to a company for 6 months ending 31st December 2016. The units to be sold for the different months are:

July	2016	15,000
August	2016	17,000
September	2016	19,000
October	2016	15,500
November	2016	20,000
December	2016	21,000
January	2017	22,000

Finished units equal to half the sales for the next month will be in Stock at the end of each month including June, 2016. Budgeted production for the year ending 31st December, 2016 is 2,50,000 units. Budgeted Material and Labour cost per unit are Rs.20 and Rs.15 respectively. Total Factory Overhead absorbed for one year is Rs.10,00,000.

Prepare Production Budget for each month and summarized production cost budget for six months ending 31st December 2016.

Solution:

Production Budget for 6 months from July 2016 to 31st December 2016

Months	Op.Stock (Units)	Sales (Units)	Clo.Stock (Units)	Production (Units)
July 2016	7,500	15,000	8,500	16,000
August 2016	8,500	17,000	9,500	18,000
September 2016	9,500	19,000	7,750	17,250
October 2016	7,750	15,500	10,000	17,750
November 2016	10,000	20,000	10,500	20,500
December 2016	10,500	21,000	11,000	21,500
			Total	1,11,000

Workings: Production = Sales + Closing Stock – Opening Stock

July 2016	=	15,000 + 8,500 – 7,500	= 16,000 units
August 2016	=	17,000 + 9,500 – 8,500	= 18,000 units
September 2016	=	19,000 + 7,750 – 9,500	= 17,200 units
October 2016	=	15,500 + 10,000 – 7,750	= 17,750 units
November 2016	=	20,000 + 10,500 – 10,000	= 20,500 units

$$\text{December 2016} = 21,000 + 11,000 - 10,500 = 21,500 \text{ units}$$

MATERIALS PURCHASE BUDGET

Problem: 5

From the following figure, prepare Materials Purchase Budget for the month of January, 2017

Particulars	Materials (Units)		
	A	B	C
Estimated Opening Stock	16,000	6,000	24,000
Estimated Closing Stock	20,000	8,000	28,000
Estimated Consumption	1,20,000	44,000	1,32,000
Standard Price per unit	Re.1.00	Rs.1.50	Rs.2.00

Solution:

Materials Purchase Budget for January 2017

Particulars	Materials			
	A	B	C	Total
Estimated Consumption (units)	1,20,000	44,000	1,32,000	2,96,000
Add: Estimated Closing stock (units)	20,000	8,000	28,000	56,000
	1,40,000	52,000	1,60,000	3,52,000
Less: Estimated Opening Stock(units)	16,000	6,000	24,000	46,000
Estimated purchase (units)	1,24,000	46,000	1,36,000	3,06,000
Rate per unit	Re.1.00	Re.1.50	Re.2.00	
Estimated Purchases (Rs.)	1,24,000	69,000	2,72,000	4,65,000

Problem: 6

Prepare Materials Purchase Budget form the following figures

Particulars	Materials (Units)					
	A	B	C	D	E	F
Estimated Stock on 01.12.2007	120000	90000	45000	25000	20000	35000
Estimated Stock on 31.12.2007	180000	70000	30000	40000	32000	50000
Estimated Consumption	900000	750000	600000	550000	400000	650000
Standard Price per unit (Rs.)	5	7	3	10	12	9

Solution:

Particulars	Materials (Units)					
	A	B	C	D	E	F
Estimated Consumption (units)	900000	750000	600000	550000	400000	650000
	180000	70000	30000	40000	32000	50000

Add: Estimated Stock						
Less: Estimated Stock on 1st Dec	1080000 120000	820000 90000	630000 45000	590000 250000	432000 20000	700000 35000
Estimated Purchase (Units)	960000	730000	585000	565000	412000	665000
Rate per Unit (Rs.)	5	7	3	10	12	9
Estimated Purchase (Rs.)	4800000	5110000	1755000	5650000	4944000	5985000

Note: Purchase of raw material is calculated by adding the estimated closing stock with estimated consumption of material and then deducting from it the estimated opening stock of material.

CASH BUDGET

Problem: 7

From the following information, prepare a Cash Budget for the period from January, 2017 to April, 2017

	Expected Sales Rs.	Expected Purchases Rs.
January	60,000	48,000
February	40,000	45,000
March	45,000	31,000
April	40,000	40,000

Wages to be paid to workers will be Rs.5,000 p.m. Cash balance on 1st January may be assumed to be Rs.8,000.

Solution:

Cash Budget from January to April

Particulars	January Rs..	February Rs.	March Rs.	April Rs.
Receipts:				
Opening Balance	8,000	15,000	5,000	14,000
Cash Sales	60,000	40,000	45,000	40,000
Total	68,000	55,000	50,000	54,000
Payments:				
Purchase	48,000	45,000	31,000	40,000
Wages	5,000	5,000	5,000	5,000
Total	53,000	50,000	36,000	45,000
Closing Cash Balance	15,000	5,000	14,000	9,000

Problem: 8

Prepare a Cash Budget for the month of May, June and July on the basis of the following information:

- i. Income and Expenditure Forecasts:

Month	Sales (all credit)	Purchases (all credit)	Wages	Manufact. Exp	Office Expenses	Selling Expenses
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
March	60,000	36,000	9,000	4,000	2,000	4,000
April	62,000	38,000	8,000	3,000	1,500	5,000
May	64,000	33,000	10,000	4,500	2,500	4,500
June	58,000	35,000	8,500	3,500	2,000	3,500
July	56,000	39,000	9,500	4,000	1,000	4,500
August	60,000	34,000	8,000	3,000	1,500	4,500

- ii. Cash balance on 1st May Rs.8,000
- iii. Plant costing Rs.16,000 is due for delivery in July payable 10% on delivery and the balance after three months.
- iv. Advance Tax of Rs.8,000 is payable in March and June each.
- v. Period of credit allowed by suppliers is 2 months and to customers is 1 month
- vi. Lag in payment of manufacturing expenses ½ month.
- vii. Lag in payment of all other expenses 1 month.

Solution:

Cash Budget for the month of May, June and July

Particulars	May Rs..	June Rs.	July Rs.
Receipts:			
Opening Balance	8,000	15,750	12,750
Cash from Debtors	62,000	64,000	58,000
Total	70,000	79,750	70,750
Payments:			
Paid to Creditors	36,000	38,000	33,000
Wages	8,000	10,000	8,500
Manufacturing Exp	3,750	4,000	3,750
Office Exp	1,500	2,500	2,000
Selling Exp	5,000	4,500	3,500
Advance Tax	---	8,000	---
Delivery of Plant (10% Payment of delivery)	---	---	1,600
Total	54,250	67,000	52,350
Closing Cash Balance	15,750	12,750	18,400

Workings:

- i. Credit allowed by suppliers for purchase is 2 months. Therefore, March purchase paid on May, April paid on June and May paid on July.
- ii. Credit allowed to customers for sales is 1 month. Therefore, April sales received on May, May sales received on June and June sales received on July.

- iii. Payment of manufacturing expenses ½ month.
- iv. Wages, Office expenses and Selling expenses are paid in the following month (lag in payment 1 month). Therefore, April expenses paid on May, May paid on June and June paid on July.

FLEXIBLE BUDGET

Problem: 9

Prepare a Flexible Budget for overheads on the basis of the following data. Ascertain the overhead rates at 50%, 60% and 70% respectively.

At 60% Capacity (Rs.)

Variable Overheads:

Indirect Materials	6,000
Indirect Labour	18,000

Semi-variable Overheads:

Electricity (40% fixed, 60% variable)	30,000
Repairs (80% fixed, 20% variable)	3,000

Fixed Overheads:

Depreciation	16,500
Insurance	4,500
Salaries	<u>15,000</u>

Total Overheads

93,000

Estimated Direct Labour Hours

1,86,000

Solution:

Flexible Budget

Items	50% Capacity Rs..	60% Capacity Rs.	70% Capacity Rs.
Variable Overheads:			
Indirect Material	6,000	6,000	
Indirect Labour	15,000	18,000	7,000
Semi-variable Overheads:			21,000
Electricity 40% Fixed	12,500	12,000	
60% Variable	15,000	18,000	12,000
Repair 80% Fixed	2,400	2,400	21,000
20% Variable	500	600	2,400
			700
Fixed Overheads:			
Depreciation	16,500	16,500	16,500
Insurance	4,500	4,500	4,500
Salaries	15,000	15,000	15,000
Total Overheads	85,900	93,000	1,00,100
Estimated Direct Overheads	1,55,000	1,86,000	2,17,000
Overheads rate per hour	Re.0.55	Re.0.50	Re.0.46

Workings:

a) Variable expenses are varying accordingly:

Indirect Materials:

$$\text{For 60\%} = .6000$$

$$\text{For 50\%} = \frac{6000}{60} \times 50 = 5000$$

$$\text{For 70\%} = \frac{6000}{60} \times 70 = 7000$$

Likewise we can calculate for Indirect labour, Electricity and Repairs.

b) Fixed expenses are fixed at all levels

c) Overhead rate per hour

$$\text{At 50\%} = \frac{85900}{155000} = \text{Rs. } 0.55$$

$$\text{At 60\%} = \frac{93000}{186000} = \text{Rs. } 0.50$$

$$\text{At 70\%} = \frac{100100}{217000} = \text{Rs. } 0.46$$

MASTER BUDGET

Problem: 10

G Ltd. presents the following information as on 31st March 2007 and you are required to prepare a Master Budget.

	Rs.
Sales	9,00,000
Direct Material Cost	25% of Sales
Direct Wages	80,000
Direct Expenses	70,000
Factory Overheads:	
Supervisors salary	9,000 per month
Manager's salary	12,000 per month
Foreman's salary	4,000 per month
Light and Power	30,000
Depreciation on Plant & Machinery	35,000
Spares and Lubricating Oil	2% of Sales
Repairs & Maintenance	3% of Plant & Machinery
Administrative Overheads	30,000 per year
Selling & Distribution Overheads	20,000 per year
Value of Plant & Machinery	7,00,000

Solution:**Master Budget**

Particulars		Rs.	Rs.
Sales			9,00,000
Less: Cost of Production:			
Direct Materials		2,25,000	
Direct Wages		80,000	
Direct Expenses		70,000	
	Prime Cost	3,75,000	
Factory Overhead:			
Fixed:			
Manager's Salary			
Supervisor's Salary	1,08,000		
Forman's Salary	1,44,000		
Depreciation	48,000		
	35,000		
Variable: Light & Power		3,35,000	
Spares & Lubricating Oil	30,000		
Repairs & Maintenance	18,000		
	21,000		
		69,000	
	Work Cost		7,79,000
	Gross Profit		1,21,000
Less: Administrative Overhead		30,000	
Selling & Distribution Overhead		20,000	
			50,000
	NET PROFIT		71,000

UNIT II

STANDARD COSTING

Standard Cost – Meaning

Standard Cost is a predetermined cost. It is calculated in advance to manufacture a single unit or a number of units of a product during a future period. The aim of standard cost is to eliminate the changes in prices. It is used as a guide for decision making.

A standard cost has been described as a predetermined cost, an estimated future cost, an expected cost, a budgeted unit cost, a forecast cost, or a "should be" cost. Standard costs are often a part of a manufacturer's annual profit plan and operating budgets. Standard costs will be established for the following year's direct materials, direct labor, and manufacturing overhead.

If standard costs are used, there will be:

- a standard cost for each unit of input
- a standard quantity of each input for each unit of output
- a standard cost for each unit of output

Definition

According to Chartered Institute of Management Accountants (CIMA), “A predetermined cost, which is calculated from management’s standards of efficient operation and the relevant necessary expenditure”.

“An estimated or predetermined cost of performing an operation or producing a good or service under normal conditions”.

Standard Costing – Meaning

Standard Costing is a technique of using standard cost for the purpose of cost control. It is an effective tool for planning, coordinating, controlling and decision making. The object of standard costing is to ascertain the quotation and determination of price policy.

Standard Costing is a method of ascertaining the costs whereby statistics are prepared to show (a) standard cost (b) the actual cost (c) the difference between these costs, which is termed the variance.

Standard costing is the practice of substituting an expected cost for an actual cost in the accounting records, and then periodically recording variances showing the difference between the expected and actual costs. This approach represents a simplified alternative to cost layering systems, such as the FIFO and LIFO methods, where large amounts of historical cost information must be maintained for items held in stock.

Standard costing involves the creation of estimated (i.e., standard) costs for some or all activities within a company. The core reason for using standard costs is that there are a number of applications where it is too time-consuming to collect actual costs, so standard costs are used as a close approximation to actual costs.

Definition:

According to ICMA Standard Costing is defined as, “The preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence”.

Standard costing is a method of ascertaining the costs whereby statistics are prepared to show:

- i. The standard cost
- ii. The actual cost
- iii. The difference between these costs, which is termed the variance.

Thus the technique of standard cost study comprises of:

Pre-determination of standard costs

Use of standard costs

Comparison of actual cost with the standard costs

Find out and analyse reasons for variances

Reporting to management for proper action to maximize efficiency

Advantages of Standard Costing

- 1. Cost Control:** Standard costing is universally recognised as a powerful cost control system. Controlling and reducing costs becomes a systematic practice under standard costing.
- 2. Elimination of Wastage and Inefficiency:** Wastage and inefficiency in all aspects of the manufacturing process are curtailed, reduced and eliminated over a period of time if standard costing is in continuous operation.
- 3. Norms:** Standard costing provides the norms and yard sticks with which the actual performance can be measured and assessed.
- 4. Locates Sources of Inefficiency:** It pin points the areas where operational inefficiency exists. It also measures the extent of the inefficiency.
- 5. Fixing Responsibility:** Variance analysis can determine the persons responsible for each variance. Shifting or evading responsibility is not easy under this system.
- 6. Management by Exception:** The principle of 'management by exception can be easily followed because problem areas are highlighted by negative variances.
- 7. Improvement in Methods and Operations:** Standards are set on the basis of systematic study of the methods and operations. As a consequence, cost reduction is possible through improved methods and operations.
- 8. Guidance for Production and Pricing Policies:** Standards are valuable guides to the management in the formulation of pricing policies and production decisions.
- 9. Planning and Budgeting:** Budgetary control is far more effective in conjunction with standard costing. Being predetermined costs on scientific basis, standard costs are also useful in planning the operations.

10. Inventory Valuation: Valuation of stocks becomes a simple process by valuing them at standard cost.

Limitations of Standard Costing

1. Variation in Price: One of the chief problems faced in the operation of the standard costing system is the precise estimation of likely prices or rate to be paid.

2. Varying Levels of Output: If the standard level of output set for pre-determination of standard costs is not achieved, the standard costs are said to be not realised.

3. Changing Standard of Technology: In case of industries that have frequent technological changes affecting the conditions of production, standard costing may not be suitable.

4. Applicability: It cannot be used in those organizations where non-standard products are produced. If the production is undertaken according to the customer specifications, then each job will involve different amount of expenditures.

5. Difficult to set Standard: The process of setting standard is a difficult task, as it requires technical skills. The time and motion study is required to be undertaken for this purpose. These studies require a lot of time and money.

6. Problem in fixing Responsibility: The fixing of responsibility is not an easy task. The variances are to be classified into controllable and uncontrollable variances. Standard costing is applicable only for controllable variances.

Purposes of Standard Costs:

Standard costs are very useful for managerial control and planning. They provide a yardstick for the measurement of operational efficiency of an enterprise. Standard Costs are used for:

- Establishing budgets
- Controlling costs, motivating employees, and measuring efficiency.
- Promoting possible cost reduction.
- Simplifying costing procedures and expediting cost reports.
- Assigning/allocating costs to materials, work-in-progress and finished goods inventories.
- Forming the basis for establishing bids and contracts as well as for setting selling prices.

Distinguish between Standard Cost and Estimated Cost

S.No.	Standard Cost	Estimated Cost
1	It is a regular system of account entered in the books of accounts.	It is statistical information and not entered in the books of accounts.
2	It finds out what the cost should be?	It finds out what the cost will be?
3	It is used for cost control to maximize efficiency.	It is used to ascertain the fixation of selling price.
4	It takes into accounts all the manufacturing processes.	It is used for specific purpose like fixing sale price.
5	.It is used by the firms where standard costing system followed.	It is used by the firms where historical costing system adopted.
6	It is an accurate based on the scientific analysis.	It is an approximate based on past experience.

Distinguish between Standard Cost and Budgetary Control

Both Standard and Budgetary Control are complimentary to each other and should be used simultaneously. But they differ in scope and techniques. They are:

S.No	Standard Costing	Budgetary Control
1	It is intensive because it is related with control of expenses.	It is extensive because it is related with control of whole business.
2	It is a part of cost accounts	It is a part of financial accounts.
3	It is based on technical assessment.	It is based on past performance to future trend.
4	Variances are revealed through accounts.	Variances are not revealed through accounts.
5	It cannot be applied in parts	It can be applied in parts.

6	.It is expensive.	It is less expensive.
7	It cannot be operated without budgets.	It can be operated without standards.

Setting of Standards

A standard is an ideal which is anticipated and can be attained over a future period of time, normally in the next accounting year. The cost accountant, departmental heads, foremen and technical experts should work together in setting standards. Just like a budget committee, a committee should be formed to set standards.

TYPES OF STANDARDS

Broadly the standards can be divided into three categories:

- (i) Current standards;
- (ii) Basic standard; and
- (iii) Normal standard

(i) Current Standards

Fixed on the basis of current conditions and remain in operation for a limited period in the sense that they are revised at regular intervals. Current standards are of two types:

(a) Ideal standards:

This standard reflects the level of attainment on the basis of maximum possible level of efficiency which may never be achieved.

(b) Expected (or Attainable) standards.

Reflects a level of attainment based on a high level of efficiency which is capable of being achieved. It is best suited for control point of view because this standard reveals real variances from the attainable performance levels.

(ii) Basic Standard

The standard is established and operated without revision for a number of years to help forward planning. It is not suitable for cost control purposes.

(iii) Normal Standard

This standard is meant to smooth out fluctuations caused by seasonal and cyclical changes. It is difficult to follow such standards in practice because it is not possible to forecast performance with adequate accuracy for a long period of time. As such, normal standards have little relevance *for planning and cost control*.

Preliminaries for Establishing Standard Costing System

The establishment of a standard costing system involves the following steps:

1. Determination of Cost Centre: A cost centre may be a department or part of a department or item of equipment or machinery or a person or a group of persons in respect of which costs are accumulated and one where control can be exercised. Cost centres are necessary for determining the costs.

2. Classification of Accounts: Classification of accounts is necessary to meet a required purpose i.e., function, asset or revenue item. Codes can be used to have a speedy collection of accounts. A standard is a predetermined measure of material, labour and overheads. It may be expressed in quantity and its monetary measurements in standard costs.

3. Types of Standards: The standards are classified into three categories:

(i) Current Standard: A current standard is a standard which is established for use over a short period of time and is related to current condition. It reflects the performance which should be accomplished during the current period. The period for current standard is normally one year. It is supposed that the conditions of production will remain unchanged. In case there is any change in price or manufacturing condition, the standards are also revised. Current standard may be ideal standard and expected standard.

(a) Ideal Standard: The standard represents a high level of efficiency. It is fixed on the assumption that favourable conditions will prevail and management will be at its best. The price

paid for materials will be lowest and wastages cost of labour and overhead expenses will be minimum possible.

(b) Expected Standard: This standard is based on expected conditions. It is the target which can be achieved if expected conditions prevail. All existing facilities and expected changes are taken into consideration while fixing these standards. An allowance is given for human error and normal deficiencies. It is realistic and an attainable and it is used for fixing efficiency standard.

(ii) Basic Standard: A basic standard is established for use for an indefinite period or a long period. These standards are revised only on the changes in specification of material and technology production.

(iii) Normal Standard: Normal standard is a standard which is anticipated can be attained over a future period of time, preferably long enough to cover one trade cycle. This standard is based on the conditions which will cover a future period, say 5 years, concerning one trade cycle. If a normal cycle of ups and downs in sales and production is 10 years then standard will be set on average sales and production which will cover all the years.

4. Organisation for Standard Costing: In a business concern a standard costing committee is formed for the purpose of setting standards. The committee includes production manager, purchase manager, sales manager, personnel manager, chief engineer and cost accountant. The Cost Accountant acts as a coordinator of this committee. He supplies all information for determining the standard and later on coordinates the costs of different departments. He also informs the committee about the change in price level, etc. The committee may revise the standards in the light of the changed circumstances.

5. Setting of Standards: The standard for direct material, direct labour and overhead expenses are fixed. The standards for direct material, direct labour and overheads should be set up in a systematic way so that they can be used as a tool for cost control easily.

VARIANCE ANALYSIS

The term variance is derived from the word 'To vary' means differ. In cost account variance means the difference between the standard cost and actual cost. When actual cost is less than standard cost, it is known as Favourable (F) variance. When actual cost is more than standard cost, it is known as Unfavourable (A) variance. It indicates whether costs are under control or not, to the management.

Variance analysis is the quantitative investigation of the difference between actual and planned behavior. This analysis is used to maintain control over a business.

Variance analysis typically involves the isolation of different causes for the variation in income and expenses over a given period from the budgeted standards.

For example, if direct wages had been budgeted to cost Rs.100,000 actually cost Rs.200,000 during a period, variance analysis shall aim to identify how much of the increase in direct wages is attributable to:

- Increase in the wage rate (adverse labor rate variance);
- Decline in the productivity of workforce (adverse labor efficiency variance);
- Unanticipated idle time (labor idle time variance);
- More wages incurred due to higher production than the budget (favorable sales volume variance).

Definition

According CIMA London, "Variance is difference between the standard cost and the comparable actual cost incurred during a period".

According ICMA, "Variance Analysis is the resolution into constituent parts and explanation of variances".

According to S.P.Gupta, "Variance Analysis is the measurement of variances, location of their root causes, measuring their effect and their disposition".

Variance Analysis, in managerial accounting, refers to the investigation of deviations in financial performance from the standards defined in organizational budgets.

Interpretation of Variances

Each variance is interpreted accordingly and by “*interpretation*” we mean making a decision whether the variance is favourably or unfavorable and attaching responsibility.

- When actual cost is less than the standard cost, the difference is considered “**Favourable**” or **Credit Variance**. On the other hand when the actual cost exceeds the standard cost, the difference is termed as **Unfavourable** or A **Debit Variance**. Ordinarily, a Favourable Variance is a sign of efficiency of the organisation whereas an Unfavourable Variance is a sign of inefficiency.

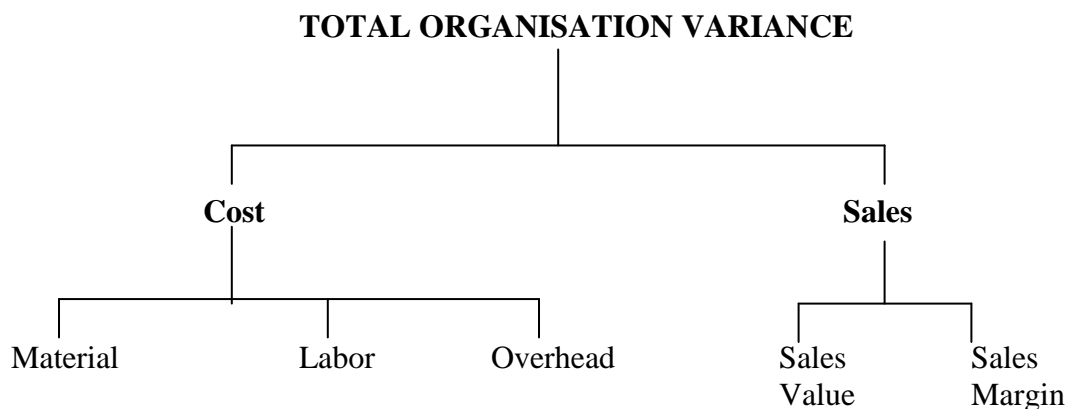
Controllable Vs. Uncontrollable Variances

- A variance is controllable if it can be identified as a primary responsibility of a specified person or of a department. If the variance is caused by factors beyond the control of the concerned person (or department), it is said to be uncontrollable. It is the controllable variance that attracts the attention of the management because it is here that corrective action is required.

CLASSIFICATION OF VARIANCES

- Variances may broadly be classified into two groups:

- (i) **Cost Variances**, and
- (ii) **Sales Variances**.



COST VARIANCES

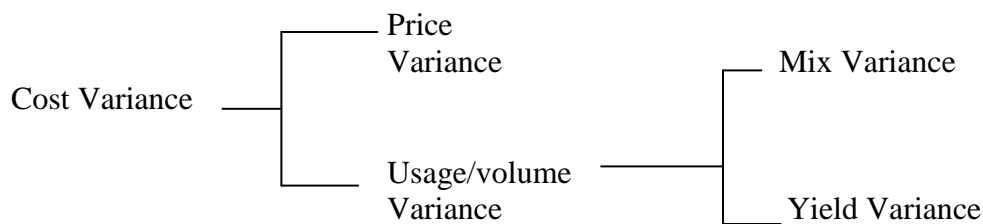
In the manufacturing function, cost variances are classified on the basis of the elements of cost viz. material, labor and expense variances.

In cost analysis the standard cost of each element of cost is reconciled with actual cost and difference is called cost variance or total variance. The cost variance has two components:

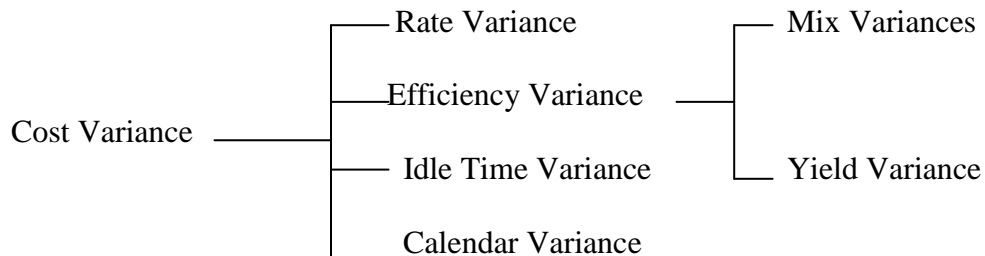
- (i) **Price Variance and**
- (ii) **Volume variance.**

Classification of Cost Variances

(i) **Material Variance:**



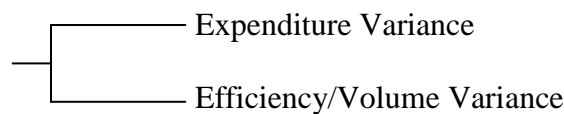
(ii) **Labour Variances:**



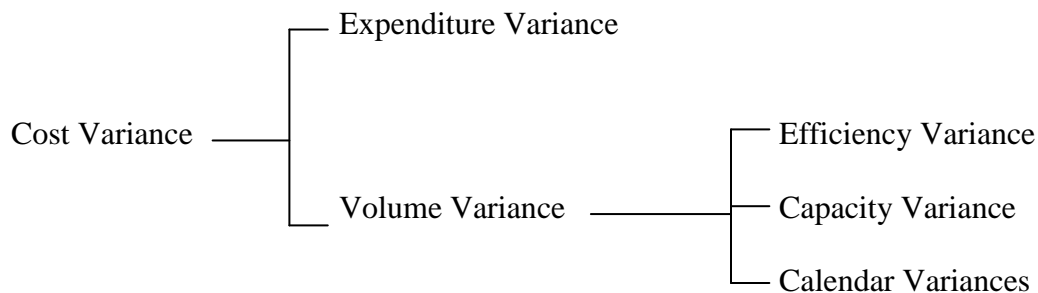
(iii) **Overhead Variances**

A: Variable

Overhead Variance



B: Fixed Overhead Variance



ANALYSIS OF VARIANCES

The divergence between standard costs, profits or sales and actual costs, profits or sales respectively will be known as variances. The variances may be favourable and unfavourable. If actual cost is less than the standard cost and actual profit and sales are more than the standard profits and sales, the variances will be favourable. On the contrary if actual cost is more than the standard cost and actual profit and sales are less than the standard profits and sales, the variances will be unfavourable.

The variances are related to efficiency. If variances are favourable, it will show efficiency and if variances are unfavourable it will show inefficiency. The variances may be classified into four categories such as Direct Materials Variances, Direct Labour Variances, Overheads Cost Variances and Sales or Profit Variances.

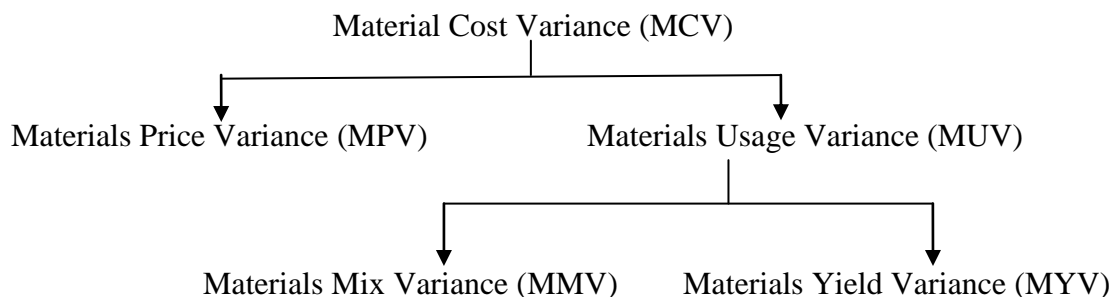
1. DIRECT MATERIAL VARIANCES

Direct material variances are also known as material cost variances. The material cost variance is the difference between the standard cost of materials that should have been incurred for manufacturing the actual output and the cost of materials that has been actually incurred. Material Cost Variance comprises of:

- (i) Material Price Variance and
- (ii) Material Usage Variance: Material usage variance may further be subdivided into material Mix Variance and Material Yield Variance.

The Chart depicts the divisions and subdivisions of material variances.

Chart



The following equations may be used for verification of material cost variances.

$$(i) MCV=MPV+MUV \text{ or } MPV+MMV+MYV$$

$$(ii) MUV=MMV+MYV$$

(a) Materials Cost Variance: Material cost variance is the difference between standard materials cost and actual materials cost. Material cost variance arises due to change in price of materials and variations in use of quantity of materials. Material cost variance is ascertained as such:

$$\text{Materials Cost Variance} = \text{Standard Material Cost} - \text{Actual Material Cost}$$

$$\text{Standard Material Cost} = \text{Standard Price per unit} \times \text{Standard Quantity of materials}$$

$$\text{Actual Material Cost} = \text{Actual price per unit} \times \text{Actual quantity of materials.}$$

If the standard cost is more than the actual cost, the variance will be favourable and on the other hand, if the actual cost is more than the standard cost, the variance will be unfavourable or adverse.

(b) Materials Price Variance: Materials price variance arises due to the standard price specified and actual price paid. It may also arise due to: (i) Changes in basic prices of materials, (ii) failure to purchase the quantities anticipated at the time when standards were set, (iii) failure to secure discount on purchases, (iv) failure to make bulk purchases and incurring more on freight, etc., (v) failure to purchase materials at proper time, and (vi) Not taking cash discount when setting standards.

$$\text{Materials Price Variance} = \text{Actual Quantity} (\text{Standard price} - \text{Actual price})$$

In this case actual quantity of materials used is taken. The price of materials is taken per unit. If the answer is in plus, the variance will be favourable and it will be unfavourable if the result is in negative.

(c) Material Usage Variance: Material usage (or quantity) variance arises due to the difference in standard quantity specified and actual quantity of materials used. This variance may also arise due to: (i) Negligence in use of materials, (ii) More wastage of materials by

untrained workers or defective methods of production, (iii) Loss due to pilferage, (iv) Use of material mix other than the standard mix, (v) More or less yield from materials than the standard set, and (vi) Defective production necessitating the use of additional materials.

$$\text{Materials Usage Variance} = \text{Standard Price (Standard Quantity – Actual Quantity)}$$

The quantities of material specified and actually used are taken and standard price per unit is used. If the answer from the above mentioned formula is in plus, the variance will be a favourable variance but if the answer is in minus the variance will be unfavourable or adverse.

Illustration 1: Following is the data of a manufacturing concern. From the figures given below, calculate (i) Materials Cost Variance, (ii) Material Price Variance, and (iii) Material Usage Variance. The standard quantity of materials required for producing one ton of output is 40 units. The standard price per unit of materials is Rs.3. During a particular period 90 tons of output was undertaken. The materials required for actual production were 4,000 units. An amount of Rs. 14,000 was spent on purchasing the materials.

Solution:

$$\text{Standard quantity of material (SQ)} = (90 \times 40) = 3600 \text{ units}$$

$$\text{Standard price per unit} = \text{Rs. } 3$$

$$\text{Actual price per unit} = 14000/4000 = \text{Rs. } 3.50$$

(i) Material Cost Variance = Standard material cost – Actual material cost

$$\begin{aligned} \text{Standard material cost} &= \text{Standard quantity} \times \text{Standard price} \\ &= 3,600 \times 3 = \text{Rs. } 10,800 \\ &= 10,800 - 14,000 \\ &= (-) \text{Rs. } 3,200 \text{ Adverse} \end{aligned}$$

(ii) Material Price Variance = Actual Quantity (Standard Price Per Unit – Actual

Price Per Unit)

$$\begin{aligned} &= 4,000 (3.00 - 3.50) \\ &= 4,000 (-0.50) \\ &= (-) \text{Rs. } 2,000 \text{ Adverse} \end{aligned}$$

(iii) Material Usage Variance = Standard Price per unit (SQ – AQ)

$$\begin{aligned} &= 3 (3,600 - 4,000) \\ &= 3 (-400) = (-) \text{Rs. } 1,200 \text{ Adverse} \end{aligned}$$

Verification:

$$\begin{aligned} \text{MCV} &= \text{MPV} + \text{MUV} \\ - 3,200 &= - 2,000 - 1,200 \\ - 3,200 &= - 3,200 \end{aligned}$$

Illustration 2 : From the data given below, calculate: (i) Material Cost Variance, (ii) Material Price Variance, and (iii) Material Usage Variance.

Product	Standard		Actual	
	Quantity (Units)	Price Rs.	Quantity (Units)	Price Rs.
A	1050	2.00	1100	2.25
B	1500	3.25	1400	3.50
C	2100	3.50	2000	3.75

Solution:

(i) Material Cost Variance = Standard Cost – Actual Cost

Or (SQ x Std. Rate) – (AQ. x Actual Rate)

$$\begin{aligned} \text{Material A} &= (1,050 \times 2) - (1,100 \times 2.25) \\ &= 2,100 - 2,475 = - \text{Rs. } 375 \end{aligned}$$

$$\begin{aligned} \text{Material B} &= (1,500 \times 3.25) - (1,400 \times 3.50) \\ &= 4,875 - 4,900 = - \text{Rs. } 25 \end{aligned}$$

$$\begin{aligned} \text{Material C} &= (2,100 \times 3.50) - (2,000 \times 3.75) \\ &= 7,350 - 7,500 = - \text{Rs. } 150 \end{aligned}$$

Material Cost Variance = Rs. 550 Unfavourable

(ii) Material Price Variance = Actual Quantity (Standard Price – Actual Price)

$$\begin{aligned} \text{Material A} &= 1,100 (2.00 - 2.25) \\ &= 1,100 (-0.25) = \text{Rs. } 275 \end{aligned}$$

$$\begin{aligned} \text{Material B} &= 1,400 (3.25 - 3.50) \\ &= 1,400 (-0.25) = - \text{Rs. } 350 \end{aligned}$$

$$\begin{aligned} \text{Material C} &= 2,000 (3.50 - 3.75) \\ &= 2,000 (-0.25) = - \text{Rs. } 500 \end{aligned}$$

Material Price Variance = Rs. 1,125 Unfavourable

(iii) Material Usage Variance = Standard Price (SQ – AQ)

$$\begin{aligned} \text{Material A} &= 2 (1,050 - 1,100) \\ &= 2 (-50) = \text{Rs. } 100 \end{aligned}$$

$$\begin{aligned} \text{Material B} &= 3.25 (1,500 - 1,400) \\ &= 3.25 (100) = \text{Rs. } 325 \end{aligned}$$

$$\begin{aligned} \text{Material C} &= 3.50 (2,100 - 2,000) \\ &= 3.50 (100) = \text{Rs. } 350 \end{aligned}$$

Material Usage Variance = Rs. 575 Favourable

Verification: $MCV = MPV + MUV$
 $- Rs.550 = - Rs. 1125 + Rs. 575$
 $- Rs. 550 = - Rs. 550$

(d) Material Mix Variance: Materials mix variance is that part of material usage variance which arises due to changes in standard and actual composition of mix. Materials mix variance is the difference between standard price of standard mix and standard price of actual mix. The standard price is used in calculating this variance.

The variance is calculated under two situations: (i) When actual weight of mix is equal to standard weight of mix, and (ii) When actual weight of mix is different from the standard mix.

(i) When Actual Weight and Standard Weight of Mix is Equal

In this case the formula for calculating mix variance is :

Standard Cost of Standard Mix – Standard Cost of Actual Mix.

$(\text{Standard Price} \times \text{Standard Quantity}) - (\text{Standard Price} \times \text{Actual Quantity})$

Or Standard Unit Cost (Standard Quantity – Actual Quantity)

In case standard quantity is revised due to shortage of one material, the formula will be equal to Standard unit cost (Revised Standard Quantity – Actual Quantity).

Illustration 3: Calculate material mix variance from the data given as such:

Materials	Standard		Actual	
	Quantity (Units)	Price Rs.	Quantity (Units)	Price Rs.
A	50	2.00	60	2.25
B	100	1.20	90	1.75

Due to the shortage of material A, the use of material A was reduced by 10% and that of material B increased by 5%.

Solution:

In this question the standards will be revised. Revised standards will be:

Material A = $50 - 5 (50 \times 10/100) = 45$

Material B = $100 + 5 (100 \times 5/100) = 105$

Material Mix Variance = Standard Unit Price (Revised Standard Quantity – AQ)

Material A = 2 (45 – 60)
= 2 (– 15) = – Rs. 30

Material B = 1.20 (105 – 90)
= 1.20(15) = Rs. 18

Material Mix Variance = – Rs. 12 Unfavourable

(ii) When Actual Weight and Standard Weight of Mix are Different

When quantities of actual material mix and standard material mix are different, the formula will be:

$$\left\{ \frac{\text{Total Weight of Actual mix}}{\text{Total Weight of Standard mix}} \times \text{Standard Cost of Standard} - (\text{Standard Cost of Actual Mix}) \right\}$$

In case the standard is revised due to the shortage of one material then revised standard will be used instead of standard, the formula will become:

$$\left\{ \frac{\text{Total Weight of Actual mix}}{\text{Total Weight of Revised Std mix}} \times \text{Standard Cost of Revised Standard Mix} - (\text{Standard Cost of Actual Mix}) \right\}$$

Illustration 4: From the following data calculate various material variances:

Materials	Standard		Actual	
	Quantity (Units)	Price Rs.	Quantity (Units)	Price Rs.
A	80	8.00	90	7.50
B	70	3.00	80	4.00

Solution:

(a) Material Cost Variance = Standard Material Cost – Actual Material Cost
 Standard Material Cost = (Standard Qty. x Standard Price)
 Actual Material Cost = (Actual Qty. x Actual Price)
 = (Standard Qty. x Standard Price) – (Actual Qty. x Actual Price)

Material A = (80 X 8) – (90 X 7.50)
= 640 – 675 = – Rs. 35

$$\begin{aligned} \text{Material B} &= (70 \times 3) - (80 \times 4.00) \\ &= 210 - 320 = - \text{Rs. } 110 \end{aligned}$$

Material Cost Variance = Rs. 145 Unfavourable

(b) Material Price Variance = Actual Quantity (Standard Price – Actual Price)

$$\begin{aligned} \text{Material A} &= 90 (8.00 - 7.50) \\ &= 90 (0.50) = + \text{Rs. } 45 \end{aligned}$$

$$\begin{aligned} \text{Material B} &= 80 (3.00 - 4.00) \\ &= 80 (-1.00) = - \text{Rs. } 80 \end{aligned}$$

Material Price Variance = Rs. 35 Unfavourable

(c) Material Usage Variance = Standard Price (Standard Quantity – Actual Quantity)

$$\begin{aligned} \text{Material A} &= 8 (80 - 90) \\ &= 8 (-10) = - \text{Rs. } 80 \end{aligned}$$

$$\begin{aligned} \text{Material B} &= 3 (70 - 80) \\ &= 3 (-10) = - \text{Rs. } 30 \end{aligned}$$

Material Usage Variance = Rs. 110 Unfavourable

(d) Material Mix Variance: In this question standard weight of mix is different from the actual weight of mix, so the formula will be:

$$\left\{ \frac{\text{Total Weight of Actual mix}}{\text{Total Weight of Standard mix}} \times \text{Standard Cost of Standard Mix} \right\}$$

$$\frac{170}{150} \times ((80 \times 8) + (70 \times 3)) - ((90 \times 8) + (80 \times 3))$$

$$\frac{170}{150} \times (640 + 210) - (720 + 240)$$

$$\frac{170}{150} \times 850 - 960 = 963.3 - 960 = \text{Rs. } 3.3 \text{ Favourable}$$

(e) Materials Yield Variance. This is the sub-variance of material usage variance. It results from the difference between actual yield and standard yield. It may be defined as that portion of the direct materials usage variance which is due to the standard yield specified and the actual yield obtained. It may arise due to low quality of materials, defective methods of production, carelessness in handling materials, etc.

Material Yield Variance is calculated with the following formula:

$$\text{Standard Rate (Actual yield – Standard yield)}$$

Standard Rate is calculated as follows:

$$\text{Standard Rate} = \frac{\text{Standard Cost of Standard Mix}}{\text{Net Standard Output i.e., Gross Output – Standard Loss}}$$

There may be a situation where standard mix may be different from the actual mix. In this case the standard is revised in relation to actual mix and the question is solved with the revised standard and not with the original standard. The standard rate will be calculated as follows:

$$\text{Standard Rate} = \frac{\text{Standard Cost of Revised Standard Mix}}{\text{Net Standard Output}}$$

In the earlier variances if the standard was more than the actual, the variance was favourable. But, in case of material yield variance the case is different. When actual yield is more than the standard yield, the variance will be favourable.

Illustration 5: The standard mix of a product is as under:

A	60	units at 15 P. per unit	Rs. 9
B	80	units at 20 P. per unit	Rs. 16
C	<u>100</u>	units at 25 P. per unit	<u>Rs. 25</u>
	<u>240</u>		<u>Rs. 50</u>

Ten units of finished product should be obtained from the above .mentioned mix. During the month of January, 1996 ten mixes were completed and the consumption was as follows:

A	640	units at 20 P. per unit	Rs. 128
B	960	units at 15 P. per unit	Rs. 144
C	<u>840</u>	units at 30 P. per unit	<u>Rs. 252</u>
	<u>2,440</u>		<u>Rs. 524</u>

The actual output was 90 units. Calculate various material variances.

Solution:

(i) Material Cost Variance:

The standard has been given for producing 10 units in one mix. Ten mixes have been completed, so standard production will be 100 units.

Standard cost for 100 Units = 50 x 10 = Rs. 500

Actual yield is 90 units, so standard cost will be adjusted accordingly.

Standard cost for actual yield = 100 X 90 = Rs. 450

Material Cost Variance = Standard Cost – Actual Cost
= 450 – 524 = Rs. 74 unfavourable

(ii) Material Price Variance = Actual Quantity (Standard Price – Actual Price)
Material A = 640 (0.15 – 0.20)
= 640 (–0.05) = Rs. 32 unfavourable

Material B = 960 (0.20 – 0.15)
= 960 (0.05) = Rs. 48 favourable

Material C = 840 (0.25 – 0.30)
= 840 (–0.05) = Rs. 42 unfavourable

Material price Variance (A + B + C) = Rs. 26 unfavourable

(iii) Material Usage Variance:

The standard quantity will be revised in proportion to actual production. Revised quantity will be:

A	600 ——— 100	X 90	=	540
B	800 ——— 100	X 90	=	720
C	1000 ——— 100	X 90	=	900

Standard Price (Standard Quantity – Actual Quantity)

Material A	= 15 P. (540 – 640)
	= 15 (– 100) = Rs. 5 unfavourable
Material B	= 20 P. (720 – 960)
	= 20 (– 240) = Rs. 48 unfavourable
Material C	= 25 P. (900 – 840)
	= 25 (60) = Rs. 15 favourable

Material usage Variance = Rs. 48 unfavourable.

(iv) Material Mix Variance

There is a difference between standard quantity (240 x 10= 2,400) and actual quantity (2,440), so the standard will be revised first. Revised standard quantity will be :

Standard Price (Standard Quantity – Actual Quantity)

A	$\frac{60}{240}$	X 2440 = 610
B	$\frac{80}{240}$	X 2440 = 813 (approximately)
C	$\frac{100}{240}$	X 2440 = 1017 (approximately)

Material Mix Variance	= Standard Price (Revised Standard Quantity – AQ)
Material A	= 15 P. (610 – 640)
	= 0.15 (–30) = Rs. 4.50 unfavourable
Material B	= 20 P. (813 – 960)
	= 0.20 (–147) = Rs. 29.40 unfavourable
Material C	= 25 P. (1017 – 840)
	= 0.25 (177) = Rs. 44.25 favourable
Material Mix Variance	= Rs. 10.35 favourable

(V) Material Yield Variance= Standard Rate (Actual Yield – Standard–Yield)

$$\text{Standard Rate} = \frac{\text{Standard Cost of Revised Standard Mix}}{\text{Net Standard Output}}$$

$$= 50/10 = \text{Rs. } 5$$

$$\text{Standard Yield} = 10/240 \times 2440 = 101.67 \text{ units}$$

$$\text{Yield Variance} = 5 (90 - 101.67) = \text{Rs. } 58.35 \text{ unfavourable.}$$

Verification: (i) $\text{MCV} = \text{MPV} + \text{MUV}$ or $-74 = 26 - 48 = -74$
(ii) $\text{MUV} = \text{MMV} + \text{MYV}$ or $-48 = 10.35 - 58.35 = -48$

Illustration 6: KSS Ltd. produces an article by blending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials:

Materials	Standard Mix	Standard Price per Kg.
A	40%	4.00
B	60%	3.00

The standard loss in processing is 15%. During April, 1996, the company produced, 1,700 kg. of finished output.

The position of stock and purchases for the month of April, 1996 is as under:

Material	Stock on 1-4-96 kg	Stock on 30-4-96 kg	Purchased during April, 1996 kg	Cost Rs.
A	35	5	800	3,400
B	40	50	1,200	3,000

Calculate the following variances:

- (i) Material Price Variance; (ii) Material Usage Variance;
(iii) Material Yield Variance; (iv) Material Mix Variance;
(v) Total Material Cost Variance.

Solution:

Calculation of Standard Cost of Standard Mix

Material	Std.Qty. of Material Required	Standard Price Per Kg.	Standard Cost
A	800	4.00	3200
B	1200	3.00	3600
Total	2000		6800

Standard Cost:

The standard loss is 15% ; so to get 85 finished kgs. 100 kgs. of material are required.

Actual finished product is 1,700 kgs; so standard material required will be

$$\frac{1700}{85} \times 100 = 2000 \text{ Kgs.}$$

Out of 2,000 kgs ; Material A will be 800 kgs. (40%) and
Material B will be 1,200 kgs (60%).

Calculation of Actual Cost of Material used

Material A :

Opening Stock :	35 kgs @ Rs. 4 (standard rate)	Rs. 40.00
Out of Purchases :	795 kgs @ Rs. 4.25 (actual rate)	<u>Rs. 3378.75</u>
(Purchases – Closing Stock)		<u>Rs. 3518.75</u>

Material B :

Opening Stock :	40 kgs @ Rs. 3 (standard rate)	Rs. 120.00
Out of Purchases :	1,150 kgs @ 2.50 (actual rate)	<u>Rs 2,875.00</u>
(Purchase – Closing Stock)		<u>Rs. 6513.75</u>

Actual Rate:

Material A	$\frac{\text{Rs.3400}}{800 \text{ Kgs}}$	= Rs. 4.25
Material B	$\frac{\text{Rs.3000}}{1200 \text{ Kgs}}$	= Rs. 2.50

(i) Material Price Variance:

$$\begin{aligned} \text{Material A} &= (830 \text{ kg} \times 4) - (35 \text{ kgs} \times 4 + 795 \text{ kgs} \times 4.25) \\ &= \text{Rs. } 3,320 - \text{Rs. } 3,518.75 \\ &= \text{Rs. } 198.75 \text{ Adverse.} \end{aligned}$$

$$\begin{aligned} \text{Material B} &= (1,190 \text{ kgs} \times 3) - (40 \text{ kgs} \times 3 + 1,150 \text{ kgs} \times 2.50) \\ &= \text{Rs. } 3,570 - \text{Rs. } 2,995 \\ &= \text{Rs. } 575 \text{ (Favourable)} \end{aligned}$$

$$\text{Total Material Price Variance} = -198.75 + 575 = \text{Rs. } 376.25 \text{ Favourable.}$$

(ii) Material Usage Variance:

Standard Price (Standard Usage–Actual Usage)

Material A :	Rs. 4 (800 kgs – 830 kgs)	= Rs. 120 Adverse
Material B :	Rs. 3 (1, 200 kgs – 1,190 kgs)	= Rs. 30 Favourable

$$\text{Total Material Usage Variance} = -120 + 30 = 90 \text{ Adverse}$$

(iii) Material Yield Variance

$$\begin{aligned} &\text{Standard Rate (Actual yield – Standard Yield)} \\ &= \text{Rs. 4 (1,700 kgs – 1,717 kgs)} \\ &= \text{Rs. 68 Adverse} \end{aligned}$$

$$\text{Standard Rate} = \frac{\text{Rs. 6800}}{1700 \text{ Kgs}} = \text{Rs. 4.00}$$

$$\text{Standard Yield} = \frac{1700}{2000} \times 2,020 = 1,717 \text{ kgs.}$$

(iv) Material Mix Variance:

$$\text{Mix) } \left[\frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of Std. Mix}} \times \text{Std. Rate} \right] - (\text{Standard Cost of Actual$$

$$\left. \frac{2020}{2000} \times \text{Rs. 6,800} \right\} - (830 \text{ kgs} \times 4 + 1,190 \text{ kgs} \times 4)$$

$$= \text{Rs. 6868} - \text{Rs. 6,890}$$

$$= \text{Rs. 22 Adverse}$$

(v) Total Material Cost Variance

$$\begin{aligned} &\text{Standard Cost of Materials} - \text{Actual Cost of Materials} \\ &\text{Rs. 6,800} - \text{Rs. 6,513.75} = \text{Rs. 286.25 Favourable.} \end{aligned}$$

2. DIRECT LABOUR VARIANCES

Labour Variances are discussed as follows:

(a) Labour Cost Variance

Labour Cost Variance or Direct Wage Variance is the difference between the standard direct wages specified for the activity and the actual wages paid. It is the function of labour rate of pay and labour time variance. It arises due to a change in either a wage rate or in time or in both. It is calculated as follows:

$$\text{Labour Cost Variance} = \text{Standard Labour Cost} - \text{Actual Labour Cost (Standard time X Standard Wage Rate)} - (\text{Actual Time X Actual Wage Rate})$$

(b) Labour Rate of Pay or Wage Rate Variance

It is that part of labour cost variance which arises due to a change in specified wage rate. Labour rate variance arises due to (i) change in basic wage rate or piece-work rate, (ii) employing

persons of different grades then specified, (iii) payment of more overtime than fixed earlier, (iv) new workers being paid different rates than the standard rates, and (v) different rates being paid to workers employed for seasonal work or excessive work load.

The wage rates are determined by demand and supply conditions of labour conditions in labour market, wage board awards, etc. So, wage rate variance is generally uncontrollable except if it arises due to the development of wrong grade of labour for which production foreman will be responsible. This variance is calculated by the formula:

$$\text{Labour Rate of Pay Variance} = \text{Actual time (Standard Rate - Actual Rate)}$$

The variance will be favourable if actual rate is less than the standard rate and it will be unfavourable or adverse if actual rate is more than the standard rate.

(c) Labour Efficiency or Labour Time Variance

It is that part of labour cost variance which arises due to the difference between standard labour hours specified and the actual labour hours spent. It helps in controlling efficiency of workers. The reasons for this variance are: (i) lack of proper supervision, (ii) defective machinery and equipment, (iii) insufficient training and incorrect instructions, (iv) increase in labour turnover, (v) bad working Conditions, (vi) discontentment along workers due to unsatisfactory personnel relations, and (vii) use of non-standard material requiring more time to complete work.

Labour efficiency variance is calculated as:

$$\text{Labour efficiency variance} = \text{Standard Wage Rate (Standard Time - Actual Time)}.$$

If actual time taken for doing a work is more than the specified standard time, the variance will be unfavourable. On the other hand, if actual time taken for a job is less than the standard time, the variance will be favourable.

(d) Idle Time Variance

This variance is the standard cost of actual time paid to workers for which they have not worked due to abnormal reasons. The Reasons for idle time may be power failure, defect in machinery, and non supply of materials, etc. Idle time variance should be segregated from the labour efficiency variance otherwise it will show inefficiency on the part of workers though they are not responsible for this. Idle time variance is always adverse and needs investigation for its causes. This variance is calculated as:

$$\text{Idle Time Variance} = \text{Idle Hours} \times \text{Standard Rate}$$

(e) Labour Mix or Gang Composition Variance

This variance arises due to change in the actual gang composition than the standard gang composition. This variance shows to the management how much labour cost variance is due to the change in labour composition. It may be calculated in two ways:

(i) When **standard and actual times of the labour mix are same**. In this case the variance is calculated as follows: .

$$\text{Labour Mix Variance} = \text{Standard Cost of Standard Labour Mix} - \text{Standard Cost of Actual Labour Mix.}$$

Due to the non-availability of one grade of labour, there may be a change in standard labour mix, and then revised standard will be used for standard mix. The formula will be:

$$\text{Labour Mix Variance} = \text{Standard cost of Revised Standard Labour Mix} - \text{Standard Cost of Actual Labour Mix.}$$

(ii) When standard and actual time of labour mix are different:

In this case the variance will be calculated as follows:

$$\left\{ \frac{\text{Total Time of Actual Labour Mix}}{\text{Total Time of Standard Labour Mix}} \times \text{Std. Cost of Revised Labour Mix} \right\} - (\text{Standard Cost of Actual Labour Mix})$$

As in the earlier case, if labour composition is revised because of non-availability of one grade of labour then revised standard mix will be used instead of standard mix and the formula will become:

$$\left\{ \frac{\text{Total Time of Actual Labour Mix}}{\text{Total Time of Revised Std Labour Mix}} \times \frac{\text{Std. Cost of Revised Std. Labour Mix}}{\text{Std. Cost of Actual Labour Mix}} - \right\}$$

Illustration: 7. The information regarding the composition and the weekly wage rates of labour force engaged on a job scheduled to be completed in 30 weeks:

Category of Workers	Standard		Actual	
	No.of Workers	Weekly Wage Rate per worker	No.of Workers	Weekly Wage Rate per worker
Skilled	75	60	70	70
Semi-skilled	45	40	30	50
Unskilled	60	30	80	20

The work was completed in 32 weeks. Calculate various labour variances.

Solution:

(i) **Labour Cost Variance** = Standard Labour Cost – Actual labour Cost

Standard Labour Cost :		Rs.
Skilled :	75 x 60 x 30	= 1,35,000
Semi-skilled :	45 x 40 x 30	= 54,000
Unskilled :	60 x 30 x 30	= 54,000
Total		= <u>2,43,000</u>

Actual Labour Cost:

Skilled :	70 x 70 x 32	= 1,56,800
Semi Skilled :	30 x 50 x 32	= 48,200
Unskilled :	80 x 20 X 32	= <u>51,000</u>
Total		= <u>2,56,000</u>

Total Labour Cost Variance: 2,43,000 – 2,56,000 = Rs. 13,000 Adverse

(ii) **Labour Rate Variance** = Actual Time (Standard Rate – Actual Rate)

Skilled :	2,240 (60 – 70)	
	2,240 (– 10)	= Rs. 22,400 Adverse
Semi Skilled :	960 (40 – 50)	
	960 (–10)	= Rs. 9,600 Adverse
Unskilled :	2,560 (30 – 20)	
	2,560 (10)	= Rs. 25,600 Favourable
Labour Rate Variance		=Rs. 6,400 Adverse

(iii) **Labour Efficiency Variance** = Standard Rate (Standard Time – Actual Time)

$$\begin{aligned} \text{Skilled :} & \quad 60(2,250 - 2,240) \\ & \quad 60(10) \quad = \text{Rs. 600 Favourable} \end{aligned}$$

$$\begin{aligned} \text{Semi Skilled :} & \quad 40(1,350 - 960) \\ & \quad 40(390) \quad = \text{Rs. 15,600 Favourable} \end{aligned}$$

$$\begin{aligned} \text{Unskilled :} & \quad 30(1,800 - 2,560) \\ & \quad 30((-760)) \quad = \text{Rs. 22,800 Adverse.} \end{aligned}$$

$$\text{Labour Efficiency Variance} = \text{Rs. 6,600 Adverse}$$

Verification:

$$\begin{aligned} \text{Labour Cost Variance} &= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} \\ -13,000 &= (-6,400) + (-6,600) \\ -13,000 &= -13,000. \end{aligned}$$

Illustration 8. The following data is taken out from the books of a manufacturing company:

Budgeted labour composition for producing 100 articles

20 Men @ Rs. 1.25 per hour for 25 hours

30 women @ 1.10 per hour for 30 hours

Actual labour composition for producing 100 articles

25 Men @ Rs. 1.50 per hour for 24 hours

25 Women @ Re.1.20 per hour for 25 hours

Calculate: (i) Labour Cost Variance, (ii) Labour Rate Variance, (iii) Labour Efficiency Variance, (iv) Labour Mix Variance.

Solution:

$$\begin{aligned} \text{(i) Labour Cost Variance} &= \text{Standard Labour Cost} - \text{Actual Labour cost} \\ \text{Men :} &= (20 \times 25 \times 1.25) - (25 \times 24 \times 1.50) \\ & \quad 625 - 900 = \text{Rs. 275 Adverse} \end{aligned}$$

$$\begin{aligned} \text{Women:} &= (30 \times 30 \times 1.10) - (25 \times 25 \times 1.20) \\ & \quad 990 - 750 = \text{Rs. 240 Favourable} \end{aligned}$$

$$\text{Labour Cost Variance} = -275 + 240 = \text{Rs. 35 Adverse.}$$

$$\begin{aligned} \text{(ii) Labour Rate Variance} &= \text{Actual Time (Standard Rate} - \text{Actual Rate)} \\ \text{Men :} &= 600 (1.25 - 1.50) \\ &= 600 (-0.25) = \text{Rs. 150.00 Adverse} \end{aligned}$$

$$\begin{aligned} \text{Women :} &= 625 (1.10 - 1.20) \\ &= 625 (-0.10) = \text{Rs. 62.50 Adverse} \end{aligned}$$

$$\text{Labour Rate Variance} = \text{Rs. 212.50 Adverse.}$$

(iii) Labour Efficiency Variance = Standard Rate (Standard Time – Actual Time)
 Men : = 1.25 (500 – 600)
 = 1.25 (– 100) = Rs. 125 Adverse

Women : = 1.10(900-625)
 = 1.10 (275) = Rs. 302.50 Favourable

Labour Efficiency Variance = Rs. 177.50 Favourable

(iii) Labour Mix Variance:

Standard time for Men and Women = 1,400 hours
 Actual time for Men and Women = 1,225 hours

When standard time of labour mix is different from the actual time of labour mix, the formula for calculating labour mix variance is:

$$\left[\left\{ \frac{\text{Total Time of Actual Labour Mix}}{\text{Std.Time of Revised Std Labour Mix}} \times \frac{\text{Std.Cost of Revised Std. Labour Mix}}{\text{Std. Cost of Actual Labour Mix}} - 1 \right\} \right]$$

$\frac{1225}{1400} \times (20 \times 25 \times 1.25) + (30 \times 30 \times 1.10) - (25 \times 24 \times 1.25) + (25 \times 25 \times 1.10)$
 $1413.12 - 1437.50 = \text{Rs. } 24.38 \text{ Adverse.}$

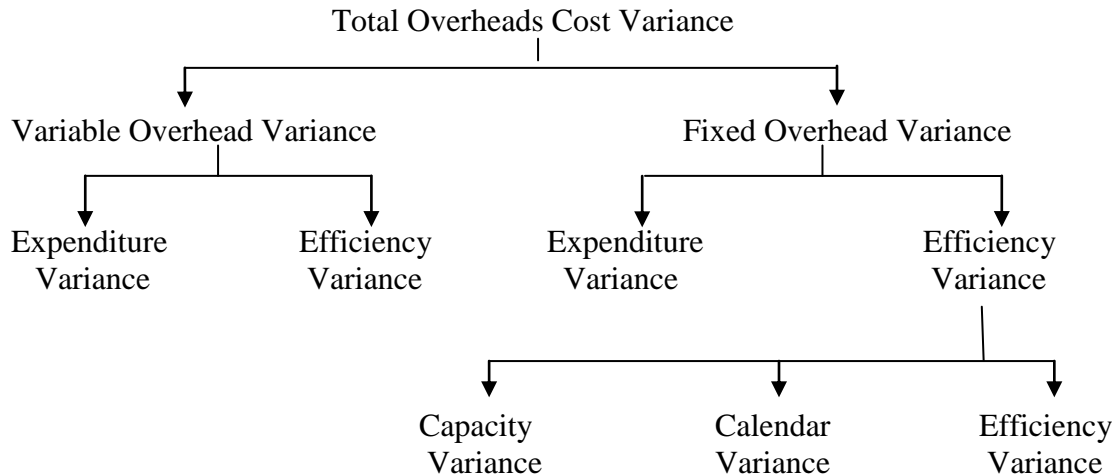
3. OVERHEAD VARIANCES

Overhead is the aggregate of indirect material cost, indirect wages (indirect labour cost) and indirect expenses. Thus, overhead costs are indirect costs and are important for the management for the purposes of cost control. Under cost accounting, overhead costs are absorbed by cost units on some suitable basis. Under standard costing, overhead rates are predetermined in terms of either labour hours (per hour) or production units (per unit of output). The formula for the calculation of overhead cost variance is given below:

Overhead Cost Variance = Actual Output x Standard Overhead Rate per unit Actual Overhead Cost
 Or
 = Standard Hours for Actual Output x Standard Overhead Rate per hour Actual Overhead Cost

An analytical study of the behaviour of overheads in relation to changes in volume of output reveals that there are some items of cost which tend to vary directly with the volume of Output

whereas, there are others which remain unaffected by variations in the volume of output achieved or labour hours spent. The former costs represent the variable overhead and the latter fixed overheads. Therefore, overhead cost variances can be classified as:



(i) Variable Overhead Variance: Variable overheads vary directly with the volume of output and hence, the standard variable overheads vary directly with the volume of output and hence, the standard variable overhead rate remains uniform. Therefore, computation of variable overhead variance, also known as variable overhead cost variance parallels the material and labour cost variances. Thus, variable overhead cost variance (VOCV) is the difference between the standard variable overhead cost for actual output and the actual variable overhead cost. It can be calculated as follows:

$$\text{VOCV} = (\text{Actual Output} \times \text{Standard Variable Overhead Rate per unit}) - \text{Actual Variable Overheads}$$

OR

$$= (\text{Standard Hours for Actual Output} \times \text{Standard Variable Overhead Rate per hour}) - \text{Actual Variable Overheads.}$$

In case information relating to standard hours allowed, for actual output and the actual time (hours) taken is available, variable overhead cost variance can be further analysed into:

- (a) Variable Overhead Expenditure or Spending Variance, and
- (b) Variable Overhead Efficiency Variance.

(a) Variable Overhead Expenditure or Spending Variance: It is the difference between the standard variable overheads for the actual hours and the actual variable overheads incurred and can be calculated as:

$$\begin{aligned} \text{Variable Overhead Expenditure Variance} &= (\text{Actual Hours} \times \text{Standard Variable} \\ &\quad \text{Overhead Rate per hour}) - \text{Actual Variable Overhead} \\ \text{OR} \\ \text{VOEV} &= \text{Actual Hours} (\text{Standard Variable Overhead Rate} - \text{Actual Variable} \\ &\quad \text{Overhead Rate}) \end{aligned}$$

(b) Variable Overhead Efficiency Variance. It represents the difference between the standard hours allowed for actual production and the actual hours taken multiplied with the standard variable overhead rate. Symbolically:

$$\text{Variable Overhead Efficiency Variance} = \text{Standard Variable Overhead Rate (Standard Hours)} - \text{Actual Hours for Actual Output.}$$

Illustration 9. Calculate variable overhead variances from the following data:

Budgeted Production for January, 1996	3000 units
Budgeted Variable Overhead	Rs. 15,000
Standard Time for One Unit	2 hours
Actual Production for January, 1996	2,500 units
Actual Hours Worked	4500 hours
Actual Variable Overhead	Rs. 13,500.

Solution:

1. Variable Overhead Cost Variance (VOCV)

$$\begin{aligned} &= \text{Actual Output} \times \text{Standard Variable Overhead Rate} - \text{Actual Variable Overhead} \\ &= \text{Rs. } (2500 \times 5) - 13500 \\ &= \text{Rs. } 1000 \text{ (Adverse)} \\ &(\text{Standard Variable Overhead Rate} = 15000/3000 = \text{Rs. } 5 \text{ per unit}). \end{aligned}$$

2. Variable Overhead Expenditure or Spending Variance (VOSV)

$$\begin{aligned} &= (\text{Actual Hours} \times \text{Standard Variable Overhead Rate}) - \text{Actual Variable Overhead} \\ &= \text{Rs. } (4500 \times 2.50) - 13500 \\ &= \text{Rs. } 11250 - 13500 = \text{Rs. } 2250 \text{ (Adverse)} \end{aligned}$$

3. Variable Overhead Efficiency Variance (VOEV)

$$\begin{aligned} &= \text{Standard Variable Overhead Rate (Standard Hours for Actual Output} - \text{Actual Hours)} \\ &= \text{Rs. } 2.50 (5000 - 4500) \\ &= \text{Rs. } 1250 \text{ (Favourable)} \end{aligned}$$

Verification:

$$\text{VOCV} = \text{VOSV} + \text{VOEV}$$

$$-1000 = -2250 + 1250$$

$$\text{or } -1000 = -1000$$

(ii) FIXED OVERHEADS VARIANCE

This variance is calculated as: Actual Output x Standard Fixed Overheads Rate– Actual Fixed Overheads. (The standard fixed overhead rate is calculated by dividing budgeted fixed overheads by standard output specified). It may be divided into expenditure and volume variances.

(a) Expenditure Variance = Budgeted Fixed Overheads – Actual fixed Overheads

(b) Volume Variance:

This variance shows a variation in overhead recovery due to budgeted production being more or less than the actual production. When actual production is more than the standard production, it will show an over-recovery of fixed overheads and the variance will be favourable. On the other hand, if actual production is less than the standard production it will show an under recovery and the variance will be unfavourable. Volume variance may arise due to change in capacity, variation in efficiency or change in budgeted and actual number of working days. Volume variance is calculated as:

$$\text{Actual Output x Standard Rate} - \text{Budgeted Fixed Overheads}$$

Volume variance is sub-divided into following variances:

(i) Capacity Variance: It is that part of volume variance which arises due to overutilization or under-utilization of plant and equipment. The working in the factory is more or less than the standard capacity. This variance arises due to idle time caused by strikes, power failure, and non-supply of materials, break down of machinery, absenteeism etc.

Capacity variance is calculated as:

$$\text{Standard Rate (Revised Budgeted Units} - \text{Budgeted Units) or, Standard Rate (Revised Budgeted Hrs- Budget Hrs).$$

(ii) Calendar Variance: This variance arises due to the difference between actual number of days and the budgeted days. It may arise due to more public holidays announced than

anticipated or working for more days because of change in holidays schedule, etc. If actual working days are more than budgeted, the variance will be favourable and it will be unfavourable if actual working days are less than the budgeted number of days Calendar variance can be expressed as:

Decrease or Increase in number of units produced due to the difference of budgeted and actual days x Standard Rate per unit.

(iii) Efficiency Variance: This is that portion of the volume variance which arises due to increased or reduced output because of more or less efficiency than expected. It signifies deviation of standard quantity from the actual quantity produced. This variance is related to the efficiency variance of labour.

Efficiency variance is calculated as:

Standard Rate (Actual Quantity – Standard Quantity) or, Standard Rate per hour (Standard Hours Produced – Actual Hours).

If Actual quantity is more than the budgeted quantity, the variance will be favourable and it will be vice versa if actual quantity is less than the budgeted quantity.

Illustration 10. From the following information calculate various overhead variances:

	Budget	Actual
Output in Units	12000	14000
No.of Working days	20	22
Fixed Overheads	36000	49000
Variable Overheads	24000	35000

There was an increase of 5% in capacity.

Solution:

Standard Fixed Overheads Rate = $36000/12000 = \text{Rs. } 3$
 Standard Variable Overheads Rate = $24000/12000 = \text{Rs. } 2$

(i) Total Overheads Cost Variance = Actual Output x Standard Rate – Actual Overheads
 = $14,000 \times (3 + 2) - (49,000 + 35,000)$
 = $70,000 - 84,000 = \text{Rs. } 14,000$ Adverse.

(ii) Variable Overheads Variance
 = Actual output x Standard Variable Overheads Rate – Actual Variable Overheads
 = $14,000 \times 2 - 35,000 = 28,000 - 35,000 = \text{Rs. } 7,000$ Adverse.

(iii) Fixed Overheads Variance

$$\begin{aligned} &= \text{Actual Output} \times \text{Standard Fixed Overheads Rate} - \text{Actual Standard Overheads} \\ &= 14,000 \times 3 - 49,000 \\ &= 42,000 - 49,000 = \text{Rs. 7,000 Adverse.} \end{aligned}$$

(iv) Expenditure Variance

$$\begin{aligned} &= \text{Budgeted Fixed Overheads} - \text{Actual Fixed Overheads} \\ &= 36,000 - 49,000 = \text{Rs. 13,000 Adverse.} \end{aligned}$$

(v) Volume Variance

$$\begin{aligned} &= \text{Actual Output} \times \text{Standard Rate} - \text{Budgeted Fixed Overheads} \\ &= 14,000 \times 3 - 36,000 \\ &= 42,000 - 36,000 = \text{Rs. 6,000 Favourable.} \end{aligned}$$

(vi) Capacity Variance

$$\begin{aligned} &= \text{Standard Rate} (\text{Revised Budgeted Units} - \text{Budgeted Units}) \\ &= 3 (12,600 - 12,000) \\ &= 3 (600) = \text{Rs. 1,800 Favourable.} \\ &(\text{Revised Budgeted Units} = 12,000 + 12,000 \times 5/100 = 12,600) \end{aligned}$$

(vii) Calendar Variance:

Change in Number of units by change in actual and standard number of days x Standard Rate.

There is an increase of 2 working days than budgeted.

Increase in units in 2 days = $12600/20 \times 2 = 1,260$ units

Calendar Variance = $1,260 \times 3 = \text{Rs. 3,780 Favourable.}$

(viii) Efficiency Variance = Standard Rate (Actual Quantity – Standard Quantity)

$$\text{Standard Quantity} = 12,000$$

$$\text{Increase in production due to change in capacity} = 600$$

$$\text{Increase in production due to increase in working days} = \underline{1,260}$$

$$\text{Standard Quantity (Revised)} = \underline{13,860}$$

$$3 (14,000 - 13,860) = \text{Rs. 420 Favourable.}$$

4. SALES VARIANCES

A sales value variance exposes the difference between actual sales and budgeted sales. It may arise due to change in sales price, sales volume or sales mix. It is important to study profit variances. It may be classified as follows:

1. Sales Value Variance: A Sales Value Variance is the difference between budgeted sales and actual sales. It is calculated as:

$$\text{Sales Value Variance} = \text{Actual Value of Sales} - \text{Budgeted Value of Sales.}$$

If actual sales are more than the budgeted sales, the variance will be favourable and on the other hand, the variance will be unfavourable if actual sales are less than the budgeted sales.

2. Sales Price Variance: A sales price variance arises due to the difference between the standard price specified and the actual price charged. It is calculated as:

$$\text{Sales Price Variance} = \text{Actual Quantity (Actual Price} - \text{Standard Price)}.$$

3. Sales Volume Variance: It is the difference between actual quantity of sales and budgeted quantity of sales. It is calculated as:

$$\text{Sales Volume Variance} = \text{Standard Price (Actual Quantity of Sales} - \text{Std. Quantity of Sales)}$$

4. Sales Mix Variance. It is the difference of standard value of revised mix and standard value of actual mix.

Illustration 11. The budget and actual sales for a period in respect of two products are as follows:

Product	Budgeted			Actual		
	Quantity (units)	Price Rs.	Value Rs.	Quantity (units)	Price Rs.	Value Rs.
X	600	3	1800	800	4	3200
Y	800	4	3200	600	3	1800

Calculate Sales Variances.

Solution:

(i) **Sales Value Variance** = Actual Value of Sales – Standard Value of Sales

$$\text{Total Actual Value: } 3,200 + 1,800 = \text{Rs. } 5,000$$

$$\text{Total Standard Value: } 1,800 + 3,200 = \text{Rs. } 5,000$$

$$\text{Sales Value Variance} = 5,000 - 5,000 = \text{Nil}$$

(ii) **Sales Price Variance** = Actual Quantity Sold (Actual Price – Standard Price)

$$\text{Product A } 800 (4 - 3) = \text{Rs. } 800 \text{ Favourable}$$

$$\text{Product B } 600 (3 - 4) = \text{Rs. } 600 \text{ Unfavourable}$$

$$\text{Sales Price Variance} = \text{Rs. } 200 \text{ Favourable}$$

(iii) **Sales Volume Variance** = Standard Price (Actual Units – Standard Units)

$$\text{Product A } 3 (800 - 600) = \text{Rs. } 600 \text{ Favourable}$$

$$\text{Product B } 4 (600 - 800) = \text{Rs. } 800 \text{ Unfavourable}$$

$$\text{Sales Volume Variance} = \text{Rs. } 200 \text{ Unfavourable.}$$

Verification:

$$\text{Sales Value Variance} = \text{Sales Price Variance} + \text{Sales Volume Variance}$$

$$0 = 200 + (-200)$$

Illustration 12. The information regarding budgeted and actual sales of two products has been given as follows:

Product	Budgeted		Actual	
	Quantity (units)	Sales Price Rs.	Quantity (units)	Sales Price Rs.
A	800	10	1000	12
B	1200	6	1400	5

Find out variances.

Solution:

(i) Sales Value Variance = Actual Value of Sales – Standard Value of Sales

Actual Value of Sales:

Product A	1,000 x 12	= 12,000
Product B	1,400 x 5	= <u>7,000</u>
Total Rs.		<u>19,000</u>

Standard Value of Sales:

Product A	800 x 10	= 8,000
Product B	1,200 x 6	= <u>7,200</u>
Total Rs.		<u>15,200</u>

Sales Value Variance = 19,000 – 15,200 = Rs. 3,800 Favourable.

(ii) Sales Price Variance = Actual Quantity Sold (Actual Price – Standard Price)

Product A	= 1,000 (12 – 10)
	= 1,000 (2)
	= Rs. 2,000 Favourable

Product B	= 1,400 (5 – 6)
	= 1,400 (–1)
	= Rs. 1400 Unfavourable

Sales Price Variance = Rs. 600 Favourable

(iii) Sales Volume Variance = Standard Price (Actual Units Sold – Standard Units)

Product A	= 10 (1,000 – 800)
	= 10(200)
	= Rs. 2,000 Favourable

Product B	= 6 (1,400 – 1,200)
	= 6 (200)
	= Rs. 1200 Favourable

Sales Volume Variance = Rs. 3,200 Favourable.

(iv) Sales Mix Variance: There is a difference between standard quantity and actual quantity, so the standard will be revised in proportion to actual quantity of sales.

Revised Standard:

Product A = $800/2000 \times 2,400 = 960$ Units .

Product B = $1200/2000 \times 2,400 = 1,440$ Units

Sales Mix Variance = Standard Value of Actual Mix – Standard Value of Revised Standard Mix

Standard Value of Actual Mix:	Rs.
Product A = 10 x 1,000	= 10,000
Product B = 6 x 1,400	= <u>8,400</u>
Total	= <u>18,400</u>

Standard Value of Revised Standard Mix:	
Product A = 10 x 960	= Rs. 9,600
Product B = 6 x 1,440	= Rs. 8,640
Total	=Rs.18,240
Sales Mix Variance	= 18,400 – 18,240 = Rs. 160 Favourable.

Verification:

Sales Value Variance	= Sales Price Variance + Sales Volume Variance
Rs. 3,800 (Fav.)	= Rs. 600 (Fav.) + Rs. 3,200 (Fav.)
Rs. 3,800 (Fav.)	= Rs. 3,800 (Fav.)

PROFIT AND TURNOVER METHODS OF CALCULATING SALES VARIANCES

A businessman may be interested more in knowing variations in profits and sales. The profit and turnover methods of calculating sales variances will be useful for this purpose. The variances are analysed as follows:

(a) Total Sales Margin Variance: Actual Profit – Budgeted Profit.

Actual Profit = Actual quantity sold x Actual profit per unit.

Budgeted Profit = Budgeted quantity of Sales x Budgeted profit per unit.

(b) Sales Margin Variance due to Selling Price. This variance arises due to the difference between actual selling price and standard selling price. This variance is calculated as :

Actual Quantity (Actual Price – Standard Price)

(c) **Sales Margin Variance due to Volume.** This Variance arises due to the difference between actual quantity of sales and budgeted quantity of sales. It is calculated as:

Standard Profit per Unit (Actual Quantity of Sales – Standard Quantity of Sales).

(d) **Sale Value Variance** = Budgeted sales value-Actual sales value.

(e) **Sales Volume Variance** = Standard selling price per Unit (Actual Quantity of Sales – Standard Quantity of Sales).

(f) **Selling Price Variance** = Actual Quantity (Budgeted selling Price – ActualSelling Price).

(g) **Sales Quantity Variance** = Budgeted sale value-Revised standard sales value.
 Budgeted sale value = Budgeted quantity x budgeted selling price per Unit
 Standard sales value = Actual Quantity x budgeted selling price per Unit
 Actual sales value = Actual Quantity x Actual selling price per Unit
 Revised Standard sales value= Total Standard sales value x budgeted proportion.

(h) **Sales Mix Variance**= Revised Standard sales value -Standard sales value

Example 12. S. M. Ltd., has given the following budgeted and actual sales figures:

Product	Budgeted			Actual		
	Quantity (units)	Price Rs.	Value Rs.	Quantity (units)	Price Rs.	Value Rs.
A	500	60	30000	600	65	39000
B	700	40	28000	650	38	24700

The cost per unit of product A and B was Rs. 55 and Rs. 32 respectively. Compute variances to explain difference between budgeted and actual profit.

Solution:

(i) **Total Sales Margin Variance** = Actual Profit– Budgeted Profit

Or Actual Quantity x Actual Profit per Unit – Budgeted Quantity x Budgeted Profit per Unit

Actual Profit per Unit

Actual Sales Price – Actual Cost

Product A = 65 – 55 = Rs. 10

Product B = 38 – 32 = Rs. 6

Budgeted Profit per Unit = Budgeted Sale Price – Actual Cost

Product A = 60 – 55 = Rs. 5

Product B = 40– 32 = Rs. 8

Actual Profit

Product A	= 600 x 10 = Rs. 6,000
Product B	= 650 x 6 = <u>Rs. 3,900</u>
	Rs. <u>9,900</u>
Budgeted Profit	
Product A:	500 x 5 = Rs. 2,500
Product B :	700 x 8 = <u>Rs. 5,600</u>
	Rs. <u>8,100</u>
Sales Margin Variance	= 9,900– 8,100 = Rs. 1,800 Favourable

(ii) Sales Margin Variance due to Selling Price:

Actual Quantity (Actual Price– Standard Price)

Product A = 600 (65-60) = Rs. 3,000 Favourable

Product B = 650 (38–40) = Rs. 1,300 Unfavourable

Sales Margin Variance due to Selling Price= Rs. 1,700 Favourable

(iii) Sales Margin Variance due to Volume:

Standard Profit per unit (Actual Quantity– Standard Quantity)

Product A: 5(600–500) = Rs. 500 Favourable

Product B: 8(650–700) = Rs. 400 Unfavourable

Sales Margin Variance due to Volume = Rs. 100 Favourable

(iv) Sale Value Variance = Budgeted sales value-Actual sales value.
= (500 x 60+700 x 40)- (600 x 65+650 x 38) = 5700 (F)

(v) Sales Volume Variance= Standard Selling Price Per Unit (Actual Quantity of Sales – Std.Quantity of Sales)

Product	Budgeted Qty.	Actual Qty	Difference	Budgeted Price Rs.	Variance Rs.
A	500	600	100 (F)	60	6000 (F)
B	700	650	50 (A)	40	2000 (A)
					4000 (A)

(vi) Selling Price Variance = Actual Quantity (Budgeted selling Price – Actual Selling Price).

Product	Budgeted Price Rs..	Actual Price Rs.	Difference	Actual Qty.	Variance Rs.
A	60	65	5 (F)	600	3000 (F)
B	40	38	2 (A)	650	1300 (A)
					1700 (F)

(vii) Sales Quantity Variance = Budgeted sale value-Revised standard sales value.

Product	BSV Rs..	AQ.	BP Rs.	SSV of AQ.	Revised SSV of AQ	Variance Rs.
A	30000	600	60	36000	$\frac{62000 \times 30000}{58000}$ = 32069	2069 (F)
B	28000	650	40	26000	$\frac{62000 \times 28000}{58000}$ =29931	1931 (F)
						4000 (F)

(viii) Sales Mix Variance = Revised Standard sales value -Standard sales value

Product	AQ.	BP Rs.	SSV of AQ.	Revised SSV of AQ	Variance Rs.
A	600	60	36000	$\frac{62000 \times 30000}{58000}$ = 32069	3991 (A)
B	650	40	26000	$\frac{62000 \times 28000}{58000}$ =29931	3991 (F)
					Nil

ACCOUNTING TREATMENT OF VARIANCES

When the financial statements are prepared they contain actual cost figures there is no variances. But, at the time of implementation of standard costing system, the accounting records contain both standard costs and actual costs, by which we calculate variances. Then the next question arises that how to deal with the variances at the end of the accounting period? Which method should be followed for treating them? The accountants suggest a number of methods for this purpose. Some of them are discussed, which may be adopted for the accounting treatment of variances:

1. Transfer to Profit and Loss Account. Under this method all variances are transferred to profit and loss account. In this method, the stock of finished goods, work-in-progress and cost of sales are shown at standard cost. It is considered that variances arise due to insufficiency or waste, so these should not become a part of normal cost of production.

2. Allocation of Variances to Finished Stock. In this method, variances are apportioned to finished goods, work-in-progress and cost of sales either on the basis of value of closing

balances or on the basis of units. This method has the effect of recording actual costs in the financial statements. The adjustment of variances is made only in the general ledger and not in subsidiary books. The distribution of variances is not made to products. The variances not being actual losses should not be taken to profit and loss account.

3. Transfer of Variances to the Reserve Account. In this method cost variances are taken to next accounting period as deferred items. The variances whether favourable or adverse are transferred to a reserve account and are offset against future fluctuations. If the variances are favourable then they are taken to the liability side of the balance sheet and they are set off against adverse variances in future. On the other hand, if variances are adverse then these are taken to the balance sheet as a deferred charge and are written off against future favourable variances. This method is not in common use but it may be useful in cases where seasonal fluctuations occur so that favourable and adverse variances may be written off in the course of a business cycle concerning more than one accounting period.

UNIT III

MARGINAL COSTING

Marginal Cost

Meaning

Marginal Cost is nothing but Variable Cost, comprising prime cost and variable overheads. Cost which varies in direct proportion to any change in the volume of output is known as Marginal Cost.

Definition

MC indicates the rate at which the total cost of a product changes as the production increases by one unit. However, because fixed costs do not change based on the number of products produced, the marginal cost is influenced only by the variations in the variable costs.

Marginal Cost is particularly important in the business decision-making process. Management has to make decisions on where to best allocate resources in the production process. For instance, when the management needs to decide whether to increase production or not, they have to compare the marginal cost with the marginal revenue that will be realized by an additional unit of output.

Marginal Costing

Meaning

Marginal Costing is a technique where by only the variable costs are considered while computing the cost of the product. The fixed cost are written off against profits in the period in which they arise.

Marginal Costing is not a system of costing such as process costing, job costing, operating costing, etc. but a technique which is concerned with the changes in costs and profits resulting from changes in the volume of output. Marginal costing is also known as 'variable costing'

Definitions

The Chartered Institute of Management Accountant (CIMA), London, defined marginal costing 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".

The Institute of Cost and Management Accountants, London, has defined Marginal Costing as “the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs”.

According to Batty, “Marginal costing is a technique of cost accounting which pays special attention to the behavior of cost with changes in the volume of output”.

Assumptions of Marginal Costing

The technique of Marginal Costing is based upon the following assumptions:

1. All elements of cost—production, administration and selling and distribution—can be segregated into fixed and variable components.
2. Variable cost remains constant per unit of output irrespective of the level of output and thus fluctuates directly in proportion to changes in the volume of output.
3. The selling price per unit remains unchanged or constant at all levels of activity.
4. Fixed costs remain unchanged or constant for the entire volume of production.
5. The volume of production or output is the only factor which influences the costs.

Features of Marginal Costing

The following are the main features of Marginal Costing:

1. This technique is used to ascertain the marginal cost and to know the impact of variable costs on the volume of output.
2. All costs are classified on the basis of variability into fixed cost and variable cost. Semi-variable costs are segregated into fixed and variable costs.
3. Marginal (i.e., variable) costs are treated as the cost of the product or service. Fixed costs are charged to Costing Profit and Loss Account of the period in which they are incurred.
4. Stock of finished goods and work-in-progress are valued on the basis of marginal costs.
5. Selling price is based on marginal cost plus contribution.
6. Profit is calculated in the usual manner. When marginal cost is deducted from sales it gives rise to contribution. When fixed cost is deducted from contribution it results in profit.
7. Break-even analysis and cost-volume profit analysis are integral parts of this technique.

8. The relative profitability of products or departments is based on the contribution made available by each department or product.

Characteristics of Marginal Costing

The main characteristics of marginal costing are as follows:

1. It is a technique of analysis and presentation of costs which help management in taking many managerial decisions and is not an independent system of costing such as process costing or job costing.
2. All elements of cost—production, administration and selling and distribution are classified into variable and fixed components. Even semi-variable costs are analysed into fixed and variable.
3. The variable costs (marginal costs) are regarded as the costs of the products.
4. Fixed costs are treated as period costs and are charged to profit and loss account for the period for which they are incurred.
5. The stocks of finished goods and work-in-process are valued at marginal costs only.
6. Prices are determined on the basis of marginal cost by adding ‘contribution’ which is the excess of sales or selling price over marginal cost of sales.

Advantages of Marginal Costing

The following are the important advantages of marginal costing:

1. The technique of marginal costing is very simple to operate and easy to understand. Since, fixed costs are kept outside the unit cost; the cost statements prepared on the basis of marginal cost are much less complicated.
2. It does away with the need for allocation, apportionment and absorption of fixed overheads and hence removes the complexities of under-absorption of overheads.
3. Marginal cost remains the same per unit of output irrespective of the level of activity. It is constant in nature and helps the management in production planning.

4. It prevents the carry forward of current year's fixed overheads through valuation of closing stocks. Since fixed costs are not considered in valuation of closing stocks, there is no possibility of factitious profits by over-valuing stocks.
5. It facilitates the calculation of various important factors, viz., break-even point, expectations of profits at different levels of production, sales necessary to earn a predetermined target of profit, effect on profit due to changes of raw materials prices, increased wages, change in sales mixture, etc.
6. It is a valuable aid to management for decision-making and fixation of selling prices, selection of a profitable product/sales mix, make or buy decision, problem of key or limiting factor, determination of the optimum level of activity, close or shut down decisions, evaluation of performance and capital investment decisions, etc.
7. It facilitates the study of relative profitability of different product lines, departments, production facilities, sales divisions, etc.
8. It is complimentary to standard costing and budgetary control and can be used along with them to yield better results.
9. Since fixed costs are not controllable and it is only variable or marginal cost that is controllable, marginal costing, by dividing costs into controllable and non-controllable, help in cost control.
10. It helps the management in profit planning by making a study of relationship between cost, volume and profits. Further, break-even charts and profit graphs make the whole problem easily understandable even to a layman.
11. It is very useful in management reporting, marginal costing facilitates 'management by exception' by focusing attention of the management towards more important areas than to waste time on problems which do not require urgent attention of the higher managements.

Limitations of Marginal Costing:

In spite of so many advantages, the technique of marginal costing suffers from the following limitations:

1. The technique of marginal costing is based upon a number of assumptions which may not hold well under all circumstances.

2. All costs are not divisible into fixed and variable. There are certain costs which are semi-variable in nature; it is very difficult and arbitrary to classify these costs into fixed and variable elements.
3. Variable costs do not always remain constant and do not always vary in direct proportion to volume of output because of the laws of diminishing and increasing returns.
4. Selling prices do not remain constant forever and for all levels of output due to competition, discounts for bulk orders, changes in the general price level, etc.
5. Fixed costs do not remain constant after a certain level of activity. Further, marginal costing ignores the fact that fixed costs are also controllable.
6. The exclusion of fixed costs from the stocks of finished goods and work-in-progress is illogical since fixed costs are also incurred on the manufacture of products. Stocks valued on marginal costing are undervalued and the profit and loss account cannot reveal true profits. Similarly, as the stock is undervalued, the balance sheet does not give a true picture.
7. Although the technique of marginal costing overcomes the problem of under or over-absorption of fixed overheads, the problem still exists in regard to under or over-absorption of variable overheads.
8. Marginal costing completely ignores the 'time factor'. Thus, if two jobs give equal contribution but one takes longer time to complete, the one which takes longer time should be regarded as costlier than the other. But this fact is ignored altogether under marginal costing.
9. The technique of marginal costing cannot be applied in contract or ship-building industry because in such cases, normally the value of work-in-progress is very high and the exclusion of fixed overheads may result into losses every year and huge profit in the year of completion of the job.
10. Cost control can be better be achieved with the help of other techniques, viz., standard costing and budgetary control than by marginal costing technique.
11. Fixation of selling prices in the long run cannot be done without considering fixed costs. Thus, pricing decisions cannot be based on marginal cost alone.
12. In the present days of automation, the proportion of fixed costs in relation to variable costs is very high and hence managerial decisions based upon only the marginal cost ignoring equally important element of fixed cost may not be correct.

Difference between Marginal and Absorption Costing

The main difference between Marginal (Variable) Costing and [Absorption Costing](#) techniques are given below

S. No	Marginal Costing (Variable Costing)	Absorption Costing
1	Marginal cost is often used in decision making process.	Absorption costing is used for external reporting.
2	Inventories are valued at variable cost of production.	Inventories are valued at total production cost so their values are higher in absorption costing than in marginal costing.
3	Use of marginal costing for inventory valuation is not allowed under accounting standards.	Absorption costing can be used for inventory valuation under International Accounting Standards 2.
4	Marginal costing does not consider fixed production overheads for product costing so the problem of arbitrary apportionment of production overheads does not arise.	In absorption costing fixed factory overheads are arbitrarily apportioned among the cost centers which often results in over or under absorption of overheads .
5	In marginal costing fixed costs are fully charged against the relevant year profit.	In absorption costing inventories are valued at total production cost so cost of sales in a period includes same fixed overheads incurred in the previous period (i.e., in opening inventory) and will exclude some fixed overheads incurred in current period but carried forward in closing inventory as a charge against profits of future periods.

Techniques of application of Marginal Costing

The following points highlight the techniques of application of marginal costing.

1. Profit Planning

Profit planning is the planning of future operations to attain maximum profit. Under the technique of marginal costing, the contribution ratio, i.e., the ratio of marginal contribution to

sales, indicates the relative profitability of the different products of the business whenever there is any change in volume of sales, marginal cost per unit, total fixed costs, selling price, and sales-mix etc. Hence marginal costing is an useful tool in planning profits as it ensures sufficient return on capital employed.

2. Pricing of Products

Sometimes pricing decisions have to be taken to cater to a recessionary market or to utilise spare capacity where only marginal cost is recovered. For export market, sometimes full cost is loaded to the sale price to remain competitive. Sometimes special prices are to be offered with expansion in mind, fixation of price below cost can be made on a short-term basis.

It may be advisable to fix prices equal to or below marginal cost under the following cases:

- i. To maintain production and employees occupied.
- ii. To keep plant in use in readiness to go 'full team ahead'.
- iii. To prevent loss of future orders.
- iv. To dispose of perishable product.
- v. To eliminate competition of nearer rivals.
- vi. To popularize a new product.
- vii. To keep the sales of a joined product which make a considerable amount of profit.
- viii. Where prices have fallen considerably or a loss has already been made.

3. Introduction of a Product

When a new product is introduced without incurring any additional fixed cost the additional contribution helps to increase profitability.

4. Selection of Product Mix

The most-profitable product mix can be determined by applying marginal costing technique. Fixed cost remaining constant, the most profitable product-mix is determined on the basis of contribution only. That product-mix which gives maximum contribution is to be considered as best products mix.

5. Problem of Key/Limiting Factor

A key factor is a factor which limits the volume of production and profit of business. It may be scarcity of any factor of production such as material labour, capital, plant capacity etc. Usually, when there is no key or limiting factor, the product is selected on the basis of highest P/V ratio of the product. But with key factor the selection of product will be on the basis of contribution per unit of limiting/key factor of production.

6. Alternative Method of Manufacture

When alternative use of production facilities or alternative methods of manufacturing a product are being considered, the alternative which gives the maximum marginal contribution is selected.

7. Make-or-Buy Decision

A company may have idle capacity which may be utilised for making a component or a product, instead of buying them from outside sources. In taking such 'make-or-buy' decision, a comparison should be made between the variable (or marginal) cost of manufacture of the product and the supplier's price for it.

It will be advantageous to manufacture than to purchase an item if the variable cost is lower than the purchase price provided that the decision to manufacture does not result in substantial increase in fixed costs and that the existing manufacturing facilities cannot be otherwise utilised more profitably.

8. Accepting Additional Orders and Exploring Foreign Market

Sometimes goods are sold at a price above total cost (i.e., at a profit) and still there remains some spare or unused capacity. In such circumstances, extra order may be accepted or goods may be sold in a foreign market at a price above marginal cost but below total cost.

This will add to the profits as, after full recovery of the fixed cost, any contribution—either from additional orders or from selling in the foreign market—will make extra profit. In this way the spare plant capacity can be used to earn additional profit.

9. Increasing or Decreasing Departments or Products

Sometimes general fixed costs are apportioned to departments or products for ascertaining total cost but it may give misleading results. However, specific fixed costs traceable to departments or products should be deducted from individual contribution to get the Net contribution. If the net contribution of a department or product is positive, then it should not be discarded.

10. Closing Down/Suspending Activities

While taking a decision in this line, the effect of fixed cost and contribution will have to be analysed. If the contribution is more than the difference in fixed costs by working at normal operations, and when the plant or product is closed down or suspended, then it is desirable to continue operation.

COST VOLUME PROFIT ANALYSIS

Cost Volume Profit Analysis (CVP) is a systematic method of examining the relationship between changes in the volume of output and changes in total sales revenue, expenses (costs) and net profit. It is the analysis of the relationship existing amongst costs, sales revenues, output and the resultant profit.

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

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

Objectives of Cost Volume Profit Analysis

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

1. Cost volume is a powerful tool for decision making.
2. It makes use of the principles of Marginal Costing.
3. It enables the management to establish what will happen to the financial results if a specified level of activity or volume fluctuates.

4. It helps in the determination of break-even point and the level of output required to earn a desired profit.
5. The PV ratio serves as a measure of efficiency of each product, factory, sales area etc. and thus helps the management to choose a most profitable line of business.
6. It helps us to forecast the level of sales required to maintain a given amount of profit at different levels of prices.

Marginal Cost Equation

The following are the main important equations of Marginal Cost :

$$\text{Sales} = \text{Variable Cost} + \text{Fixed Expenses} \pm \text{Profit / Loss}$$

(or)

$$\text{Sales} - \text{Variable Cost} = \text{Fixed Cost} \pm \text{Profit or Loss}$$

(or)

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

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

The above equation can be expressed in the following statement:

	Rs.	Rs.
Sales		xxx
Less: Variable / Marginal Cost	xxx	
Direct Materials	xxx	
Direct Wages	xxx	
Variable Overheads	xxx	xxx
Contribution		xxx
Less: Fixed Cost		xxx
Profit / Loss		xxx

Contribution

The term Contribution refers to the difference between Sales and Marginal Cost of Sales. It also termed as "Gross Margin." Contribution enables to meet fixed costs and profit. Thus, contribution will first covered fixed cost and then the balance amount is added to Net profit. Contribution can be represented as:

$$\text{Contribution} = \text{Sales} - \text{Marginal Cost} \quad C = S - M.C$$

$$\text{Contribution} = \text{Sales} - \text{Variable Cost} \quad C = S - V.C$$

$$\text{Contribution} = \text{Fixed Expenses} + \text{Profit} \quad C = F.C + P$$

$$\text{Contribution} - \text{Fixed Expenses} = \text{Profit} \quad C - F.C = P$$

$$\text{Sales} - \text{Variable Cost} = \text{Fixed Cost} + \text{Profit} \quad S - V.C = F.C + P$$

Where:

C = Contribution

S = Sales

F :: Fixed Cost

P = Profit

V = Variable Cost

Profit Volume Ratio (P / V Ratio)

Profit Volume Ratio is also called as Contribution Sales Ratio (or) Marginal Income Ratio (or) Variable Profit Ratio. It is used to measure the relationship of contribution, the relative profitability of different products, processes or departments.

The following formula for calculating the P / V Ratio is given below:

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\text{P/V Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

Margin of Safety:

The term Margin of Safety refers to the excess of actual sales over the break-even sales. It is known as the Margin of Safety. Margin of safety can also be expressed as a percentage of sales. Margin of safety can be improved by:

1. Increasing the selling price
2. Reducing the variable cost
3. Selecting a product mix of larger PN ratio items
4. Reducing fixed costs
5. Increasing the output

Margin of Safety can be calculated by the following formula:

1. Margin of Safety = Total Sales - Break-Even Sales

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

$$3. \text{ Margin of Safety} = \frac{\text{Profit}}{\text{Contribution}} \times \text{Sales}$$

$$4. \text{ Profit} = \text{Margin of Safety} \times \text{P/V ratio}$$

5. Margin of Safety expressed as percentage:

$$\text{Margin of Safety} = \frac{\text{Margin of Safety}}{\text{Total Sales}} \times \text{Sales} \quad \text{OR}$$

$$= \frac{\text{Actual Sales} - \text{Break Even Sales}}{\text{Total Sales}} \times \text{Sales}$$

Key Factor / Limiting Factor

The main objective of any business is to maximize profits. Sometimes, it may happen that the firm may not be able to sell the products, manufactured by it. Sometimes it can sell all the products it manufactured but unable to earn a reasonable profit. This is because of some factors, which will limit it. These limiting factors are known as Key Factor. It is also known as Principal Factors or Critical Factors. It is defined as, “the factor which will limit the volume of production”. Key factor may arise due to shortage of raw materials, labour, plant capacity, capital, demand and so on. When there is no limiting factor, the production can be on the basis of the highest P/V Ratio. When limiting factors are in operation, the production can be on the basis of the highest contribution of the key factor. Thus the profitability can be measured by the following formula:

$$\text{Profitability} = \frac{\text{Contribution}}{\text{Key Factor}}$$

Break-Even Analysis

Break-Even Analysis is a widely used technique to study Cost-Volume-Profit relationship. In a narrow sense, Break-Even Analysis concerned with the break-even point and in a broad sense, it refers to a system of analysis which is used to determine the profit at any level of production. Break-Even Analysis is a logical extension of marginal costing. It establishes the

relationship of cost, volume and profit, so it is also designated as Cost-Volume Profit Analysis. CVP analysis includes the entire gamut profit planning, while break-even analysis is one of the techniques used in this process.

In order to understand the concept of Break-Even Analysis, the following terms are studied:

a. Break Even Point:

It is a point at which the total costs are exactly equal to total revenue. In this point there is no profit or no loss. At this point, the income of the business equals its expenditure. If sales go up beyond this point, the firm makes profit. If they come down, the loss is incurred. The formula is

$$\text{B.E.P. (in units)} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

$$\text{B.E.P. (in rupees)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

At break-even point the profit is zero. In case the volume of sales to be computed for desired / estimated profit. The formula is:

$$\text{Sales units for desired profit} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}}$$

$$\text{Sales value for desired profit} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}}$$

b. Margin of Safety:

The difference between the actual sales at break-even point is known as the margin of safety. In other words, sales over and above break-even sales are known as margin of safety. It indicates the soundness of the business. If the margin is large, it is a sign of soundness of the business and vice versa. Margin of safety can be improved by:

- i. Increase the sales / selling price without affecting the demand

- ii. Decrease the fixed and variable cost
- iii. Change the product mix which gives more P/V ratio
- iv. Unprofitable products may be substituted by profitable ones.

The formula is:

$$\text{Margin of Safety} = \frac{\text{Total Actual Sales} - \text{Break-Even Sales}}{\text{Profit}}$$

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

$$\text{Margin of Safety Ratio} = \frac{\text{Margin of Safety}}{\text{Total Sales}} \times 100$$

c. Angle of Incidence:

The angle is formed by intersecting the sales line and the total cost line at break-even point. It indicates the profit earning capacity of the firm. Large angle indicates a high rate of profit and vice versa. A wider angle of incidence and high margin of safety indicates most favourable situations.

Break Even Chart

It is the graphical representation of break-even point which shown the varying costs along with varying sales revenues. It indicates the break-even point and the estimated profit or loss at different levels of production.

According to Dr.Vance, “it is a graph showing the amounts of fixed variable costs and the sales revenue at different volumes of operation. It shown at what volume the firm first covers all costs with revenue of break-even.

According to CIMA, “ a chart which shown profit or loss at various levels of activities, the level at which neither profit nor loss is shown being termed the break-even point”.

Relationship between Angle of Incidence, Break-Even Sales and Margin of Safety Sales

- 1) When the Break-even sales are very low, with large angle of incidence, it indicates that the firm is enjoying business stability and in that case margin of safety sales will also be high.

- 2) When the break-even sales are low, but not very low with moderate angle of incidence, in that case though the business is stable, the profit earning rate is not very high as in the earlier case.
- 3) Contrary to the above when the break-even sales are high, the angle of incidence will be narrow with much lower margin of safety sales.

SOLVED PROBLEMS

Illustration: 1

From the following information, calculate the amount of profit using marginal cost technique:

Fixed cost	Rs. 3,00,000
Variable cost per unit	Rs. 5
Selling price per unit	Rs. 10
Output level	1,00,000 units

Solution:

Contribution	=	Selling Price - Marginal Cost
Contribution	=	(1,00,000 x 10) - (1,00,000 x 5)
	=	10,00,000 - 5,00,000
	=	Rs. 5,00,000
Contribution	=	Fixed Cost + Profit
Rs.5,00,000	=	3,00,000 + Profit
Profit	=	Contribution - Fixed Cost
Profit	=	Rs. 5,00,000 - Rs. 3,00,000
	=	Rs. 2,00,000

Illustration: 2

From the following information, calculate P/V Ratio

Marginal cost Rs.2400

Sales Rs.3000.

Solution:

$$P/V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\begin{aligned}
\text{Contribution} &= \text{Sales} - \text{Variable Cost} \\
&= 3000 - 2400 = 600 \\
&= \frac{600}{3000} \times 100 = 20\% \text{ P/V Ratio} = 20\%
\end{aligned}$$

Illustration: 3

From the following particulars find out break-even point:

Fixed Expenses Rs. 1,00,000

Selling price Per unit Rs. 20

Variable cost per unit Rs. 15

Solution

$$\begin{aligned}
\text{Break-Even Point in Units} &= \frac{\text{Fixed Cost}}{\text{Contribution per unit}} \\
\text{Contribution per unit} &= \text{Selling Price per unit} - \text{Variable Cost per unit} \\
&= \text{Rs. } 20 - \text{Rs. } 15 = \text{Rs. } 5 \\
\text{B E P (in units)} &= \frac{100000}{5} = 20000 \text{ Units} \\
\text{BE P in Sales} &= 20,000 \times \text{Rs. } 20 = \text{Rs. } 4,00,000
\end{aligned}$$

Illustration: 4

From the following information calculate :

(1) P / V Ratio

(2) Break-Even Point

(3) If the selling price is reduced to Rs. 80, calculate New Break-Even Point:

Total sales Rs. 5,00,000

Selling price per unit Rs. 100

Variable cost per unit Rs. 60

Fixed cost Rs. 1,20,000

Solution

$$\begin{aligned}
1) \text{ P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 \\
\text{Contribution} &= \text{Sales} - \text{Variable Cost} \\
\text{Total Sales} &= \text{Rs. } 5,00,000
\end{aligned}$$

$$\text{Selling Price per unit} = \text{Rs. } 100$$

$$\text{Sales in units} = \frac{500000}{100} \times 100 = 5000$$

$$\begin{aligned} \text{Contribution} &= \text{Rs. } 5,00,000 - (5000 \times 60) \\ &= \text{Rs. } 5,00,000 - \text{Rs. } 3,00,000 = \text{Rs. } 2,00,000 \end{aligned}$$

$$\text{P/V Ratio} = \frac{200000}{500000} \times 100 = 40\%$$

$$\begin{aligned} 2) \text{ B.E.P. (in Sales)} &= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{120000}{40/100} = \frac{120000}{40} \times 100 \\ &= \text{Rs. } 300000 \end{aligned}$$

3) If the Selling price is reduced to Rs. 80 :

$$\text{Sales in units} = \frac{500000}{100} \times 80 = \text{Rs. } 4,00,000$$

$$\text{Break-Even Point in Units} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

$$\begin{aligned} \text{Contribution} &= \text{Selling Price} - \text{Variable Cost} \\ &= 80 - 30 = 50 \end{aligned}$$

$$= \frac{120000}{50} = 4000 \text{ Units}$$

$$\text{Break-Even Point in Sales} = 4,000 \text{ units} \times \text{Rs. } 80 = \text{Rs. } 3,20,000$$

Illustration: 5

From the details find out

- P/V Ratio
- Break Even Point
- Margin of Safety

Solution

$$\text{a) P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$\text{Contribution} = \text{Sales} - \text{Variable Cost} = 100000 - 60000 = 40000$$

$$= \frac{40000}{100000} \times 100 = 40\%$$

b) B.E.P. = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{20000}{40\%} = \frac{20000}{40} \times 100 = \text{Rs.}50000$

c) Margin of Safety = Actual Sales – Sales at BEP
= 10000 – 50000 = Rs.50000 Or

Margin of Safety = $\frac{\text{Profit}}{\text{P/V Ratio}} = \frac{20000}{40\%} = \frac{20000}{40} \times 100 = \text{s.}50000$

Illustration: 6

The following are the data for the year 2004 of a company:

Variable Cost	Rs.6,00,000
Fixed Cost	Rs.3,00,000
Net Profit	Rs.1,00,000
Sales	Rs.10,00,000

You are required to calculate

- P/V Ratio
- B.E.P.
- Profit when sales amounted to Rs.12,00,000
- Sales required to earn a profit of Rs.2,00,000

Solution

Sales	10,00,000
Less: Variable cost	<u>6,00,000</u>
Contribution	4,00,000
Less: Fixed cost	<u>3,00,000</u>
Profit	<u>1,00,000</u>

a) P/V Ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{400000}{1000000} \times 100 = 40\%$

b) B.E.P. = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{300000}{40\%} = \frac{300000}{40} \times 100 = \text{Rs.}750000$

c) Profit

$$\begin{aligned}
 \text{Sales} &= 12,00,000 \\
 \text{P/V Ratio} &= 40\% \\
 \text{Contribution} &= \text{Sales} \times \text{P/V Ratio} \\
 &= 12,00,000 \times 40/100 = 4,80,000 \\
 \text{Contribution} &= \text{Fixed cost} + \text{Profit} \\
 4,80,000 &= 3,00,000 + \text{Profit} \\
 \text{Profit} &= 4,80,000 - 3,00,000 = 1,80,000
 \end{aligned}$$

d) Sales required to earn a profit of Rs.2,00,000

$$\begin{aligned}
 &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}} \\
 &= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}} \\
 &= \frac{3,00,000 + 2,00,000}{40} \times 100 = \text{Rs.12,50,000}
 \end{aligned}$$

Illustration: 7

Comment on the relative profitability of the following two products if the output is limiting factor.

	Product A Rs.	Product B Rs.
Materials	200	150
Wages	100	200
Fixed Overheads	350	100
Variable Overheads	150	200
Profit	200	350
Selling Price	1000	1000
Output per week	200 Units	100 Units

Solution

Comparative Statement of Profitability

	Production Cost per unit	
	Product A Rs.	Product B Rs.
Selling Price	1000	1000
Less: Variable Overheads	450	550
Contribution	550	450
Less: Fixed Cost	350	100
Profit	200	350
Total Profit	40000	35000

Comment: When output is Limiting Factor, Product A is profitable because Product B gives more contribution per unit of output.

Illustration: 8

The following information in respect of Product A and Product B of a firm is given:

	Product A	Product B
Selling Price	75	48
Direct Materials	30	30
Direct Labour Hours (Re.0.50 per hour)	15 Hours	2 Hours
Variable overhead	100% of Direct Wages	
Fixed Overhead	Rs.3000	

Show the profitability of products during labour shortage.

Solution

	Product A Rs.		Product B Rs.	
Sales		75.00		48.00
Less: Marginal Cost	--		---	
Direct Materials	30.00		30.00	
Direct Wages	7.50		1.00	
Variable Overhead	7.50	45.00	1.00	32.00
Contribution		30.00		16.00

$$\text{Profitability} = \frac{\text{Contribution}}{\text{Key Factor}} = \frac{\text{Contribution}}{\text{Labour Hours}}$$

$$\text{Product A} = \frac{\text{Rs.30}}{15 \text{ Hours}} = \text{Rs.2 per hour}$$

$$= \frac{\text{Rs.16}}{2 \text{ Hours}} = \text{Rs.8 per hour}$$

Product B is preferable during labour shortage.

UNIT IV

Inter Firm Comparison (IFC)

Meaning

Inter-firm comparison means a comparison of two or more similar business units with the objective of finding the competitive position to improve the profitability and productivity of those business units. It is a tool used by the management of a company to compare its operating performance and financial results with those of similar companies engaged in the same industry.

The method by which one firm is compared with other firms particularly when technology, product characteristics, production method and general operating conditions are same in the same industry, the same is known as inter-firm comparison. It would be more significant and meaningful if the performances of the firms are compared with that of the others, belonging to the same group, for a year or for a few years. It is a technique by which one can evaluate the performances, efficiencies, profits and costs of a company with other companies in the industry.

Inter-firm comparison may be made not in the form of absolute figures but in the form of various ratios, usually the figures relate to cost accounting liquidity and profitability as well.

According to Centre for Inter-firm Comparison, established by the British Institute of Management, Inter firm Comparison is concerned with the industrial firm, its success and the part played by the management in achieving it. The end product of a properly conducted inter firm comparison is not a statistical survey but the flash of insight in the mind of meaning director of the firm which has taken part in such an exercise. The results of this give him an instant and vivid picture of how his firm's profitability, its costs, its stock turnover, and other key factors affecting the success of a business compares with other firms in his industry.

Purpose:

The main purpose of inter-firm comparison is to compare the efficiency of one firm with that of other belonging to the same group of industry and helps the management to locate the problems or reasons for such inefficiency and to take the corrective measures for its improvement.

Types of Inter-Firm Comparison

The following are the three main types of Inter-Firm Comparison.

1. Management Ratios
2. Cost Ratios
3. Technical Data.

1. Management Ratios:

The management ratios are those which are linked to sales, profits and assets of a business. These ratios are meant to provide management in a nutshell, a comparative picture of its operating performance, financial result, growth, liquidity etc. compared with those of other firms in the industry or trade. These ratios are worked out on the basis of figures supplied by each member. In the pyramid of ratios the apex ratio is profit related to the capital employed, which takes into account the various factors affecting the business. The ratios worked out are useful to the management to the extent that the comparison reflects the earning capacity, return on capital employed, earnings on fixed assets, liquidity, growth etc. of the business. On the basis of this information, it can act for future improvement.

2. Cost Ratios:

If the management may not be satisfied with the ratios calculated, they would like to go a step further to make inter-firm comparison more meaningful and to find out how they are doing in relation to others as regards the cost of production. As competition becomes keener, cost ratios will assume greater importance for the simple reason that cost reduction becomes a compelling necessity. The members of the Association will, under this type of inter-firm comparison, have to disclose much more information than they will be required to do in case of the advantages of cost ratios comparison will be more marked in the areas where cost reduction is visualised.

3. Technical Data:

This type of comparison will be of special interest to industries working in highly competitive economies. Such comparison will gradually lead to rationalisation of industry. It is visualised that technical comparison will be in the realm of quality of

materials used, their utilisation, process involved, machinery used, and certain other technical aspects of production

Objects of Inter Firm Comparison:

The meaning of IFC can be easily explained by considering the main object of the system. The main purpose of IFC is improvement of efficiency by showing the management of participating firm its present achievements and possible weaknesses. These firms have to contribute their data to the central body which acts as a neutral body. This central body ensures confidence and it gives report regarding comparisons only to participants.

The following are important objectives of inter-firm comparison:

1. IFC analyses costs of different firms with a view to spot out relative efficiency.
2. IFC provides aid to management in enforcing and reviewing budgetary control and standard costing. These techniques enforced in one firm are compared with those in other firms making more efficient use of the same. Inadequacies of standard costing and budgetary control are located by making inter-firm comparisons and remedial measures are introduced.
3. IFC helps to prepare a comprehensive and detailed plan for firms or units to obtain optimum use of human and material resources.
4. The main objection of IFC is the improvement of efficiency and identification of weak points. IFC is a scheme consisting of exchange of information with regard to cost, profit, productivity and efficiency between the participating firms through a central organisation. IFC focuses the remedial measure of a number of problems related to profit, sales and production.

Advantages of Inter-Firm Comparison:

The following are the advantages of inter-firm comparison:

1. Under IFC the weakness of participating firms are revealed and the management will be guided to remedial actions.

2. The firm will come to know the trend of sales, profit and cost of an industry or trade as shown by different ratios. If all firms are suffering from falling sales, it will be indicated by sales to capital or asset employed ratio. When an individual firm compares its own ratio with the ratio of the group, it will see that there are general reduction sales.
3. Management of participating firm are provided with most significant facts on the basis of ratios carefully selected by the central body. The firm will have to do only the study of the ratios and the necessary action.
4. Whether firm is doing better or worse than other firms is made known through the ratios. The firm can take positive steps to improve efficiency.
5. The experience of the central body is at the disposal of participating firms. This knowledge can be very valuable in the analysis of performance and profitability of the firm.
6. Participating firm provide information willingly knowing that this remains confidential.
7. IFC develops cost consciousness among participating firm.
8. IFC leads to avoidance of unfair competition. It guides in the direction of proper and positive efforts towards improvement of performances.
9. Inter-firm comparisons and related data help in representing the problem of the industry to regulating authorities and the Government in an effective and convincing matter. Information regarding entire industry can be presented before the Government and not the isolated problem of individual firm.
10. Collective information provided under IFC can help the industry in its negotiations with trade unions.

Limitations of Inter-Firm Comparison:

The following are the advantages of inter-firm comparison:

1. It is very difficult to maintain the secrecy of the firm since the data are presented to its members.
2. It is not always possible to make a proper comparison between the two firms as identical position is hardly possible in the real world situation. Thus, it is not always effective.
3. Suitable basis for comparison may not be available.

4. In the absence of any proper cost accounting system, the data so collected and presented cannot produce any reliable information for the purpose of making proper comparison. Thus, it will become fruitful only when both the firms maintain good costing system.
5. Sometimes the member firms do not prefer to disclose their data about the financial and operational performances.
6. Middle management is usually not convinced with the utility of such a comparison.
7. It is obvious that inter-firm comparison is useful in improving productivity, efficiency and profitability.
8. It will be useful only when ratios are properly calculated and impartially used. The limitations of ratio analysis should be taken into consideration. It should be noted that a single ratio is of a limited value and their trend is most important.
9. The limitation of uniform costing should also be taken into consideration because uniform costing provides the very basis of inter-firm comparison
10. It should also not be ignored that certain extraneous factors such as prolonged strike, power shortage may also adversely affect the performance of the industry in a particular period.
11. Limitations and short comings of annual returns and data may also affect the reliability of conclusions.

Requisites of Inter-Firm Comparison System

The following requisites should be considered while installing a system of inter-firm comparison:–

1. **Centre for Inter-Comparison:** For collection and analysing data received from member units, for doing a comparative study and for dissemination of the results of study a Central body is necessary. The functions of such a body may be :–
 - a. Collection of data and information from its members;
 - b. Dissemination of results to its members;
 - c. Undertaking research and development for common and individual benefit of its members;
 - d. Organising training programmes and publishing magazines.

2. **Membership:** Another requirement for the success of inter-firm comparison is that the firms of different sizes should become members of the Centre entrusted with the task of carrying out inter-firm comparison.
3. **Nature of information to be collected:** Although there is no limit to information, yet the following information useful to the management is in general collected by the Centre for inter-firm comparison.
 - a. Information regarding costs and cost structures.
 - b. Raw material consumption.
 - c. Stock of raw material, wastage of materials, etc.
 - d. Labour efficiency and labour utilisation.
 - e. Machine utilisation and machine efficiency.
 - f. Capital employed and Return on capital.
 - g. Liquidity of the organisation.
 - h. Reserve and appropriation of profit.
 - i. Creditors and debtors.
 - j. Methods of production and technical aspects.
4. **Method of Collection and presentation of information:** The Centre collects information at fixed intervals in a prescribed form from its members. Sometimes a questionnaire is sent to each member; the replies of the questionnaire received by the Centre constitute the information/data. The information supplied by firms is generally in the form of ratios and not in absolute figures. The information collected as above is stored and presented to its members in the form of a report. Such reports are not made available to non-members.

Ratio Analysis

Meaning of Ratio

The relationship between two figures or variables expressed mathematically is called a Ratio. The relationship between two figures may be a numerical or quantitative. It is calculated by dividing one by another. It can be expressed as simple fraction, integer, decimal fraction or percentage.

Definition:

According to James C. Van Horne, ;“Ratio is a yardstick used to evaluate the financial condition and performance of a firm, relating to two pieces of financial data to each other”.

According to H.G.Guthmann, “Ratio is the relationship or proportion that one amount bears to another, the first number being the numerator and the later denominator”.

According to Kohler“The relation of one amount, a to abother b, expressed as the ratio of a to b”.

Ratio Analysis - Meaning

A ratio analysis is a quantitative analysis of information contained in a company’s financial statements. Ratio analysis is based on line items in financial statements like the balance sheet, income statement and cash flow statement; the ratios of one item – or a combination of items - to another item or combination are then calculated. Ratio analysis is used to evaluate various aspects of a company’s operating and financial performance such as its efficiency, liquidity, profitability and solvency. The trend of these ratios over time is studied to check whether they are improving or deteriorating. Ratios are also compared across different companies in the same sector to see how they stack up, and to get an idea of comparative valuations. Ratio analysis is a cornerstone of fundamental analysis.

Ratio Analysis as a tool possesses several important features. The data, which are provided by financial statements, are readily available. The computation of ratios facilitates the comparison of firms which differ in size. Ratios can be used to compare a firm's financial performance with industry averages. In addition, ratios can be used in a form of trend analysis to identify areas where performance has improved or deteriorated over time.

Advantages of Ratio Analysis

The following are the advantages of Ratio Analysis:

1. Ratio analysis summarizes and simplifies the accounting data.
2. It acts as an index of the efficiency of the business.
3. It evaluates the firm’s performance over a period by comparing present and past ratio.

4. It helps the management to prepare budgets, formulate policies and prepare future plan of action.
5. It points out the liquidity position to meet its short term obligations and long term solvency.
6. It provides inter firm comparison which reveals the strong firms and weak firms. It helps the management to take corrective action.
7. It facilitates intra firm comparison, which shows the performance of different divisions of the firm.
8. It is an effective means of communication, since ratios have power to speak.
9. It can assess the liquidity, solvency and profitability of the business which identifies the capabilities of business.

Limitations of Ratio Analysis

The following are the advantages of Ratio Analysis:

1. Ratios are tools of quantitative analysis, which ignore qualitative points of view.
2. Ratios are generally distorted by inflation.
3. Ratios give false result, if they are calculated from incorrect accounting data.

4. Ratios are calculated on the basis of past data. Therefore, they do not provide complete information for future forecasting.
5. Ratios may be misleading, if they are based on false or window-dressed accounting information.

Classification of Accounting Ratios

Accounting ratios can be classified from different point of view. Ratios may be used to evaluate the company's liquidity, efficiency, leverage and profitability. The ratios may be classified as following.

1. Balance Sheet Ratios or Financial Ratios

- a. Current Ratio
- b. Quick Ratio
- c. Proprietary Ratio
- d. Debt-Equity Ratio
- e. Capital Gearing Ratio

2. Profit and Loss Account Ratios or Profitability Ratios

- f. Gross Profit Ratio
- g. Net Profit Ratio
- h. Operating Ratio
- i. Return on Investment Ratio

3. Turnover Ratios or Inter-Statement Ratios

- j. Fixed Assets Turnover Ratio
- k. Debtors Turnover Ratio
- l. Creditors Turnover Ratio
- m. Total Assets Turnover Ratio
- n. Stock Turnover Ratio

a. Current Ratio:

Current Ratio is the most common ratio for measuring the liquidity. Current ratio is a liquidity ratio that measures whether or not a firm has enough resources to meet its short-term obligations. It compares a firm's current assets to its current liabilities, and is expressed as follows:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The current ratio is an indication of a firm's liquidity. Acceptable current ratios vary from industry to industry. In many cases a creditor would consider a high current ratio to be better than a low current ratio, because a high current ratio indicates that the company is more likely to pay the creditor back. Large current ratios are not always a good sign for investors. If the company's current ratio is too high it may indicate that the company is not efficiently using its current assets or its short-term financing facilities. The ideal ratio is 2:1

If current liabilities exceed current assets the current ratio will be less than 1. A current ratio of less than 1 indicates that the company may have problems meeting its short-term obligations. Some types of businesses can operate with a current ratio of less than one however. If inventory turns into cash much more rapidly than the accounts payable become due, then the firm's current ratio can comfortably remain less than one. Inventory is valued at the cost of acquiring it and the firm intends to sell the inventory for more than this cost. The sale will therefore generate substantially more cash than the value of inventory on the balance sheet. Low current ratios can also be justified for businesses that can collect cash from customers long before they need to pay their suppliers.

b. Quick Ratio or Liquid Ratio:

The **Acid-Test** or **Quick Ratio** or **Liquidity Ratio** measures the ability of a company to use its *near cash* or quick assets to extinguish or retire its liabilities immediately. Quick assets include those current assets that presumably can be quickly converted to cash at close to their book values. It is the ratio between quick or liquid assets and current liabilities.

$$\text{Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Liquid Liabilities}} \quad \text{Or} \quad \frac{\text{Liquid Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Liquid Assets} &= \text{Current Assets} - (\text{Stock and Prepaid Expenses}) \\ \text{Liquid Liabilities} &= \text{Current Liabilities} - \text{Bank Overdraft} \end{aligned}$$

A normal liquid ratio is considered to be 1:1. A company with a quick ratio of less than 1 cannot currently fully pay back its current liabilities. This ratio is considered to be much better and reliable as a tool for assessment of liquidity position of firms.

c. Proprietary Ratio:

This ratio establishes relationship between the shareholders funds to total tangible assets. It shows the general strength of the company. It is calculated from the following formula:

$$\text{Proprietary Ratio} = \frac{\text{Proprietors Fund}}{\text{Tangible Assets}}$$

$$\begin{aligned} \text{Proprietors Fund} &= \text{Equity Sharecapital} + \text{Preference Share capital} + \text{Reserves \& Surplus} \\ \text{Tangible Assets} &= \text{Total Assets} - \text{Goodwill \& Preliminary Expenses} \end{aligned}$$

The ideal ratio is 1:3. A ratio below 50% may be alarming for creditors, because they incur loss during winding up.

d. Debt Equity Ratio:

The Debt-Equity Ratio (D/E) is a financial ratio indicating the relative proportion of shareholders' equity and debt used to finance a company's assets. It is also known External-Internal Equity Ratio. Closely related to leveraging, the ratio is also known

as risk, gearing or leverage. The two components are often taken from the firm's balance sheet or statement of financial position (so-called book value), but the ratio may also be calculated using market values for both, if the company's debt and equity are publicly traded, or using a combination of book value for debt and market value for equity financially.

$$\text{Debt-Equity Ratio} = \frac{\text{Debt}}{\text{Equity}} \text{ or } \frac{\text{Outsiders Fund}}{\text{Shareholders Fund}} \text{ or } \frac{\text{Long term Debts}}{\text{Shareholders Fund}}$$

$$\text{Shareholders Fund} = \text{Preference Capital} + \text{Equity Capital} + \text{Reserves \& Surplus} \\ - \text{Goodwill \& Preliminary Expenses}$$

$$\text{Outsiders Fund} = \text{Current Liabilities} + \text{Debentures} + \text{Loans}$$

The ideal ratio is 2:1. High ratio shows that the claims of creditors are greater than the owners. A low ratio implies, a greater claim of owners than creditors.

e. Capital Gearing Ratio:

It is the ratio between the capital plus reserves i.e. equity and fixed cost bearing securities. Fixed cost bearing securities include debentures, long term mortgage loans etc.

In a company form of organization, real risk is borne by equity shareholders because they are entitled to whatever residue is left after all others have been paid at the contracted rate.

This ratio measures the extent of capitalization by the funds raised by the issue of fixed cost securities. This ratio is interpreted by the use of two terms. Highly geared mean lower proportion of equity. Low geared means high proportion of equity as compared to fixed cost bearing capital..

$$\text{Capital Gearing Ratio} = \frac{\text{Fixed interest bearing securities}}{\text{Equity share holders funds}} \\ = \frac{\text{Pref. Share capital} + \text{Fixed bearing securities}}{\text{Equity share holders funds}}$$

f. Gross Profit Ratio:

Gross Profit ratio (GP ratio) is a profitability ratio that shows the relationship between gross profit and total net sales revenue. Net sales means sales minus sales returns. It is a popular tool to evaluate the operational performance of the business. The ratio is computed by dividing the gross profit figure by net sales. GP ratio is highly significant. It is a useful test of profitability and management efficiency. Higher ratio is better.

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

g. Net Profit Ratio:

Net Profit Ratio (NP ratio) is a popular profitability ratio that shows relationship between net profit after tax and net sales. The profit margin indicates the management's ability to operate the business successfully. It is computed by dividing the net profit (after tax) by net sales.

$$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100$$

High ratio is preferable. An increase in the ratio over the previous period indicates improvement in the operational efficiency of the business.

h. Operating Ratio:

Operating ratio (also known as **operating cost ratio** or **operating expense ratio**) is computed by dividing operating expenses of a particular period by net sales made during that period. This ratio is a complementary of net profit ratio. Like expense ratio, it is expressed in percentage.

$$\begin{aligned} \text{Operating Ratio} &= \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 \quad \text{or} \\ &= \frac{\text{Cost of goods sold} + \text{Operating expenses}}{\text{Net Sales}} \times 100 \end{aligned}$$

i. Return on Investment (ROI):

Return on Investment is also called as “Overall Profitability Ratio” or “Return on Capital Employed”. The prime objective or making investments in any business is to obtain satisfactory return on capital invested. It indicates the percentage of return on the total capital employed in the business. It shows the efficiency of the business as whole. The formula is:

$$\text{ROI} = \frac{\text{Operating Profit}}{\text{Capital Employed}} \times 100 \quad \text{or}$$
$$\text{Operating Profit} = \text{Net Profit} + \text{Interest} + \text{Taxes}$$
$$\text{Capital employed} = \text{Fixed Assets} + \text{Current Assets} - \text{Current Liabilities}$$

j. Fixed Assets Turnover Ratio:

It shows the relationship between fixed assets and sales. It indicates the extent to which the sales value is invested in fixed assets. The ratio is calculated by:

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Net Fixed Assets}}$$
$$\text{Net Fixed Assets} = \text{Value of Assets} - \text{Depreciation}$$

Higher ratio means proper utilization of fixed assets and lower ratio indicated under utilization of fixed assets.

k. Debtors Turnover Ratio:

Receivable Turnover Ratio or Debtor's Turnover Ratio is an accounting measure used to measure how effective a company is in extending credit as well as collecting debts. The receivables turnover ratio is an activity ratio, measuring how efficiently a firm uses its assets.

$$\text{Debtors Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average Debtors} + \text{Average Bills Receivables}}$$
$$\text{Net Credit Sales} = \text{Total Sales} - (\text{Cash Sales} - \text{Sales Return})$$
$$\text{Total Debtors} = \left\{ \frac{\text{Op. Debtors} + \text{Cl. Debtors}}{2} + \frac{\text{Op. B/R} + \text{Cl. B/R}}{2} \right\}$$

A high ratio implies either that a company operates on a cash basis or that its extension of credit and collection of accounts receivable is efficient. While a low ratio implies the company is not making the timely collection of credit.

l. Creditors Turnover Ratio:

It is a ratio of net credit purchases to average trade creditors. Creditors Turnover Ratio is also known as Payables Turnover Ratio. It is on the pattern of debtors turnover ratio. It indicates the speed with which the payments are made to the trade creditors. It establishes relationship between net credit annual purchases and average accounts payables. Accounts payables include trade creditors and bills payables. Average means opening plus closing balance divided by two. In this case also accounts payables' figure should be considered at gross value i.e. before deducting provision for discount on creditors (if any).

$$\text{Creditors Turnover Ratio} = \frac{\text{Net Credit Purchases}}{\text{Average Creditors} + \text{Average Bills Payables}}$$

$$\text{Net Credit Purchases} = \text{Total Purchases} - (\text{Cash Purchases} - \text{Purchases Return})$$

$$\text{Total Debtors} = \left\{ \frac{\text{Op. Creditors} + \text{Cl. Creditors}}{2} + \frac{\text{Op. B/P} + \text{Cl. B/P}}{2} \right\}$$

The higher ratio should indicate that the payments are made promptly.

m. Total Assets Turnover Ratio:

The total asset turnover ratio compares the sales of a company to its asset base. The ratio measures the ability of an organization to efficiently produce sales, and is typically used by third parties to evaluate the operations of a business. Ideally, a company with a high total asset turnover ratio can operate with fewer assets than a less efficient competitor, and so requires less debt and equity to operate. The result should be a comparatively greater return to its shareholders.

The formula for total asset turnover is:

$$\text{Total Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Total Assets}}$$

n. Stock Turnover Ratio:

This ratio is also called Inventory Turnover Ratio. It indicates whether investment in stock is efficiently used or not. It helps the financial manager to evaluate the inventory policy. This ratio indicates the number of times finished stock is replaced during a year.

The formula is:

$$\text{Stock Turnover Ratio} = \frac{\text{Cost of Goods sold}}{\text{Average Stock}} \quad (\text{or}) \quad \frac{\text{Net Sales}}{\text{Average Stock}}$$

Cost of goods sold = Sales – Gross Profit

Illustration: 1

From the following Trading Account calculate:

i) Gross Profit Ratio and ii) Stock Turnover Ratio

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		
Total	6,60,000	Total	6,60,000

Solution

i) Gross Profit Ratio = Gross Profit/ Sales x 100
 = 201000/560000 X 100 = 35.89%

ii) Stock Turnover Ratio = Cost of Goods Sold / Average Stock
 Cost of Goods Sold = Sales – Gross Profit
 = 560000 – 201000 = 3,59,000
 Average Stock = (Opening Stock + Closing Stock) / 2
 = (100000 + 100000) /2 = 1,00,000
 = 359000/100000 = 3.59 times

Illustration: 2

Following is the Profit & Loss account of ABC Ltd. calculate

i) Net Profit Ratio, ii) Operating Ratio, iii) Office Expenses Ratio and iv) Selling Expenses Ratio

To Opening Stock	50,000	By Sales	2,50,000
To Purchases	1,25,000	By Closing Stock	25,000
To Manufacturing Exp	12,500		
To Office Exp	15,000		
To Selling Exp	12,000		
To Preliminary Exp	3,000		
To Net Profit	57,500		
Total	2,75,000	Total	2,75,000

Solution

i) Net Profit Ratio = Net Profit/ Sales x 100
= 57500/250000 X 100 = 23%

ii) Operating Ratio = $\frac{\text{Cost of Goods Sold} + \text{Operating Exp}}{\text{Sales}}$ x 100

Cost of goods sold = Op.Stock + Purchases + Manuf.Exp – Closing Stcok
= 50000 + 125000 + 12500 – 25000 = 1,62,000

Operating Expenses = Office Exp + Selling Exp
= 15000 + 12000 = 27,000

Operating Ratio = $\frac{162500 + 27000}{250000}$ x 100 = $\frac{189500}{250000}$ x 100 = 75.80%

iii) Office Expenses Ratio = Office Exp / Sales x 100
= 15000/25000 X 100 = 6%

vi) Selling Expenses Ratio = Selling Exp / Sales x 100
= 1200/25000 X 100 = 4.80%

Illustration: 3

The following is the Profit and Loss Account of Ram & Co. Ltd. for the year ended 31st March 2006.

To Opening Stock	26,000	By Sales	1,60,000
To Purchases	80,000	By Closing Stock	38,000
To Wages	24,000		
To Manufacturing Exp	16,000		
To Gross Profit	52,000		

	1,98,000		1,98,000
To Selling and Distn. Expenses	4,000	By Gross Profit	52,000
To Administrative Exp	22,800	By Compensation for Acquisition of Land	4,800
To General Exp	1,200		
To Furniture lost by Fire	800		
To Net Profit	28,000		
Total	56,800	Total	56,800

You are required to find out i) G/P Ratio, ii) N/P Ratio, iii) Operating Ratio and iv) Operating Net Profit to Net Sales Ratio.

Solution

i) Gross Profit Ratio = $\frac{\text{Gross Profit}}{\text{Sales}} \times 100$
= $\frac{52000}{160000} \times 100 = 32.50\%$

ii) Net Profit Ratio = $\frac{\text{Net Profit}}{\text{Sales}} \times 100$
= $\frac{28000}{160000} \times 100 = 17\%$

iii) Operating Ratio = $\frac{\text{Cost of Goods Sold} + \text{Operating Exp}}{\text{Sales}} \times 100$

Cost of goods sold = Sales – Gross Profit
= 160000 - 52000 = 1,08,000

Operating Expenses = Selling & Administrative Exp + Selling Exp + General Exp
= 4000 + 22800 + 1200 = 28,000

Operating Ratio = $\frac{108000 + 28000}{160000} \times 100 = \frac{136000}{160000} \times 100 = 85\%$

vi) Operating Net Profit To Net Sales Ratio = $\frac{\text{Operating Profit}}{\text{Sales}} \times 100$
= $\frac{1200}{25000} \times 100 = 4.80\%$

Operating Profit = NP + Non Operating Exp - Non Operating Income
= 28000 + 800 – 4800 = 32,000
= $\frac{32000}{160000} \times 100 = 20\%$

Illustration: 4

The following is the Balance Sheet of Rahim Ltd

Share Capital	30,000	Fixed Assets	16,500
Creditors	8,000	Cash	1,000
Bills Payable	2,000	Bank Debts	6,000
Bank O/D	3,500	Bills Receivable	2,000
		Stock	17,500
		Prepaid Expenses	500
Total	2,75,000	Total	2,75,000

Calculate a) Current Ratio and b) Liquid Ratio

Solution:

$$\text{a) Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Current Assets = Cash + Bank Debts + B/R + Stock + Prepaid Exp
= 1000 + 6000 + 2000 + 17500 + 500 = 27,000

Current Liabilities = Creditors + B/P + Bank O/D
= 8000 + 2000 + 3500 = 13,500

$$\text{Current Ratio} = \frac{27000}{13500} = 2 : 1$$

$$\text{b) Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Liquid Liabilities}}$$

Liquid Assets = Current Assets - Stock - Prepaid Exp
= 27000 - 17500 - 500 = 9,000

Liquid Liabilities = Current Liabilities - Bank O/D
= 13,500 - 3500 = 10000

$$\text{Liquid Ratio} = \frac{9000}{10000} = 0.9 : 1$$

Illustration: 5

From the following Balance Sheet of Robert Ltd. calculate i) Current Ratio ii) Liquid Ratio iii) Proprietary Ratio iv) Debt-Equity Ratio and v) Capital Gearing Ratio

Liabilities	Rs.	Assets	Rs.
5000 Equity shares of Rs.100 Each	5,00,000	Land and Buildings	6,00,000
2000 8% Preference shares of Rs.100 each	2,00,000	Plant and Machinery	5,00,000
4000 9% Debentures of Rs.100 each	4,00,000	Stock	2,40,000
Reserves	3,00,000	Debtors	2,00,000
Creditors	1,50,000	Cash and Bank	55,000
Bank O/D	50,000	Prepaid Expenses	5,000
Total	16,00,000	Total	16,00,000

Solution:

$$\text{a) Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\begin{aligned} \text{Current Assets} &= \text{Stock} + \text{Debtors} + \text{Cash \& Bank} + \text{Prepaid Exp} \\ &= 240000 + 200000 + 55000 + 5000 = 5,00,000 \end{aligned}$$

$$\begin{aligned} \text{Current Liabilities} &= \text{Creditors} + \text{Bank O/D} \\ &= 150000 + 50000 = 2,00,000 \end{aligned}$$

$$\text{Current Ratio} = \frac{500000}{200000} = 2.5 : 1$$

$$\text{b) Liquid Ratio} = \frac{\text{Liquid Assets}}{\text{Liquid Liabilities}}$$

$$\begin{aligned} \text{Liquid Assets} &= \text{Current Assets} - \text{Stock} - \text{Prepaid Exp} \\ &= 500000 - 240000 - 5000 = 2,55,000 \end{aligned}$$

$$\begin{aligned} \text{Liquid Liabilities} &= \text{Current Liabilities} - \text{Bank O/D} \\ &= 200000 - 50000 = 150000 \end{aligned}$$

$$\text{Liquid Ratio} = \frac{255000}{150000} = 1.7 : 1$$

$$\text{c) Proprietary Ratio} = \frac{\text{Proprietors Fund}}{\text{Total Tangible Assets}}$$

$$\begin{aligned} \text{Proprietors Fund} &= \text{Equity Share capital} + \text{Pref. Share capital} + \text{Reserves \& surplus} \\ &= 500000 + 200000 + 300000 = 10,00,000 \end{aligned}$$

$$\text{Total Tangible Assets} = 16,00,000$$

$$10,00,000 / 16,00,00 = 0.6 \text{ times}$$

$$\begin{aligned} \text{d) Debt-Equity Ratio} &= \text{External Equities} / \text{Internal Equities (or)} \\ &= \text{Debt} / \text{Equity} \end{aligned}$$

$$\begin{aligned} \text{Debt} &= \text{Debentures} + \text{Current Liabilities} \\ &= 400000 + 200000 = 6,00,000 \end{aligned}$$

$$\begin{aligned} \text{Equity} &= \text{Proprietors Fund} = 10,00,000 \\ &= 6,00,000 / 10,00,000 = 0.6 : 1 \end{aligned}$$

$$\text{e) Capital Gearing Ratio} = \frac{\text{Pref. Share capital} + \text{Fixed Interest Securities}}{\text{Equity holders Fund}}$$

$$\begin{aligned} \text{Fixed Interest Securities} &= \text{Debentures} + \text{Long Term Loan} \\ &= 200000 + 400000 = 6,00,000 \end{aligned}$$

$$\begin{aligned} \text{Equity Share holders Fund} &= \text{Equity Capital} + \text{Reserves \& Surplus} \\ &= 500000 + 300000 = 8,00,000 \\ 6,00,000 / 8,00,000 &= 0.75 : 1 \end{aligned}$$

Illustration: 6

$$\begin{aligned} \text{Annual Credit Sales} &= \text{Rs. } 50,000 \\ \text{Returns Inwards} &= \text{Rs. } 5,000 \\ \text{Debtors} &= \text{Rs. } 10,000 \\ \text{Bills Receivables} &= \text{Rs. } 5,000 \end{aligned}$$

Find out Debtors Turnover Ratio

Solution:

$$\begin{aligned} \text{Debtors Turnover Ratio} &= \text{Net Credit Sales} / \text{Debtors} + \text{Bills Receivables} \\ &= 50000 - 5000 / 10000 + 5000 \\ &= 45,000 / 15,000 = 3 \text{ times} \end{aligned}$$

Illustration: 7

From the following information, calculate Creditors Turnover Ratio

$$\begin{aligned} \text{Total Purchases} &= 2,00,000 \\ \text{Cash Purchases} &= 25,000 \\ \text{Purchases Returns} &= 15,000 \\ \text{Creditors at the end} &= 30,000 \\ \text{Bills Payable at end} &= 10,000 \\ \text{Reserves for Discount on Creditors} &= 5,000 \end{aligned}$$

Solution:

Total Purchases	2,00,000
Less: Cash Purchases	<u>25,000</u>
	1,75,000
Less: Purchases Returns	<u>15,000</u>
Net Annual Purchases	<u>1,60,000</u>

$$\begin{aligned} \text{Creditors Turnover Ratio} &= \text{Net Credit Purchases} / \text{Creditors} + \text{Bills Payable} \\ &= 1,60,000 / 30,000 + 10,000 = 4 \text{ times} \end{aligned}$$

Illustration: 8

Calculate i) Current Asset ii) Liquid Assets iii) Inventory

Current Ratio	= 2.6 : 1
Liquid Ratio	= 1.5 : 1
Current Liabilities	= Rs.40,000

Solution:

i) Current Ratio	= Current Assets / Current Liabilities
2.6	= Current Assets / 40,000
Current Assets	= 2.6 x 40,000 = Rs.1,04,000
ii) Liquid Ratio	= Liquid Assets / Liquid Liabilities
1.5	= Liquid Assets / 40,000
Liquid Assets	= 1.5 x 40,000 = Rs.60,000
Liquid Assets	= Current Assets – Inventory
60,000	= 1,04,000 - Inventory
Inventory	= 1,04,000 – 60,000 = 40,000

UNIT V

Reporting for Management

Meaning and Definition of Report

The word 'Report' is derived from the Latin word '*portage*' that means 'to carry'. So 'report' is a document, which carries the information. The word report consists of two parts, viz, RE+PORT. The meaning of the word RE is 'again' or 'back' and PORT means 'to carry'. Combining these two words it means to carry the information again. It must be clear that reports are always written for any event, which has already occurred. So report is a written document, which carries the information again. Dictionary meaning of the word report is 'to convey' or to transmit as having been said.' In fact, a report is a communication from someone who has the information to someone who wants to use that information.

According to G.R. Terry, report is "a written statement based on a collection of facts, event and opinion and usually expresses a summarized and interpretative value of this information. It may deal with past accomplishments, present conditions or future developments".

In the word of Johnson and Savage, "A good business report is a communication that contains factual information, organized and presented in clear, correct and coherent language".

Simply, report can be defined as "a form of statement which presents and examines facts relating to an event, problem, progress of action, state of business affairs etc, and for the purpose of conveying information, reporting findings, putting forward ideas and making recommendations as the basis of action".

Reporting to Management – Meaning

The reporting to management is a process of providing information to various levels of management so as to enable in judging the effectiveness of their responsibility centres and become a base for taking corrective measures, if necessary. The reporting to management can also be called as management reporting or internal reporting.

The process of providing information to the management is known as 'Management Reporting'. The reports are regularly sent to various levels of management so as to enable in judging the effectiveness of their responsibility centers. These reports also become a base for taking corrective measures, if necessary. According to Anthony and Reece, "Reports on what has happened in a business, are useful for two general purposes: information and control, respectively". Information reports are useful to tell management what is going on. On the other hand, control reports are useful in assessing personal performance and economic performance. Reporting is not equivalent to communication. Communication is both downward and upward i.e. decisions are communicated to lower levels and reactions of lower levels are communicated to top-level management. The reports are prepared by the management accountant and sent for the review of top-level management. The communication of reports may be oral, written or graphic. The reports may be sent weekly, monthly, quarterly or yearly. The timing of reports is linked with their nature. The sales and production reports may be weekly, whereas profitability reports may be annually.

Definition of Reporting to Management

According to S.N.Maheshwari, " Reporting to Management can be defined as an organized method of providing each manager with all the data and only those data which he needs for his decisions, when he needs them and in a form which aids his understanding and stimulates his action".

Objectives or Purpose of Reporting to Management

The following are main objectives of Reporting to Management:

1. **Means of Communication:** A report is used as a means of upward communication. A report is prepared and submitted to someone who needs that information for carrying out functions of management.
2. **Satisfy Interested Parties:** The interested parties of management report are top management executives, government agencies, shareholders, creditors, customers and

general public. Different types of management reports are prepared to satisfy above mentioned interested parties.

- 3.
4. **Serve as a Record:** Reports provide valuable and important records for reference in the future. As the facts and investigations are recorded with utmost care, they become a rich source of information for the future.
5. **Legal Requirements:** Some reports are prepared to satisfy the legal requirements. The annual reports of company accounts are prepared to furnish the same to the shareholders of the company under Companies Act 1946. Likewise, audit report of the company accounts is submitted before the income tax authorities under Income Tax Act 1961.
6. **Develop Public Relations:** Reports of general progress of business and utilization of national resources are prepared and presented before the public. It is useful for increasing the goodwill of the company and developing public relations.
7. **Basis to Measure Performance:** The performance of each employee is prepared in a report form. In some cases, group or department performance is prepared in a report form. The individual performance report is used for promotion and incentives. The group performance report is used for giving bonus.
8. **Control:** Reports are the basis of control process. On the basis of reports, actions are initiated and instructions are given to improve the performance.

Methods of Reporting

Reports may be presented in a number of ways. The method of reporting may depend upon the nature of information to be conveyed, the volume of data or information to be the media available for communications. Following methods of reporting may be used:

1. Written Reporting

A number of written reports may be sent to different levels of management. These reports may be:

(i) **Formal financial statements:** Such statements may deal with actual figures against the budgeted ones or comparative accounting statement giving information at different period of time.

(ii) **Tabulated information:** The tabulated statistics, which include analysis according to products, time, territories etc. A particular type of information, for examples sales, may be tabulated as per different periods, products, areas etc.

(iii) **Accounting Ratios:** Accounting ratios may be presented as a part of formal financial statements. The ratios are useful in appropriate analysis of financial statements. The ratios may be current ratios, efficiency ratios, long-term solvency ratios, profitability ratios, etc.

2. Graphic Reporting

The reports may be presented in the form of charts, diagrams and pictures. These reports have the advantage of quick grasp of trends of information presented. A look at the chart of diagram may enable the reader to have an idea about the information.

3. Oral Reporting

Oral reporting may be of: a) Group meetings, b) Conversation with individuals. Oral reporting is helpful only to a limited extent. It cannot form a part of important managerial decision making. For that purpose the reports must be in writing so that these may be referred in future discussions too. A combination of written, graphic and oral reporting may be useful for the concern.

Requisites of a Good Report

A report is vehicle carrying information to those who need it. A report is prepared by putting in labour by the executives. The usefulness of the report will depend upon its quality and the way in which it has been communicated. A report should be prepared in a way it serves the purpose and presented at a time when it is needed. Good reporting is thus essential for effective communication. A good report should have the following requisites:

1. Good form and content: The following points must be taken into account while preparing a report:

(i) The report should be given a proper title, headings, sub headings and paragraph divisions. The title will explain the purpose for which the report has been prepared the title also enables to point out the persons who need the report. A production report may be titled as ‘Production Report for the Month of April 1992’. The title explains the purpose and period of preparing the report.

(ii) If statistical figures are to be given in the report then only significant figures and totals should be made a part of it and other detailed figures should be given in appendix.

(iii) The reports should contain facts and not opinions. The opinion may come, if essential, as a sequel to certain facts and not otherwise.

(iv) The report must contain the date of its preparation and date of submission.

(v) If the report is prepared in response to a request or letter then it should bear reference number of such request or letter.

(vi) The contents of a report must serve the purpose for which it has been prepared. Separate reports should be prepared for different subjects. Various aspects of the subject should be properly conveyed.

(vii) The contents of the report should be in a logical sequence.

2. Simplicity: The report should be presented in a simple, unambiguous and clear language. The language should be non-technical. If the report is loaded with technical terminology, it will reduce its utility because the reader may be unfamiliar with that language. The reader should be able to understand report without any difficulty. The report should also be readable. The figures should be rounded so as to make them easily

understandable. If possible, chart, diagrams or graphs should be used for presenting information.

3. Promptness: Promptness in submitting a report is an essential element of a good report. The reports should be sent at the earliest. These are required for studying the progress and performance of various departments. A considerable delay in the occurrence of an event and reporting of the same will defeat the purpose of reporting. Information declared is information denied. The quick supply of reports will enable the management to take corrective measures at the earliest. The reports are to be based on information; the promptness in reporting will depend on quick collections of facts and figures. Following steps may help in quick reporting.

(i) A proper record-keeping system should be introduced in the organisation to meet various information needs.

(ii) To avoid clerical errors, mechanized accounting should be used.

(iii) The accounting work should be centralized to avoid bottlenecks in collecting information.

4. Relevancy: The reports should be presented only to the persons who need them. They should be marked to relevant officials. Sometimes reports are sent to various departments in a routine way, then it will involve unnecessary expenditure and the reports will not remain secret. The persons or departments to whom the report is to be sent must be clear to the sender. People do not give much attention to reports coming in a routine way. So, this type of practice involves unavoidable expenditure and reduces the importance of reports.

5. Consistency: There should be a consistency in the preparation of reports. The comparability of reports will be possible only if they are consistent. For consistency, the reports should be prepared from the same type of information and statistical data. This will be possible if same accounting principles and concepts are used for collecting, classifying, tabulating and presenting of information. Consistency in reporting enhances their utility.

6. Accuracy: The reports should be reasonably accurate. Statistical reports may sometimes be approximated to make them easily understandable. The production of figures accurate up to paise may be difficult to be remembered, their reasonable approximation may make them readable and understandable. The degree of accuracy depends upon the nature of information and the purpose of its collection. The approximation should not be done up to the level where information loses its form and utility. So accuracy should be used to enhance the use of reports.

7. Controllability: The reports should be addressed to appropriate persons in respective responsibility centres. The reports should give details of variances, which are related to that centre. This will help in taking corrective measures at appropriate levels. The variances which are not controllable at a particular responsibly centre may also be mentioned separately in the report.

8. Cost Consideration: The cost of preparing and presenting the report should also be considered. This cost should not be more than the benefits expected from such reports. The cost should be reasonable so that all types of concerns may use reporting. The cost-benefit analysis will help in deciding about the adopting of reporting system.

9. Comparability: The reporting system is meant to help management in taking correct decision and improving the operational efficiency of the organization. This objective will better be achieved if reports give comparative information. The comparative information can be in relation to previous period, current standards, or budgets. This information helps in finding out deviations or variances. Where performance is below standards or expectations, such variances can be highlighted in the reports. The 'management by exception' is possible when exceptional information will be supplied to the management. The comparative reporting will, at once, help the reader to reach at conclusions about his performance of the responsibility o centre mentioned in the report.

10. Frequency of Report: Along with promptness, the frequency of reporting is also significant. The reports should be sent regularly when they are required. The timing of

reporting will depend upon the nature of information and its purpose. Some reports may be sent daily, some weekly, some monthly and so on. Frequency of reports means that these should be sent when required. The reports are prepared at appropriate times and sent to appropriate persons as per their requirements.

Kinds or Types of Reports

The reports may be classified into the following categories:

I. According to Object and Purpose

Reporting based on objectives and purpose has been further grouped into the following:

(1) External Reports: The reports meant for persons outside the business are known as external reports. Outsiders interested in company reports may be shareholders, creditors or bankers. Though the company may not be answerable to outsiders but still some reports are meant for outside public. The company publishes income Statement and Balance Sheet at the end of every financial year and these statements are filed with the Registrar of Companies and stock Exchanges. Final statements of accounts are expected to conform to certain basic details. In India, Companies Act has made it compulsory to disclose some minimum information in final accounts.

(2) Internal Reports. Internal reports refer to those reports, which are meant for different levels of management. Internal reports are not public documents and they are not expected to conform to any standards. These reports are prepared by keeping in view the needs of disposal for scanning them. These reports may be meant for top level, middle level and lower level of management. The frequency of these reports vary in accordance with the purpose they serve. Some of the internal reports that are commonly used are: period report about profit or loss and financial position, statement of cash flow and changes in, working capital, report about cost of production, production trends and utilisation of capacity, labour turnover reports, material utilisation reports, periodic reports on sales, credit collection period and selling and distribution expenses, report on stock position, etc.

II. According To Nature

According to nature, reports are divided into three categories:

(1) Enterprise Reports: These reports are prepared for the concern as a whole. These reports serve as a channel of communication with outsiders. Enterprise reports may concern all activities of the enterprise or may be related to different activities. Enterprise reports may include balance sheet, income statement, income tax returns, employment reports, chairman's report, etc. These reports contain standardised information and are beneficial to outsiders. The interpretation of financial statements can also be undertaken from these reports. The reports are important from financial analysis point of view.

(2) Control Reports: Control reports deal with two aspects. One aspect relates to the personal performance and the second aspect deals with the economic performance. The first type of reports is reported to judge the performance of managers and heads of responsibility centres with that performance should have been under the prevailing circumstances. The reasons for deviations in performance are also identified. The second type of reports shows how well the responsibility centre has fared as an economic entity. Such analysis is made periodically. This type of analysis requires the use of full cost accounting rather than responsibility accounting. Control reports should consider the following:

- (i) Control reports should be related to personal responsibility.
- (ii) They should compare actual performance with the standards.
- (iii) They should highlight significant information.
- (iv) These reports should be sent at a proper time as to enable taking corrective measures.

(3) Investigative Reports: These reports are linked with control reports. In case some serious problem arises then the causes of this situation are studied and analysed. Investigative reports are based on the outcome of special solution studies. These reports are intermittent and are prepared only when a situation arises. They are prepared according to the nature of every situation. They are helpful to the management in analysing the cause of some problems.

III. According To Period

According to period the reports may be:

(1) Routine Reports: These reports are prepared about day-to-day working of the concern. They are periodically sent to various levels of management. These reports may differ according to the nature of information and details to be reported. So far as the timing is concerned they may be sent daily, weekly monthly, or quarterly. Routine reports may relate to sales information, production figures, capital expenditure, purchases of raw materials, market trends, labour situations, etc. There is a tendency to ignore routine reports by all recipients because of their routine nature. Important information in the report should be highlighted or presented in a different way or may be written in a different ink.

(2) Special Reports. The management may confront some difficulties and routine reports may not give sufficient information to tackle these situations. Under such circumstances, special reports are required for special purposes only, which are known as 'Special reports'. These reports are prepared according to the need of the situation. Available accounting information may not be sufficient, so data may have to be especially collected. There may be a need to put extra staff for compiling these reports. It may also involve co-ordination of different departments and different levels of management. According to J. Batty, special reports should be divided into sections, each covering the main purposes: reasons for the report; investigation made; finding a conclusion and recommendations. Special reports may deal with the following topics:

- a. Information about market analysis and methods of distribution of competitors.
- b. Technological change in the industry.
- c. Problems about the purchase of raw materials, etc.
- d. Reports about the change in methods of production and their implications.
- e. Trade association matters.
- f. Report by the secretary on company matters.
- g. Political development at home and abroad having impact on business.

IV. According To Functions

According to function, the reports may be divided into two categories:

(1) Operating Reports: These reports provided information about operations of the concern. The operating reports may consist of the following:

(i) Control Reports. These reports are used for managerial control. They are intended to spot deviations from budgeted performance without loss of time so that corrective action can be taken. Control reports are also used to assess the performance of individuals.

(ii) Information Reports. These reports are prepared to provide useful information, which will enable planning and policy formation for future. Information reports can take the form of trend reports and analytical reports. Trend reports provide information in comparative form over a period of time. Graphic representations can be effectively used in trend reports. As opposed to trend reports, analytical reports provide information in a classified manner about composition of certain results so that one can identify specific factors in the overall total.

(2) Financial Reports: These reports provide information about the financial position of the concern on specific dates or movement of finances during a specific period. The balance sheet provides information movement of cash during a particular period. These reports can be either static or dynamic. Balance sheet and other subsidiary reports are examples of static reports: cash flow, fund flow statements and other reports showing financials position as compared to the budgeted are examples of dynamic reports.

Principles of a Good Reporting System

A good reporting system is helpful to the management in planning and controlling. Every level of management needs information relating to its activities so that effective planning may be undertaken and current activities may be controlled and necessary corrective measures may also be taken in time, if needed. Some general principles are followed for making the reporting system effective. These principles are discussed as follows:

1. **Proper flow of information:** A good reporting system should have a proper flow of information. The information should flow from the proper place to the right levels of management. The information should be sent in the right form and at a proper time so that it helps in planning and co-ordination. The frequency of reports will depend upon the nature of report, the types of data required for preparing the information and cost involved in preparing such reports. The flow of reports should be such that it does not cause delay in taking decisions. The reports should flow at regular intervals so that information needs of different managerial levels are met at a proper time. Flow of information is a continuous activity and affects all levels of the organisation. Information may flow upward, downwards or sideways within an organisation. Orders, instructions, plans etc may flow from top to bottom. Reports, grievances, suggestions etc. may flow from bottom to top, Notifications, letters; settlements, complaints may flow from outside. Information also flows sideways from one manager to another at the same level through meetings, discussions etc.

2. **Proper timing:** Since reports are used as a controlling device so they should be presented at the earliest or immediately after the happenings of an event. The time required for preparation of reports should be reduced to the minimum; for routine reports the period should be known and strictly adhered to. It will be a waste of time and effort to prepare information, which is too late to be of any use. The absence of information when needed will either mean wrong decisions or deferment of decisions on matters, which may be urgent in nature.

3. **Accurate information:** The information should be as accurate as possible. If the information supplied is inaccurate it may result in making wrong decisions. However, the degree of accuracy may differ in different reports. Sometimes, fractional information may be supplied as a guide for future policy making, so the degree of accuracy may be less. The supply of exact figures may involve a problem of understanding. Approximate figures are more understandable than accurate figures given up to a point. Accuracy should also not involve excessive cost of preparation nor should it be achieved at the

sacrifice of promptness of presentation. It will be better to have approximate figure at a proper time than delayed information prepared accurately.

4. Basis of comparison: The information supplied through reports will be more useful when it is supplied in comparison with past figures, standards set or objectives lay down. The comparison of information with past or budgeted figures enables the reader to find out trends of variations. The decision taking authority will be able to make use of comparative figures while taking a decision. Corrective measures can also be initiated to improve upon the past performance. The management accountant can make the reports more useful by giving his own interpretations to the information.

5. Reports should be clear and simple: The purpose of preparing reports is to help management in planning, co-ordinating and controlling. This purpose can be achieved only when the readers easily understand the reports. The information should be presented in a clear manner by avoiding extraneous data. Only relevant important information should become the part of a report. If supporting information cannot be avoided then it should either be given in appendix or separate chart should be attached for it. The method of presenting information should be attract the eye, and enables the reader from an opinion about the information. The graphic presentation of information will enable the reader to find out the trends and also to determine deviations more quickly than in other methods. The arrangement of presentation should be brief, clear and complete. Simplicity is a good guide for reports preparation.

6. Cost: The benefit derived from reporting system must be commensurate with the cost involved in it. Though, it is not possible to assess the benefit of this system in monetary terms, there should be an endeavour to make the system as economical as possible.

7. Evaluation of Responsibility: The reporting system should enable the evaluation of managerial responsibility. The targets are fixed for various functional departmental heads. The record of actual performance is monitored along with the standards so as to enable management to assess the performance of different individuals. So, management

reporting should be devised in a way that it helps in evaluating the work assigned to various persons.

Process of Report Writing

The process of designing and writing a report consists of three stages. These stages are as follows:

1. Deciding the Nature and Purpose of the Report

The first stage is to know the type of the report. Whether the report is statutory or non-statutory., its type shall determine the nature and shape of the report. It is also very essential to know the purpose or object of the report. The purpose shall determine the other two stages.

2. Planning Structure of the Report

There is no one-way to design the structure of the report. But following parts are common in any report.

(i) Heading: A short. Clear, meaningful and attractive heading or title is necessary for a report. Title or heading should indicate the subject matter of the report.

(ii) Address: Every report is written for some one. So it is essential to write the name of reader or readers. Report must be addressed to some person or body of persons.

(iii) Contents: It is a list of chapters of the report. The contents of the report are listed in serial order along with page numbers on which such contents are to be found. Contents should be arranged logically.

(iv) Terms of reference or introduction: It gives the reasons for writing a report. Brief description of the problem is stated. The object and scope of investigation are also given in this part.

(v) Body of the report: This part is most important and lengthy. The writer presents here the facts and data collected by him. Use of tables, graphs, and diagrams can be made here or in appendices. The analysis of data is shown in this part.

(vi) Recommendations: This part is the summary of the report and consists of conclusions and recommendations. The conclusions are made on the basis of the facts and collected data. Recommendations or suggestions are given on the basis of conclusions.

(vii) Reference and appendices: It is customary to mention, list of references and bibliography indicating the sources from where the writer has taken material for writing the report. Appendices contain diagrams, statistical tables, specimen forms etc.

(viii) Signature. The person responsible for its preparation should sign every report. The chairman should sign any report submitted by a committee. It is advisable to mention date on the report.

3. Drafting of Report

Drafting of a report is an important stage in report writing. This stage includes following considerations.

(i) Collection of data and its analysis. First step in drafting is collecting information, facts and data necessary for the purpose of the report. Data can be collected from secondary or primary sources. Data is collected by investigations, observations, and interviews or by survey etc. Collected data has to be classified tabulated, edited and analysed. The collected data has to be arranged logically and conclusions are drawn.

(ii) Format of a report. The format of a report is concerned with the layout of the report and arrangement of the data. It can be standardised for the purpose. Following is a specimen of a report form. If report is in a letter form then it has salutation and a complimentary close. If report is in memorandum form, both salutation and complimentary close may be dispensed with.

(iii) Writing of report: Report writing is an art, which can be developed by practicing report writing and by studying the reports of other writers. Reports are written for other so the needs and style preferred by the reader should be kept in mind while writing a report. The general principles of a good reporting system, which have been explained earlier, will help in writing the report.

(iv) Presentation of report. General layout of a report should be pleasing to the eye. Report may be typewritten, printed or handwritten depending on the number of copies required. Sufficient space and margin should be kept on the left hand side. Reports should be written on one side of the paper with double spacing. Pages, paras and sections should be numbered. Use of diagrams, illustrations, charts, and tables may be made and these should be numbered. If report is voluminous or is liable to constant handling it should be in bound form.